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STRUCTURES AND MATERIALS RESEARCH
Department of Civil Engineering

STUDIES OF CONCRETE FOR SAN ONOFRE NUCLEAR POWER PLANT CONTAINMENT STRUCTURES, UNITS 2 & 3

Final Report

by

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Report to

Bechtel Power Corporation
Los Angeles, California

June 1979

STRUCTURAL ENGINEERING LABORATORY
UNIVERSITY OF CALIFORNIA
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COLLEGE OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING
DIVISION OF STRUCTURAL ENGINEERING
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BERKELEY, CALIFORNIA 94720

June 19, 1979

Mr. J.D. Houchen, Project Engineer
Bechtel Power Corporation
P.O. Box 60860, Terminal Annex
Los Angeles, CA 90060

Re: Studies of Concrete for San Onofre Nuclear Power Plant Containment Structures, Units 2 & 3

Dear Mr. Houchen:

Transmitted herein is the Final Report, "Studies of Concrete for San Onofre Nuclear Power Plant Containment Structures, Units 2 & 3." This report contains concrete mix data, compressive strength, elastic properties, thermal coefficient of expansion, diffusivity, and creep for concrete stressed at the ages of 28, 180, and 365 days.

This project was performed under Service-to-Industry Account Number E.S. 7448.

Sincerely yours,

David Pirtz
Professor of Civil Engineering

I hereby certify this report to be correct and complete to the best of my knowledge.

David Pirtz

DP:sd

Enclosure

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Final Report

STUDIES OF CONCRETE FOR SAN ONOFRE

NUCLEAR POWER PLANT CONTAINMENT STRUCTURES, UNITS 2 & 3

1.0 SCOPE

The purpose of this test program is to establish the uniaxial creep and other mechanical and thermal properties of concrete mixes designed by Bechtel Power Corporation for the containment structures of the San Onofre nuclear power plant units 2 & 3 being constructed for the Southern California Edison Company. This work consists of furnishing all supervision, labor, material, equipment, and performance of all operations and incidentals necessary for the concrete material properties tests, and associated progress reports in accordance with agreement for Technical Services No. S-023-210-15, dated 8/4/77.

2.0 TEST PROGRAM

The test program comprises the evaluation of the following properties on two concrete mixes, one with 3/4 in., and other with 1 1/2-in. maximum size aggregate. Both of these mixes are designated for fc = 6000 psi @ 90 days.

2.1 Compressive strength to be determined on three 6-in. by 12-in. 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 three 6-in. by 12-in. sealed concrete specimens, stored at 73°F, at ages of 28, 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, 90, 180 and 365 days.

2.4 Diffusivity to be determined on two (total of four) 8-1/2-in. by 17-in. sealed concrete specimens, stored at 73°F, at age of 90 days.

2.5 Creep Characteristics of sealed concrete specimens to be determined at a sustained stress of 2100 psi initially applied at ages of 28, 180, and 365 days. The autogenous strains changes for specimens stressed at ages of 28 and 180 days shall be determined from sealed creep specimen that will be stressed at age one year.

Changes in autogenous strains are small after the age of one year; therefore, no corrections of autogenous strains will be applied to creep specimens stressed at one year. The creep tests shall be carried out at 73°F. Each creep test shall be conducted on a set of two 6-in. by 16-in. sealed concrete specimens.

2.6 The following related work is not included.

2.6.1 Design of concrete mixes.

2.6.2 Supply of portland cement, admixtures, and aggregate used for the test program.

2.6.3 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 33-71a	Standard Specification for Concrete Aggregates
ASTM C 39-71	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 127-68	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128-68	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 150-72	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 Capping Cylindrical Concrete Specimens
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 Methods 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 designs and materials supplied by the Bechtel Power Corporation. The mix designs are shown in Table 1.

Aggregates were prepared in accordance with ASTM C 192, Section 4.3. Bulk specific gravity and absorption were determined for the aggregates which were not initially oven dried, in accordance with ASTM C 127 and C 128 and are reported in Table 2. 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° $\pm$ 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 length of concrete in the specimen was 16-inches.

A 5/16-in. by 1-in. by 8-in. metal bar supported 3/4-in. above the top of the mold was placed diametrically across the 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 bar removed and the top of the cast iron mold sealed with Saran wrap.

The creep and thermal expansion specimens were allowed to set after casting until bleeding water was 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. The 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 relative humidity 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.

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 73°F, 100 percent RH room until one day prior to testing, at which time they were stripped, capped, and covered with Saran wrap and then placed in the 100 percent RH room. During testing the Saran wrap was left on 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 0.024 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.

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. TEST RESULTS

6.1 Mix Design Data

The mix design and data for the concrete mixes used in casting the specimens are shown in Tables 1 and 3. The mix design as given by Bechtel Power Corporation is shown in Table 1. The mix batch weights were computed using absorption of the aggregates determined at Berkeley. A "One Sacker" drum type Essick concrete mixer was used. In Table 3, the weights 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 = (Batch weight of each material, lbs.) × (Unit weight of concrete, pcy) ÷ (Total batch weight, lbs.)].

6.2 Compressive Strength and Elastic Properties

Compressive strengths were determined at the ages of 7, 28, 90, 180 and 365 days for both concrete Mix No. TC1PA (1 1/2-in. MSA) and Mix No. TC2A (3/4-in. MSA). 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 C617. Each specimen was checked for planeness. Testing procedures were in accordance with ASTM C469, Sections 4.3 through 4.7, inclusive. The testing machine and compressometer used comply with ASTM C469, Section 2. Each strength determination represents the average obtained from three 6-in. by 12-in. cylinders. At ages of 28, 180 and 365 days 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 strength, modulus of elasticity, and Poisson's ratio for sealed concrete specimens stored at 73°F and 100% R.H. are shown in Table 4.

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 at 90 days were 0.035 ft^2/hr and 0.035 ft^2/hr, for Mix No. TC1PA (1 1/2-in. M.S.A.) and Mix No. TC2A (3/4-in. M.S.A.) respectively; these values are also shown in Table 4.

Thermal diffusivity is determined by cooling 8 1/2-in. diameter by 17-in. long cylinders from 139°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 139 $\pm$ 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° $\pm$ 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 HP 2801A 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 Thermal Coefficient of Expansion

The four sealed 6-in. by 16-in. thermal coefficient of expansion specimen containing Mix No. TC1PA (1 1/2-in. M.S.A.) and Mix No. TC2A (3/4 in. M.S.A.) concrete were measured for length changes by means of a Carlson strain meter at

successive temperatures of 73°F, 40°F, 73°F, 110°F, and 73°F. Specimens were left for at least 19 hours at each temperature before the first strain reading was taken on each meter. Then, five hours later, a second reading was taken and compared to the first. If in agreement, no further reading was taken.

Thermal coefficient of expansion were determined at the ages of 28, 90, 180 and 365 days for both mixes and the results are given in Table 4. At the end of the cycling period, the specimens were stored at 73°F.

6.5 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. Class E concrete specimens containing Mix No. TC1PA (1 1/2-in. M.S.A.) concrete and Mix No. TC2A (3/4-in. M.S.A.) concrete were stressed at the nominal ages of 28, 180 and 365 days as indicated in the table below. All specimens were tested at 73 ± 3°F.

DATA ON CREEP SPECIMENS

Date Cast	Date Stressed	No. of Specimens	Age Stressed, (2100) psi days	Mix No.	Comp. Strength at Time of Test, psi	% of Ult. Strength	Maximum Size Aggregate, Inches
2-3-78	3-3-78	2	28	TC1PA	5460	38.5	1 1/2
2-1-78	3-1-78	2	28	TC2A	6050	34.7	3/4
2-3-78	8-2-78	2	180	TC1PA	6600	31.8	1 1/2
2-1-78	7-31-78	2	180	TC2A	7040	29.8	3/4
2-3-78	2-2-79	2	365	TC1PA	6950	30.2	1 1/2
2-1-78	2-1-79	2	365	TC2A	7380	28.5	3/4

Four specimens stored at 73 ± 3°F which were stressed at age of 365 days were used to determine the autogenous strains for the creep specimens stressed at ages of 28 and 180 days. For specimens stressed at 365 days the autogenous strains were assumed to be small and therefore no correction was applied.

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 60 seconds. Each loaded creep specimen's strain was read at: -1 minute (no load applied); zero time (full load applied); approximately 5 minutes; 10 minutes; two hours; six hours; 24 hours; daily for one week; weekly for one month; and twice monthly thereafter.

The complete computer calculations for determining the autogenous strains on individual sealed concrete specimens and their averages are shown in Tables 5 through 10.

AUTOGENOUS STRAINS

Table No.	Mix No.	Maximum Size of Aggregate, inches	Specimens
5 & 6	TC1PA	1 1/2	Individual
7	TC1PA	1 1/2	Average of two
8 & 9	TC2A	3/4	Individual
10	TC2A	3/4	Average of two

The complete computer calculations for determining creep strains, creep plus autogenous strains, and elastic plus creep plus autogenous strains on individual stressed sealed concrete specimens stored at 73 ± 3°F are shown in Table 11 through 22. Average autogenous strains values from Tables 7 and 10 were used in Tables 11 through 22.

CREEP, AUTOGENOUS, AND ELASTIC STRAINS - INDIVIDUAL SPECIMENS

Table No.	Mix No.	Maximum Size of Aggregate, Inches	Age Stressed at 2100 psi, days	Days Stressed
11 & 12	TC1PA	1 1/2	28	336.0
13 & 14	TC2A	3/4	28	337.0
15 & 16	TC1PA	1 1/2	180	184.0
17 & 18	TC2A	3/4	180	185.0
19 & 20	TC1PA	1 1/2	365	132.0
21 & 22	TC2A	3/4	365	133.0

Creep characteristics and autogenous strains determined from the average of two sealed concrete specimens stored at 73 ± 3°F are shown in Tables 23 through 28. Data in Tables 23 through 28 were determined by using the data in Tables 11 through 22.

CREEP, AUTOGENOUS AND ELASTIC STRAINS - AVERAGE OF TWO SPECIMENS

Table No.	Mix	Maximum Size of Aggregate, Inches	Age Stressed at 2100 psi, days	Days Stressed	Strains at end of test in millionths	
					Elastic plus Creep	Creep
23	TC1PA	1 1/2	28	336.0	1114	523
24	TC2A	3/4	28	337.0	1057	539
25	TC1PA	1 1/2	180	184.0	760	267
26	TC2A	3/4	180	185.0	744	271
27	TC1PA	1 1/2	365	132.0	668	201
28	TC2A	3/4	365	133.0	645	191

Autogenous strain values are based on zero values at time of full load. Creep strains, creep strains per psi of stress, and creep plus autogenous strain reading start within 15 seconds after full load was applied.

Creep strains, creep plus autogenous strains, and elastic plus creep are plotted on linear-linear graphs; creep strains and creep plus autogenous strains are plotted on log-log graphs. All graphs are plotted versus time for the average of two sealed-specimens stored at 73 ± 3°F in Figures 1 through 12.

PLOTS OF CREEP, CREEP PLUS AUTOGENOUS, AND ELASTIC PLUS CREEP STRAINS

Figure No.	Mix No.	Maximum Size of Aggregate, Inches	Age Stressed at 2100 psi, days	Scales	
				Strain (ordinate)	Time, days (abscissa)
1	TC1PA	1 1/2	28	Linear	Linear
2	TC2A	3/4	28	Linear	Linear
3	TC1PA	1 1/2	180	Linear	Linear
4	TC2A	3/4	180	Linear	Linear
5	TC1PA	1 1/2	365	Linear	Linear
6	TC2A	3/4	365	Linear	Linear
7	TC1PA	1 1/2	28	Log	Log
8	TC2A	3/4	28	Log	Log
9	TC1PA	1 1/2	180	Log	Log
10	TC2A	3/4	180	Log	Log
11	TC1PA	1 1/2	365	Log	Log
12	TC2A	3/4	365	Log	Log

7.0 Comments

The value of modulus of elasticity for Mix No. TC1PA of 4.60×10^6 psi at age 180 days seems to be too high. All calculations were checked and found to be correct. A value of 4.2×10^6 psi at age 180 days would have been more reasonable.

APPENDIX A

EXPLANATION OF INFORMATION AND DATA PROVIDED ON COMPUTER OUTPUTS

Heading--Identifies the type of data given on the computer output and indicates the project name, project number, specimen size, and specimen type (sealed or unsealed). (A) Autogenous strains on individual specimens; (B) Average autogenous strains of two specimens; (C) Total, elastic, and creep strains on individual specimens; and, (D) Average total, elastic, and creep strains of two specimens.

Carlson Meter Constants--As shown on computer output for individual specimens (Forms A and C):

1. Meter resistance at 0.0 degrees F: Constant used to determine temperature of the meter.
2. Temperature calibration constant - change in degrees F per ohm change in resistance of the meter: Constant used to determine temperature of the meter and also of the concrete in the center of the specimen.
3. Strain calibration constant: Change in microvolts per volt applied to bridge due to change in strain at one micro-strain.
4. Calibrated strain range: Limits in microvolts with 2.0000 volts applied to the bridge for which the calibration of the meter is linear.
5. Coefficient of thermal expansion of the meter: Constant used to reduce strain data (change in micro-strain per degree F change of the Carlson meter).

Concrete Constants—As shown on computer output for individual specimens (Forms A and C):

1. Concrete coefficient of thermal expansion - change in micro-strain per degree F change of the concrete: The value for coefficient of thermal expansion of the concrete was obtained at the University of California, Berkeley, during thermal cycling tests.
2. Strain in concrete under applied load = Meter strain ÷ (1 + SMF): Specimen-meter factor (SMF) constant was determined by comparing strains during initial loading of creep specimens and the strains during tests for modulus of elasticity on 6-in. by 12-in. concrete cylinders. Strains as determined by the Carlson meter due to stress indicated strains that are too large mainly due to meter cavity in the concrete. This correction

does not apply to temperature or autogenous strains.

Temperature Calculations--As shown on computer output for individual specimens (Forms A and C):

1. Temperature reading, volts = volt reading on test set having applied voltage of 2.0000 volts.
2. Meter resistance, ohms = [120 (1 + temperature reading, volts) ÷ (1 - temperature reading, volts)] + 0.06.
3. Temperature, degrees F = (Meter resistance, ohms - Meter resistance at 0.0 degrees F) × (Temperature calibration constant).

Strain Calculations--As shown on computer output for individual specimens (Forms A and C):

1. Strain reading, microvolts = microvolt reading on test set having applied voltage of 2.0000 volts.
2. Autogenous strains corrected for temperature change = [(Change in strain reading in microvolts ÷ 2.0000) ÷ Strain calibration constant] + [(Change in temperature in degrees F) × (Thermal expansion of the meter in micro-strain per degree F - Thermal expansion of the concrete in micro-strain per degree F)].
3. Total indicated micro-strain corrected for temperature = [(Change in strain reading in microvolts ÷ 2.0000) ÷ Strain calibration constant] + [(Change in temperature in degrees F) × (Thermal expansion of the meter in micro-strain per degree F - Thermal expansion of the concrete in micro-strain from age one day.
4. Total microstrain from age one day = Elastic plus creep plus autogenous strains in micro-strain from age one day.
   (a) Total micro-strain from age one day if concrete is not stressed = Total indicated, micro-strain.
   (b) Total micro-strain from age one day if concrete is under stress = [(Total indicated micro-strain - Autogenous strain, micro-strain - Total indicated micro-strain at beginning of loading) ÷ (1 + SMF)] + [(Autogenous strain, micro-strain) + (Total micro-strain at beginning of loading)].
5. Elastic plus creep, microstrain (concrete under stress) = (Total from age one day, micro-strain) - (Total indicated micro-strain at beginning of loading) - (Autogenous strain, micro-strain).
6. Creep, micro-strain = Elastic plus creep, micro-strain - First elastic plus creep value after specimen fully loaded.

TABLES 1 THROUGH 28

TABLE 1

SAN ONOFRE NUCLEAR POWER PLANT CONTAINMENT STRUCTURES, UNITS 2 & 3

Material:	Source:
Cement	Kaiser Cement Company, Type II
Pozzolan	Airox
Sand	Conrock (San Juan Capistrano)
3/4-in. Aggregate	Conrock
1 1/2-in. Aggregate	Conrock
WRA Admixture	Master Builders, Pozzolith 80
AEA Admixture	Darox AEA, W.R. Grace Co.

Specifications:	Mix No. TC1PA (1 1/2-in. MSA)	Mix No. TC2A (3/4-in. MSA)
Compressive Strength	6000 psi at 90 days	6000 psi at 90 days
Slump:		
Design slump	4 1/2 inches	4 inches
Target slump at placement	2 1/2 inches	3 inches
Air	4 1/2 percent	6 percent

Weights (SSD Basis) for one Cubic Yard of Concrete (as per letters from Mr. J.D. Houchen, Project Engineer, Bechtel Power Corporation, dated August 8, 1977)

Mix Number	TC1PA	TC2A
Maximum Size Aggregate	1 1/2-inch	3/4-inch
Cement, lb.	660	625
Pozzolan, lbs.	73	70
Water, lb.	308	306
Sand, lb.	1153	1147
3/4-in. Aggregate, lb.	992	1163
1 1/2-in. Aggregate, lb.	680	0
AEA, fl. oz.	7	7
WRA, fl. oz.	50	47

TABLE 2

SAN ONOFRE NUCLEAR POWER PLANT CONTAINMENT STRUCTURES, UNITS 2 & 3

BULK SPECIFIC GRAVITY AND ABSORPTION CAPACITY

Aggregate	Bulk Specific Gravity (Saturated Surface Dry)	Absorption Capacity, %
Sand, natural	2.62	1.85
3/4-in. Aggregate	2.64	1.47
1 1/2-in. Aggregate	2.66	1.19

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

TABLE 3

SAN ONOFRE NUCLEAR POWER PLANT CONTAINMENT STRUCTURES, UNITS 2 & 3

CASTING DATA

Date	February 3, 1978			February 1, 1978		
Mix No.	TC1PA (1-1/2-in. MSA)			TC2A (3/4-in. MSA)		
Specimens Cast	16 - 6 x 12-in. cylinders 6 - 6 x 16-in. creep 2 - 8 1/2 x 17-in. diffusivity cylinders 2 - 6 x 16-in. thermal expansion			16 - 6 x 12-in. cylinders 6 - 6 x 16-in. creep 2 - 8 1/2 x 17 in. diffusivity cylinders 2 - 6 x 16-in. thermal expansion		
Batch Number	1	2	Avg.	1	2	Avg.
Batch Size, ft^3	3.5	3.5	3.5	3.5	3.5	3.5
Cement, (a) pcy	668	670	669	640	644	642
Pozzolan, (a) pcy	74	74	74	72	72	72
Water, (a) pcy	312	313	313	313	315	314
Sand, (a) pcy SSD	1168	1170	1169	1174	1182	1178
3/4-in. Aggregate (a) pcy SSD	1004	1007	1006	1702	1714	1708
1 1/2-in. Aggregate (a) pcy SSD	689	690	690	----	----	----
AEA, fl. oz./cu. yd.	7.1	7.1	7.1	7.2	7.2	7.2
WRA, ft. oz./cu. yd.	51	51	51	48	48	48
Unit Weight, pcy	3915	3924	3920	3901	3927	3914
Unit Weight, pct	145.0	145.3	145.2	144.4	145.5	145.0
Slump, in.	2 1/2	2 1/4	2 1/2	3	3	3
Air, % by Volume	3.1	3.5	3.3	3	3	3
Temperature, °F	73	74	73	72	72	72
W/C+P Ratio, by wt.	0.420	0.421	0.420	0.440	0.440	0.440

(a) Weights were computed using measured unit weight of the concrete and the batch weights of each material.

TABLE 4

SAN ONOFRE NUCLEAR POWER PLANT CONTAINMENT STRUCTURES, UNITS 2 & 3

MECHANICAL AND THERMAL PROPERTIES

Property (a)	Age, days	Mix No. TC1PA (1-1/2 in. MSA)	Mix No. TC2 (3/4-in. MSA)
Compressive Strength, psi	7	4160	4180
	28	5460	6050
	90	6470	6590
	180	6600	7040
	365	6950	7380
Modulus of Elasticity, psi x 10^6 $\pm$ 0.05 x 10^6	28	3.85	4.05
	180	~~4.60~~*	4.32
	365	4.53	4.64
Poisson's Ratio	28	0.19	0.20
	180	0.21	0.20
	365	0.19	0.20
Linear Thermal Expansion, micro-strain per °F	28	5.7	5.6
	90	6.1	6.1
	180	6.5	6.3
	365	6.8	6.8
Diffusivity, $ft^2/hr.$	90	0.035	0.035

* Value too high.

(a) All specimens sealed from casting through testing.

Table 5 AUTOGENOUS STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TCIPA ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.23 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.58 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.65 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 13807 TO -21650 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.

STRAIN METER NO. : 1117 73-18
AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (90 DAY) : 6290. PSI

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	TEMP. READING, VOLTS	METER RESIST., OHMS	TEMP., DEGREES F.	STRAIN READING MICRO-VOLTS	CHANGE IN	AUTOGENOUS STRAIN--MICROSTRAIN AFTER AGE--- 1 DAY	28 DAYS	90 DAYS	180 DAYS
* 2 -3-78	1000	0	SPECIMEN CAST								
2-16-78	1442	13.2	-.37198	54.99	71.51	3242	1	0			
2-23-78	1421	20.2	-.37171	55.02	71.89	3079	-162	-8			
2-28-78	806	24.9	-.37232	54.95	71.06	3051	-190	-10			
3 -1-78	1705	26.3	-.37169	55.03	71.91	3046	-195	-10			
3 -3-78	849	28.0	-.37196	54.99	71.54	3075	-166	-9			
3 -6-78	1034	31.0	-.37203	54.98	71.44	3003	-238	-13	-4		
3-14-78	1434	39.2	-.37168	55.03	71.92	3025	-216	-12	-3		
3-15-78	1013	40.0	-.37161	55.04	72.02	3024	-217	-12	-3		
3-21-78	1528	46.2	-.37168	55.03	71.93	3030	-211	-11	-2		
3-22-78	1120	47.1	-.37181	55.01	71.75	3031	-210	-11	-2		
3-28-78	1541	53.2	-.37160	55.04	72.03	3035	-206	-11	-2		
4-10-78	1441	66.2	-.37183	55.01	71.72	3034	-207	-11	-2		
4-19-78	852	75.0	-.37177	55.02	71.80	3004	-237	-13	-4		
5 -9-78	814	94.9	-.37111	55.10	72.69	2958	-283	-15	-6	-1	
5-16-78	1111	102.0	-.37145	55.06	72.24	2918	-323	-18	-9	-4	
5-23-78	810	108.9	-.37156	55.04	72.09	2894	-347	-19	-10	-5	
5-30-78	832	115.9	-.37136	55.07	72.35	2877	-364	-20	-11	-6	
6 -6-78	1355	123.2	-.37160	55.04	72.03	2785	-456	-25	-16	-11	
6-13-78	1122	130.1	-.37169	55.03	71.90	2776	-465	-26	-17	-12	
6-20-78	806	136.9	-.37184	55.01	71.71	2769	-472	-26	-17	-12	
6-27-78	1119	144.1	-.37170	55.03	71.90	2745	-496	-28	-19	-14	
7 -4-78	1003	151.0	-.37198	54.99	71.52	2724	-517	-29	-20	-15	
7-11-78	1712	158.3	-.37162	55.04	72.00	2715	-525	-29	-20	-15	
7-18-78	1642	165.3	-.37144	55.06	72.25	2701	-540	-30	-21	-16	
7-25-78	1128	172.0	-.37182	55.01	71.73	2687	-554	-31	-22	-17	
8 -1-78	933	179.0	-.37216	54.97	71.27	2645	-596	-33	-24	-19	
8 -2-78	807	179.9	-.37203	54.98	71.45	2631	-610	-34	-25	-20	
8 -2-78	904	180.0	-.37204	54.99	71.44	2616	-625	-35	-26	-21	
8 -2-78	905	180.0	-.37204	54.99	71.44	2649	-592	-33	-24	-19	
8 -2-78	909	180.0	-.37202	54.98	71.46	2624	-617	-35	-26	-21	
8 -2-78	915	180.0	-.37202	54.99	71.46	2629	-612	-34	-25	-20	
8 -2-78	936	180.0	-.37203	54.99	71.45	2619	-622	-35	-26	-21	
8 -2-78	1105	180.0	-.37202	54.99	71.46	2619	-622	-35	-26	-21	0
8 -2-78	1303	180.1	-.37206	54.98	71.41	2616	-625	-35	-26	-21	0
8 -2-78	1501	180.2	-.37208	54.98	71.39	2619	-622	-35	-26	-21	0
8 -3-78	814	180.9	-.37221	54.96	71.21	2646	-595	-33	-24	-19	2
8 -4-78	815	181.9	-.37213	54.97	71.31	2635	-606	-34	-25	-20	1
8 -5-78	1301	183.1	-.37193	55.00	71.59	2632	-609	-34	-25	-20	1
8 -6-78	1154	184.1	-.37171	55.02	71.88	2633	-608	-34	-25	-20	1
8 -7-78	811	184.9	-.37177	55.02	71.80	2622	-619	-35	-26	-21	0
8 -8-78	807	185.9	-.37195	54.99	71.56	2658	-583	-33	-24	-19	2
8 -9-78	808	186.9	-.37199	54.99	71.50	2598	-653	-37	-28	-23	-2
8-16-78	1637	194.3	-.37194	54.99	71.57	2651	-590	-33	-24	-19	2
8-23-78	944	201.0	-.37198	54.99	71.51	2592	-659	-37	-28	-23	-2
8-30-78	930	208.0	-.37192	55.00	71.60	2615	-626	-35	-26	-21	0
9 -5-78	815	213.9	-.37206	54.98	71.41	2600	-641	-36	-27	-22	-1
10 -3-78	1435	242.2	-.37165	55.03	71.96	2590	-651	-37	-28	-23	-2
10-17-78	1636	256.3	-.37187	55.00	71.67	2622	-619	-35	-26	-21	0
11 -1-78	1540	271.2	-.37207	54.98	71.40	2672	-569	-32	-23	-18	3
11-28-78	1026	298.0	-.37271	54.90	70.54	2551	-690	-39	-30	-25	-4
12-12-78	1036	312.0	-.37295	54.87	70.21	2597	-644	-36	-27	-22	-1
12-19-78	1504	319.2	-.37288	54.87	70.30	2542	-699	-39	-30	-25	-4
1 -9-79	1414	340.2	-.37299	54.86	70.16	2514	-727	-41	-32	-27	-6
1-23-79	1437	354.2	-.37303	54.86	70.10	2491	-750	-42	-33	-28	-7
* 6-14-79	1700	496.3	END OF TEST								

Table 6 AUTOGENOUS STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TCIPA FS7449
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.43 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.77 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.68 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 5557 TO -23580 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.

STRAIN METER NO. : 1498 73-19
AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (90 DAY) : 6290. PSI

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	TEMP. READING, VOLTS	METER RESIST., OHMS	TEMP., DEGREES F.	STRAIN READING MICRO-VOLTS	CHANGE IN	AUTOGENOUS STRAIN MICROSTRAIN AFTER AGE 1 DAY	28 DAYS	90 DAYS	180 DAYS
* 2 -3-78	1000	0	SPECIMEN CAST								
2-16-78	1442	13.2	-.37128	55.08	71.61	-8160	0	0			
2-23-78	1421	20.2	-.37086	55.13	72.19	-8373	-213	-11			
2-28-78	806	24.9	-.37147	55.05	71.35	-8419	-259	-14			
3 -1-78	1705	26.3	-.37079	55.14	72.28	-8433	-273	-15			
3 -3-78	948	28.0	-.37131	55.07	71.56	-8446	-286	-15			
3 -5-78	1034	31.0	-.37143	55.06	71.40	-8459	-299	-16	-1		
3-14-78	1434	39.2	-.37111	55.10	71.84	-8435	-275	-15	0		
3-21-78	1528	46.2	-.37106	55.11	71.92	-8455	-295	-16	-1		
3-22-78	1120	47.1	-.37121	55.09	71.71	-8446	-286	-15	0		
3-28-78	1541	53.2	-.37097	55.12	72.04	-8444	-284	-15	0		
4-10-78	1441	66.2	-.37118	55.09	71.75	-8481	-321	-18	-3		
4-19-78	852	75.0	-.37114	55.10	71.80	-8496	-336	-18	-3		
5 -9-78	914	94.9	-.37049	55.18	72.69	-8531	-371	-20	-5	-1	
5-16-78	1111	102.0	-.37082	55.14	72.24	-8549	-389	-21	-6	-2	
5-23-78	810	108.9	-.37088	55.13	72.16	-8556	-396	-22	-7	-3	
5-30-78	832	115.9	-.37073	55.15	72.36	-8570	-410	-23	-8	-4	
6 -6-78	1355	123.2	-.37095	55.12	72.07	-8550	-490	-27	-12	-8	
6-13-78	1122	130.1	-.37106	55.11	71.91	-8641	-481	-27	-12	-8	
6-20-78	806	136.9	-.37116	55.09	71.78	-8625	-465	-25	-11	-7	
6-27-78	1119	144.1	-.37102	55.11	71.97	-8609	-449	-25	-10	-6	
7 -4-78	1003	151.0	-.37135	55.07	71.52	-8632	-472	-26	-11	-7	
7-11-78	1712	158.3	-.37097	55.12	72.04	-8613	-459	-25	-10	-6	
7-18-78	1642	165.3	-.37079	55.14	72.28	-8629	-469	-26	-11	-7	
7-25-78	1028	172.0	-.37122	55.09	71.69	-8631	-471	-25	-11	-7	
8 -1-78	933	179.0	-.37173	55.02	70.99	-8640	-480	-27	-12	-8	
8 -2-78	807	179.9	-.37158	55.04	71.20	-8648	-488	-27	-12	-8	
8 -2-78	904	180.0	-.37159	55.04	71.18	-8666	-506	-29	-13	-9	
8 -2-78	905	180.0	-.37159	55.04	71.18	-8641	-481	-27	-12	-8	
8 -2-78	909	180.0	-.37159	55.04	71.18	-8668	-508	-29	-13	-9	
8 -2-78	915	180.0	-.37159	55.04	71.18	-8673	-513	-29	-14	-10	
8 -2-78	936	180.0	-.37161	55.04	71.16	-8663	-503	-29	-13	-9	
8 -2-78	1105	180.0	-.37157	55.04	71.21	-8673	-513	-29	-14	-10	-1
8 -2-78	1303	180.1	-.37163	55.03	71.13	-8686	-526	-29	-14	-10	-1
8 -2-78	1501	180.2	-.37163	55.03	71.13	-8671	-511	-28	-13	-9	0
8 -3-78	814	180.9	-.37176	55.02	70.95	-8641	-481	-27	-12	-8	1
8 -4-78	816	181.9	-.37171	55.02	71.01	-8640	-480	-27	-12	-8	1
8 -5-78	1301	183.1	-.37153	55.05	71.27	-8637	-477	-26	-11	-7	2
8 -6-78	1154	184.1	-.37114	55.10	71.80	-8628	-468	-26	-11	-7	2
8 -7-78	811	184.9	-.37135	55.07	71.51	-8661	-501	-28	-13	-9	0
8 -8-78	807	185.9	-.37150	55.05	71.31	-8634	-464	-26	-11	-7	2
8 -9-78	808	186.9	-.37151	55.05	71.29	-8651	-491	-27	-12	-8	1
8-16-78	1647	194.3	-.37157	55.04	71.21	-8631	-471	-26	-11	-7	2
8-23-78	944	201.0	-.37156	55.04	71.22	-8695	-535	-30	-15	-11	-2
8-30-78	930	208.0	-.37130	55.08	71.58	-8626	-466	-26	-11	-7	2
9 -5-78	815	213.9	-.37143	55.06	71.41	-8627	-467	-26	-11	-7	2
10 -3-78	1435	242.2	-.37102	55.11	71.97	-8629	-469	-26	-11	-7	2
10-17-78	1636	256.3	-.37122	55.09	71.69	-8611	-451	-25	-10	-6	3
11 -1-78	1540	271.2	-.37145	55.06	71.38	-8601	-441	-24	-9	-5	4
11-28-78	1025	298.0	-.37211	54.97	70.47	-8633	-473	-26	-11	-7	2
12-12-78	1036	312.0	-.37232	54.95	70.18	-8596	-436	-23	-8	-4	5
12-19-78	1504	319.2	-.37226	54.95	70.26	-8658	-498	-28	-13	-9	0
1 -9-79	1414	340.2	-.37237	54.94	70.11	-8671	-511	-28	-13	-9	0
1-23-79	1437	354.2	-.37241	54.93	70.05	-8674	-514	-28	-13	-9	0
* 6-14-79	1700	496.3	END OF TEST								

Table 7 AVERAGE AUTOGENOUS STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TCIPA FS7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

SPECIMEN	METER NO.	CHANNEL	TEST TEMPERATURE : 73 DEG. F.
AUTOG.1	1117	73-19	
AUTOG.2	1498	73-19	

DATE	TIME	CONCRETE AGE, DAYS	AVG. TEMP. DEG.F.	MICROSTRAIN FROM AGE ONE DAY SPECIMEN NO.1	NO.2	AVG.	FROM AGE 28 DAYS SPECIMEN NO.1	NO.2	AVG.	FROM AGE 90 DAYS SPECIMEN NO.1	NO.2	AVG.	FROM AGE 180 DAYS SPECIMEN NO.1	NO.2	AVG.
* 2 -3-78	1000	0	SPECIMENS CAST												
2-16-78	1442	13.2	71.56 **	0	0	0 **									
2-23-78	1421	20.2	72.04 **	-8	-11	-9 **									
2-28-78	806	24.9	71.20 **	-10	-14	-12 **									
3 -1-78	1705	26.3	72.10 **	-10	-15	-12 **									
3 -3-78	848	28.0	71.55 **	-9	-15	-12 **									
3 -6-78	1034	31.0	71.42 **	-13	-16	-14 **	-4	-1	-2 **						
3-14-78	1434	39.2	71.88 **	-12	-15	-13 **	-3	0	-1 **						
3-21-78	1528	46.2	71.92 **	-11	-16	-13 **	-2	-1	-1 **						
3-22-78	1120	47.1	71.73 **	-11	-15	-13 **	-2	0	-1 **						
3-28-78	1541	53.2	72.03 **	-11	-15	-13 **	-2	0	-1 **						
4-10-78	1441	66.2	71.74 **	-11	-18	-14 **	-2	-3	-2 **						
4-19-78	852	75.0	71.80 **	-13	-18	-15 **	-4	-3	-3 **						
5 -9-78	814	94.9	72.69 **	-15	-20	-17 **	-6	-5	-5 **	-1	-1	-1 **			
5-16-78	1111	102.0	72.74 **	-18	-21	-19 **	-9	-6	-7 **	-4	-2	-3 **			
5-23-78	810	108.9	72.13 **	-19	-22	-20 **	-10	-7	-8 **	-5	-3	-4 **			
5-30-78	832	115.9	72.36 **	-20	-23	-21 **	-11	-8	-9 **	-6	-4	-5 **			
6 -6-78	1355	123.2	72.05 **	-25	-27	-26 **	-15	-12	-14 **	-11	-8	-9 **			
6-13-78	1122	130.1	71.91 **	-26	-27	-26 **	-17	-12	-14 **	-12	-8	-10 **			
6-20-78	806	136.9	71.75 **	-26	-26	-26 **	-17	-11	-14 **	-12	-7	-9 **			
6-27-78	1119	144.1	71.93 **	-28	-25	-26 **	-19	-10	-14 **	-14	-6	-10 **			
7 -4-78	1003	151.0	71.52 **	-29	-26	-27 **	-20	-11	-15 **	-15	-7	-11 **			
7-11-78	1719	158.3	72.02 **	-29	-25	-27 **	-20	-10	-15 **	-15	-6	-10 **			
7-18-78	1642	165.3	72.26 **	-30	-26	-28 **	-21	-11	-16 **	-15	-7	-11 **			
7-25-78	1028	172.0	71.71 **	-31	-26	-29 **	-22	-11	-16 **	-17	-7	-12 **			
8 -1-78	933	179.0	71.13 **	-33	-27	-30 **	-24	-12	-18 **	-19	-8	-13 **			
8 -2-78	807	179.9	71.33 **	-34	-27	-30 **	-25	-13	-18 **	-20	-8	-14 **			
8 -2-78	904	180.0	71.31 **	-35	-28	-31 **	-25	-13	-19 **	-21	-9	-15 **			
8 -2-78	905	180.0	71.31 **	-33	-27	-30 **	-24	-12	-18 **	-19	-8	-13 **			
8 -2-78	909	180.0	71.32 **	-35	-28	-31 **	-25	-13	-19 **	-21	-9	-15 **			
8 -2-78	915	180.0	71.32 **	-34	-29	-31 **	-25	-14	-19 **	-20	-10	-15 **			
8 -2-78	936	180.0	71.31 **	-35	-28	-31 **	-25	-13	-19 **	-21	-9	-15 **			
8 -2-78	1105	180.0	71.34 **	-35	-29	-32 **	-25	-14	-20 **	-21	-10	-15 **	0	-1	-0 **
8 -2-78	1303	180.1	71.27 **	-35	-29	-32 **	-26	-14	-20 **	-21	-10	-15 **	0	-1	-0 **
8 -2-78	1501	180.2	71.26 **	-35	-28	-31 **	-26	-13	-19 **	-21	-9	-15 **	0	0	0 **
8 -3-78	814	180.9	71.28 **	-33	-27	-30 **	-24	-12	-18 **	-19	-8	-13 **	2	1	1 **
8 -4-78	816	181.9	71.14 **	-34	-27	-30 **	-25	-12	-18 **	-20	-8	-14 **	1	1	1 **
8 -5-78	1301	183.1	71.43 **	-34	-26	-30 **	-25	-11	-18 **	-20	-7	-13 **	1	2	1 **
8 -6-78	1154	184.1	71.84 **	-34	-26	-30 **	-25	-11	-18 **	-20	-7	-13 **	1	2	1 **
8 -7-78	911	184.9	71.66 **	-35	-29	-31 **	-25	-13	-19 **	-21	-9	-15 **	0	0	0 **
8 -9-78	907	185.9	71.43 **	-33	-26	-29 **	-24	-11	-17 **	-19	-7	-13 **	2	2	2 **
8-16-78	1637	194.3	71.39 **	-33	-26	-29 **	-24	-11	-17 **	-19	-7	-13 **	2	2	2 **
8-23-78	944	201.0	71.37 **	-37	-30	-33 **	-29	-15	-21 **	-23	-11	-17 **	-2	-2	-2 **
8-30-78	930	208.0	71.59 **	-35	-26	-30 **	-26	-11	-18 **	-21	-7	-14 **	0	2	1 **
9 -5-78	815	213.9	71.41 **	-36	-26	-31 **	-27	-11	-19 **	-22	-7	-14 **	-1	2	0 **
10 -3-78	1435	242.2	71.96 **	-37	-26	-31 **	-28	-11	-19 **	-23	-7	-15 **	-2	2	0 **
10-17-78	1536	256.3	71.68 **	-35	-25	-30 **	-26	-10	-18 **	-21	-6	-13 **	0	3	1 **
11 -1-78	1540	271.2	71.39 **	-32	-24	-28 **	-23	-9	-16 **	-18	-5	-11 **	3	4	3 **
11-28-78	1026	298.0	70.51 **	-39	-25	-32 **	-30	-11	-20 **	-25	-7	-16 **	-4	2	-1 **
12-12-78	1036	312.0	70.20 **	-36	-23	-29 **	-27	-8	-17 **	-22	-4	-13 **	-1	5	2 **
12-19-78	1504	319.2	70.28 **	-39	-28	-33 **	-30	-13	-21 **	-25	-9	-17 **	-4	0	-2 **
1 -9-79	1414	340.2	70.13 **	-41	-28	-34 **	-32	-13	-22 **	-27	-9	-18 **	-6	0	-3 **
1-23-79	1437	354.2	70.07 **	-42	-28	-35 **	-33	-13	-23 **	-28	-9	-18 **	-7	0	-3 **

Table 8 AUTOGENOUS STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TC2A ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.44 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.49 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.86 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 8012 TO -24120 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.

STRAIN METER NO. : 1488 73-14
AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (90 DAY) : 6590. PSI

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	TEMP. READING, VOLTS	METER RESIST., OHMS	TEMP., DEGREES F.	STRAIN READING MICRO-VOLTS	CHANGE IN	AUTOGENOUS STRAIN MICROSTRAIN AFTER AGE 1 DAY	28 DAYS	90 DAYS	180 DAYS
* 2 -1-78	1000	0	SPECIMEN CAST								
2-16-78	1442	15.2	-.36996	55.25	71.41	-4304	1	0			
2-23-78	1421	22.2	-.36933	55.33	72.26	-4433	-128	-5			
2-28-78	806	26.9	-.36969	55.28	71.77	-4432	-127	-6			
3 -1-78	1705	28.3	-.36892	55.38	72.81	-4397	-92	-4	0		
3 -6-78	1034	33.0	-.36886	55.39	72.88	-4477	-172	-9	-5		
3-14-78	1434	41.2	-.36886	55.39	72.88	-4509	-204	-11	-7		
3-22-78	1120	49.1	-.36893	55.38	72.80	-4560	-255	-14	-10		
3-28-78	1541	55.2	-.36867	55.41	73.14	-4574	-269	-14	-10		
4-10-78	1441	68.2	-.36893	55.38	72.80	-4660	-355	-19	-15		
4-19-78	852	77.0	-.36882	55.39	72.94	-4677	-372	-20	-16		
5 -9-78	814	96.9	-.36829	55.46	73.65	-4802	-497	-27	-23	-3	
5-16-78	1111	104.0	-.36857	55.43	73.28	-4838	-533	-29	-25	-5	
5-23-78	810	110.9	-.36858	55.42	73.27	-4925	-620	-34	-30	-10	
5-30-78	832	117.9	-.36856	55.43	73.29	-4936	-631	-35	-31	-11	
6 -6-78	1355	125.2	-.36868	55.41	73.13	-4983	-678	-37	-33	-13	
6-13-78	1122	132.1	-.36879	55.40	72.98	-5010	-705	-39	-35	-15	
6-20-78	805	138.9	-.36881	55.39	72.96	-4995	-690	-38	-34	-14	
6-27-78	1119	146.1	-.36870	55.41	73.10	-5001	-696	-38	-34	-14	
7 -4-78	1003	153.0	-.36903	55.37	72.66	-5005	-700	-39	-35	-15	
7-11-78	1712	160.3	-.36867	55.41	73.15	-4956	-651	-36	-32	-12	
7-18-78	1642	167.3	-.36852	55.43	73.34	-4999	-694	-38	-34	-14	
7-25-78	1028	174.0	-.36890	55.38	72.83	-4986	-681	-38	-34	-14	
7-31-78	826	179.9	-.36981	55.27	71.62	-4915	-610	-33	-29	-9	
7-31-78	1055	180.0	-.36978	55.27	71.66	-4868	-563	-31	-27	-7	0
7-31-78	1056	180.0	-.36972	55.28	71.73	-4869	-564	-31	-27	-7	0
7-31-78	1058	180.0	-.36976	55.27	71.68	-4865	-560	-31	-27	-7	0
7-31-78	1105	180.0	-.36976	55.27	71.68	-4868	-563	-31	-27	-7	0
7-31-78	1112	180.0	-.36976	55.27	71.68	-4863	-558	-31	-27	-7	0
7-31-78	1300	180.1	-.36973	55.28	71.72	-4865	-560	-31	-27	-7	0
7-31-78	1655	180.3	-.36968	55.28	71.79	-4868	-563	-31	-27	-7	0
8 -1-78	933	181.0	-.36976	55.27	71.68	-4866	-561	-31	-27	-7	0
8 -2-78	807	181.9	-.36963	55.29	71.86	-4868	-563	-31	-27	-7	0
8 -3-78	821	182.9	-.36986	55.26	71.55	-4858	-553	-30	-26	-6	1
8 -4-78	816	183.9	-.36983	55.26	71.58	-4861	-556	-30	-26	-6	1
8 -5-78	1301	185.1	-.36957	55.30	71.93	-4862	-557	-30	-26	-6	1
8 -6-78	1154	186.1	-.36944	55.31	72.11	-4855	-550	-30	-26	-6	1
8 -7-78	811	186.9	-.36927	55.34	72.34	-4879	-574	-31	-27	-7	0
8 -8-78	807	187.9	-.36935	55.33	72.23	-4853	-548	-30	-26	-6	1
8-15-78	804	194.9	-.36964	55.29	71.84	-4882	-577	-32	-28	-8	-1
8-21-78	1530	201.3	-.36960	55.29	71.90	-4886	-581	-32	-28	-8	-1
8-28-78	1544	208.2	-.36937	55.32	72.21	-4938	-633	-35	-31	-11	-4
9 -5-78	815	215.9	-.36932	55.33	72.26	-4987	-682	-38	-34	-14	-7
10 -3-78	1435	244.2	-.36892	55.38	72.81	-4934	-629	-35	-31	-11	-4
10-17-78	1636	258.3	-.36932	55.33	72.27	-4954	-649	-36	-32	-12	-5
11 -1-78	1540	273.2	-.36967	55.28	71.80	-4849	-544	-30	-26	-6	1
11-28-78	1026	300.0	-.37056	55.17	70.61	-5003	-698	-38	-34	-14	-7
12-12-78	1036	314.0	-.37087	55.13	70.19	-4961	-656	-36	-32	-12	-5
12-19-78	1504	321.2	-.37093	55.12	70.11	-5045	-740	-41	-37	-17	-10
1 -9-79	1414	342.2	-.37092	55.12	70.12	-5047	-742	-41	-37	-17	-10
1-23-79	1437	356.2	-.37093	55.12	70.11	-5063	-758	-42	-38	-18	-11
1-30-79	954	363.0	-.36996	55.25	71.41	-5017	-712	-39	-35	-15	-8
* 6-14-79	1700	498.3	END OF TEST								

Table 9 AUTOGENOUS STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TC2A ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.23 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.50 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 9.03 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 14222 TO -19730 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.

STRAIN METER NO. : 1495 73-15
AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (90 DAY) : 6590. PSI

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	TEMP. READING, VOLTS	METER RESIST., OHMS	TEMP., DEGREES F.	STRAIN READING MICRO-VOLTS	CHANGE IN	AUTOGENOUS STRAIN MICROSTRAIN AFTER AGE 1 DAY	28 DAYS	90 DAYS	180 DAYS
* 2 -1-78	1000	0	SPECIMEN CAST								
2-16-78	1442	15.2	-.37121	55.09	72.00	3790	0	0			
2-23-78	1421	22.2	-.37066	55.16	72.75	3809	-181	-9			
2-28-78	806	26.9	-.37109	55.10	72.17	3641	-149	-7			
3 -1-78	1705	29.3	-.37029	55.21	73.24	3656	-134	-7	0		
3 -6-78	1034	33.0	-.37059	55.17	72.85	3633	-157	-8	-1		
3-14-78	1434	41.2	-.37061	55.16	72.81	3590	-200	-10	-3		
3-22-78	1120	49.1	-.37068	55.16	72.72	3559	-231	-12	-5		
3-28-78	1541	55.2	-.37042	55.19	73.07	3537	-253	-13	-6		
4-10-78	1441	68.2	-.37068	55.16	72.72	3499	-291	-15	-8		
4-19-78	852	77.0	-.37062	55.16	72.80	3486	-304	-16	-9		
5 -9-78	814	96.9	-.37006	55.23	73.55	3486	-304	-16	-9	0	
5-16-78	1111	104.0	-.37037	55.20	73.14	3488	-302	-16	-9	0	
5-23-78	810	110.9	-.37043	55.19	73.06	3481	-309	-16	-9	0	
5-30-78	832	117.9	-.37033	55.20	73.18	3490	-300	-16	-9	0	
6 -6-78	1355	125.2	-.37053	55.17	72.92	3490	-300	-16	-9	0	
6-13-78	1122	132.1	-.37061	55.16	72.81	3493	-297	-16	-9	0	
6-20-78	805	138.9	-.37069	55.15	72.71	3506	-284	-15	-8	1	
6-27-78	1119	146.1	-.37052	55.18	72.93	3512	-278	-14	-7	2	
7 -4-78	1003	153.0	-.37083	55.14	72.52	3500	-290	-15	-8	1	
7-11-78	1712	160.3	-.37047	55.18	73.00	3501	-289	-15	-8	1	
7-18-78	1642	167.3	-.37037	55.20	73.13	3504	-286	-15	-8	1	
7-25-78	1028	174.0	-.37075	55.15	72.62	3505	-285	-15	-8	1	
7-31-78	826	179.9	-.37116	55.09	72.08	3439	-351	-18	-11	-2	
7-31-78	1055	180.0	-.37111	55.10	72.15	3474	-316	-17	-10	-1	0
7-31-78	1056	180.0	-.37102	55.11	72.26	3481	-309	-16	-9	0	1
7-31-78	1058	180.0	-.37106	55.11	72.21	3486	-304	-16	-9	0	1
7-31-78	1105	180.0	-.37106	55.11	72.21	3474	-316	-17	-10	-1	0
7-31-78	1112	180.0	-.37106	55.11	72.21	3484	-306	-16	-9	0	1
7-31-78	1300	180.1	-.37101	55.11	72.28	3486	-304	-16	-9	0	1
7-31-78	1655	180.3	-.37096	55.12	72.35	3494	-296	-15	-8	1	2
8 -1-78	933	181.0	-.37106	55.11	72.20	3492	-298	-16	-9	0	1
8 -2-78	807	181.9	-.37101	55.11	72.28	3486	-304	-16	-9	0	1
8 -3-78	921	182.9	-.37116	55.09	72.08	3496	-294	-15	-8	1	2
8 -4-78	916	183.9	-.37111	55.10	72.14	3502	-288	-15	-8	1	2
8 -5-78	1301	185.1	-.37088	55.13	72.46	3496	-294	-15	-8	1	2
8 -5-78	1154	186.1	-.37081	55.14	72.54	3501	-289	-15	-8	1	2
8 -7-78	811	186.9	-.37067	55.16	72.73	3480	-310	-16	-9	0	1
8 -8-78	807	187.9	-.37085	55.13	72.49	3513	-277	-14	-7	2	3
8-15-78	804	194.9	-.37107	55.11	72.20	3494	-296	-15	-8	1	2
8-21-78	1630	201.3	-.37093	55.12	72.39	3495	-295	-15	-8	1	2
8-28-78	1544	208.2	-.37070	55.15	72.69	3543	-247	-13	-6	3	4
9 -5-78	815	215.9	-.37088	55.13	72.46	3528	-262	-14	-7	2	3
10 -3-78	1435	244.2	-.37050	55.18	72.96	3522	-268	-14	-7	2	3
10-17-78	1636	258.3	-.37072	55.15	72.66	3570	-220	-11	-4	5	6
11 -1-78	1540	273.2	-.37097	55.12	72.33	3557	-233	-12	-5	4	5
11-28-78	1025	300.0	-.37168	55.03	71.38	3541	-249	-13	-6	3	4
12-12-78	1036	314.0	-.37192	55.00	71.06	3587	-203	-10	-3	6	7
12-19-78	1504	321.2	-.37193	55.00	71.04	3520	-270	-14	-7	2	3
1 -3-79	1053	336.0	-.37261	54.91	70.14	3529	-261	-13	-6	3	4
1 -9-79	1414	342.2	-.37194	54.99	71.03	3506	-284	-15	-8	1	2
1-23-79	1437	356.2	-.37198	54.99	70.97	3495	-295	-15	-8	1	2
1-30-79	954	363.0	-.37194	54.99	71.03	3431	-359	-19	-12	-3	-2
* 6-14-79	1700	498.3	END OF TEST								

Table 10 AVERAGE AUTOGENOUS STRAINS -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MIX TC2A ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

SPECIMEN	METER NO.	CHANNEL
AUTOG.1	1488	73-14
AUTOG.2	1495	73-15

TEST TEMPERATURE : 73 DEG. F.

DATE	TIME	CONCRETE AGE, DAYS	AVG. TEMP. DEG.F.	MICROSTRAIN FROM AGE ONE DAY SPECIMEN NO.1	NO.2	AVG.	FROM AGE 28 DAYS SPECIMEN NO.1	NO.2	AVG.	FROM AGE 90 DAYS SPECIMEN NO.1	NO.2	AVG.	FROM AGE 180 DAYS SPECIMEN NO.1	NO.2	AVG.
* 2 -1-78	1000	0	SPECIMENS CAST												
2-16-78	1442	15.2	71.71	0	0	0									
2-23-78	1421	22.2	72.50	-6	-9	-7									
2-28-78	806	26.9	71.97	-6	-7	-6									
3 -1-78	1705	28.3	73.02	-4	-7	-5	0	0	0						
3 -6-78	1034	33.0	72.86	-9	-8	-8	-5	-1	-3						
3-14-78	1434	41.2	72.85	-11	-10	-10	-7	-3	-5						
3-22-78	1120	49.1	72.76	-14	-12	-13	-10	-5	-7						
3-28-78	1541	55.2	73.11	-14	-13	-13	-10	-6	-8						
4-10-78	1441	68.2	72.76	-19	-15	-17	-15	-8	-11						
4-19-78	852	77.0	72.87	-20	-16	-18	-16	-9	-12						
5 -9-78	814	96.9	73.60	-27	-16	-21	-23	-9	-16	-3	0	-1			
5-16-78	1111	104.0	73.21	-29	-16	-22	-25	-9	-17	-5	0	-2			
5-23-78	810	110.9	73.16	-34	-16	-25	-30	-9	-19	-10	0	-5			
5-30-78	832	117.9	73.24	-35	-16	-25	-31	-9	-20	-11	0	-5			
6 -6-78	1355	125.2	73.03	-37	-16	-26	-33	-9	-21	-13	0	-6			
6-13-78	1122	132.1	72.89	-39	-16	-27	-35	-9	-22	-15	0	-7			
6-20-78	806	138.9	72.83	-38	-15	-26	-34	-8	-21	-14	1	-6			
6-27-78	1119	146.1	73.02	-38	-14	-26	-34	-7	-20	-14	2	-6			
7 -4-78	1003	153.0	72.59	-39	-15	-27	-35	-8	-21	-15	1	-7			
7-11-78	1712	160.3	73.08	-36	-15	-25	-32	-8	-20	-12	1	-5			
7-18-78	1642	167.3	73.24	-39	-15	-26	-34	-8	-21	-14	1	-6			
7-25-78	1028	174.0	72.73	-38	-15	-26	-34	-8	-21	-14	1	-6			
7-31-78	826	179.9	71.85	-33	-18	-25	-29	-11	-20	-9	-2	-5			
7-31-78	1055	180.0	71.90	-31	-17	-24	-27	-10	-18	-7	-1	-4	0	0	0
7-31-78	1056	180.0	72.00	-31	-16	-23	-27	-9	-18	-7	0	-3	0	1	0
7-31-78	1058	180.0	71.95	-31	-16	-23	-27	-9	-18	-7	0	-3	0	1	0
7-31-78	1106	180.0	71.95	-31	-17	-24	-27	-10	-18	-7	-1	-4	0	0	0
7-31-78	1112	180.0	71.95	-31	-16	-23	-27	-9	-18	-7	0	-3	0	1	0
7-31-78	1300	180.1	72.00	-31	-16	-23	-27	-9	-18	-7	0	-3	0	1	0
7-31-78	1655	180.3	72.07	-31	-15	-23	-27	-8	-17	-7	1	-3	0	2	1
8 -1-78	933	181.0	71.94	-31	-16	-23	-27	-9	-18	-7	0	-3	0	1	0
8 -2-78	807	181.9	72.07	-31	-16	-23	-27	-9	-18	-7	0	-3	0	1	0
8 -3-78	821	182.9	71.81	-30	-15	-22	-25	-8	-17	-6	1	-2	1	2	1
8 -4-78	816	183.9	71.86	-30	-15	-22	-26	-8	-17	-6	1	-2	1	2	1
8 -5-78	1301	185.1	72.19	-30	-15	-22	-25	-8	-17	-6	1	-2	1	2	1
8 -6-78	1154	186.1	72.32	-30	-15	-22	-26	-8	-17	-6	1	-2	1	2	1
8 -7-78	811	186.9	72.53	-31	-16	-23	-27	-9	-18	-7	0	-3	0	1	0
8 -8-78	807	187.9	72.36	-30	-14	-22	-26	-7	-16	-6	2	-2	1	3	2
8-15-78	804	194.9	72.02	-32	-15	-23	-28	-8	-18	-8	1	-3	-1	2	0
8-21-78	1630	201.3	72.14	-32	-15	-23	-28	-8	-18	-8	1	-3	-1	2	0
8-28-78	1544	208.2	72.45	-35	-13	-24	-31	-6	-18	-11	3	-4	-4	4	0
9 -5-78	815	215.9	72.36	-38	-14	-26	-34	-7	-20	-14	2	-6	-7	3	-2
10 -3-78	1435	244.2	72.88	-35	-14	-24	-31	-7	-19	-11	2	-4	-4	3	-0
10-17-78	1636	258.3	72.47	-36	-11	-23	-32	-4	-18	-12	5	-3	-5	6	0
11 -1-78	1540	273.2	72.07	-30	-12	-21	-26	-5	-15	-6	4	-1	1	5	3
11-28-78	1026	300.0	71.00	-38	-13	-25	-34	-6	-20	-14	3	-5	-7	4	-1
12-12-78	1036	314.0	70.62	-36	-10	-23	-32	-3	-17	-12	6	-3	-5	7	1
12-19-78	1504	321.2	70.57	-41	-14	-27	-37	-7	-22	-17	2	-7	-10	3	-3
1 -9-79	1414	342.2	70.58	-41	-15	-28	-37	-8	-22	-17	1	-9	-10	2	-4
1-23-79	1437	356.2	70.54	-42	-15	-28	-38	-8	-23	-18	1	-8	-11	2	-4
1-30-79	954	363.0	71.22	-39	-19	-29	-35	-12	-23	-15	-3	-9	-8	-2	-5

Table 11 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TCIPA ES7488
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.29 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.78 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 9.16 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 11312 TO -21660 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.07)

STRAIN METER NO. : 1499 20-02
AGE AT LOADING : 28 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (28 DAY) : 5460. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 38.5 PERCENT OF COMP. STR.
AUTOGENOUS SPECIMEN NO.S : 1117 73-18
1498 73-19

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	TEMP. READING, VOLTS	METER RESIST., OHMS	TEMP., DEGREES F.	STRAIN READING MICRO-VOLTS	MICROSTRAIN: TOTAL CHANGE IN	TOTAL AVG. INDICATED	TOTAL AUTOG. VALUE	ELASTIC FROM AGE ONE DAY	CREEP PLUS CREEP
* 2 -3-78	1000	0		SPECIMEN CAST								
2-16-78	1442	13.2		-.37291	54.87	70.9	2427	1	0	0		
2-23-78	1421	20.2		-.37231	54.95	71.4	2221	-205	-10	-10		
2-28-78	806	24.9		-.37254	54.92	71.5	2201	-225	-11	-11		
3 -1-78	1705	26.3		-.37164	55.03	72.7	2201	-225	-11	-11		
* 3 -3-78	835	27.94	LOADING BEGINS									
3 -3-78	835	27.94	-.0007	-.37193	55.00	72.3	2179	-247	-13	0	-13	0
* 3 -3-78	835	27.94	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
3 -3-78	835	27.94	0.	-.37193	55.00	72.3	-8414	-10840	-591	0	-553	-540 0
3 -3-78	841	27.95	.0035	-.37191	55.00	72.3	-8899	-11325	-617	0	-577	-564 -24
3 -3-78	849	27.95	.0083	-.37191	55.00	72.3	-9151	-11577	-631	0	-591	-578 -38
3 -3-78	906	27.96	.0208	-.37186	55.00	72.4	-9429	-11855	-646	0	-605	-592 -52
3 -3-78	930	27.98	.0375	-.37181	55.01	72.5	-9616	-12042	-656	0	-614	-601 -61
3 -3-78	1050	28.03	.0931	-.37176	55.02	72.5	-9951	-12377	-675	0	-632	-619 -79
3 -3-78	1434	28.19	.2496	-.37171	55.02	72.6	-10346	-12772	-696	0	-651	-638 -98
3 -3-78	1556	28.25	.3056	-.37173	55.02	72.6	-10444	-12870	-702	0	-657	-644 -104
3 -4-78	923	28.97	1.0396	-.37191	55.00	72.3	-11090	-13516	-737	0	-690	-677 -137
3 -5-78	1010	30.0	2.1	-.37196	54.99	72.2	-11643	-14069	-767	-1	-718	-704 -164
3 -6-78	1034	31.0	3.1	-.37183	55.01	72.4	-12010	-14436	-787	-2	-736	-721 -181
3 -7-78	840	31.9	4.0	-.37178	55.01	72.5	-12268	-14694	-801	-2	-750	-735 -195
3 -8-78	1310	33.1	5.2	-.37168	55.03	72.6	-12580	-15006	-818	-2	-765	-750 -210
3 -9-78	904	34.0	6.0	-.37183	55.01	72.4	-12743	-15169	-827	-2	-774	-759 -219
3-10-78	816	34.9	7.0	-.37198	54.99	72.2	-12905	-15331	-836	-2	-782	-767 -227
3-14-78	1434	39.2	11.2	-.37171	55.02	72.6	-13525	-15951	-870	-1	-814	-800 -260
3-15-78	1621	40.3	12.3	-.37145	55.06	73.0	-13521	-16047	-875	-1	-819	-805 -265
3-17-78	1152	42.1	14.1	-.37144	55.06	72.9	-13828	-16254	-886	-1	-829	-815 -275
3-22-78	1120	47.1	19.1	-.37196	54.99	72.3	-14272	-16698	-911	-1	-852	-838 -298
3-28-78	1541	53.2	25.3	-.37155	55.04	72.9	-14724	-17150	-935	-1	-875	-861 -321
4-10-78	1341	66.2	38.3	-.37176	55.02	72.5	-15407	-17833	-973	-2	-910	-895 -355
4-19-78	852	75.0	47.0	-.37169	55.03	72.6	-15694	-18120	-988	-3	-924	-908 -368
5 -9-78	814	94.9	67.0	-.37126	55.08	73.2	-16430	-18856	-1028	-5	-962	-944 -404
5-16-78	1111	102.0	74.1	-.37157	55.04	72.8	-16668	-19094	-1041	-7	-974	-954 -414
5-23-78	810	109.9	81.0	-.37166	55.03	72.7	-16915	-19341	-1049	-8	-982	-961 -421
5-30-78	832	115.9	88.0	-.37151	55.05	72.9	-16989	-19415	-1059	-9	-991	-969 -429
6 -6-78	1355	123.2	95.2	-.37170	55.03	72.6	-17146	-19572	-1068	-14	-1000	-973 -433
6-13-78	1122	130.1	102.1	-.37181	55.01	72.5	-17335	-19761	-1078	-14	-1009	-982 -442
6-20-78	806	136.9	109.0	-.37189	55.00	72.4	-17477	-19898	-1085	-14	-1016	-989 -449
6-27-78	1119	144.1	116.1	-.37167	55.03	72.6	-17586	-20012	-1092	-14	-1022	-995 -455
7 -4-78	1003	151.0	123.1	-.37200	54.99	72.2	-17707	-20133	-1098	-15	-1028	-1000 -460
7-11-78	1712	158.3	130.4	-.37155	55.04	72.8	-17838	-20264	-1105	-15	-1035	-1007 -467
7-18-78	1642	165.3	137.3	-.37137	55.07	73.1	-17943	-20369	-1111	-16	-1040	-1011 -471
7-25-78	1029	172.0	144.1	-.37187	55.00	72.4	-18011	-20437	-1115	-16	-1044	-1015 -475
8 -1-78	956	179.0	151.1	-.37175	55.02	72.5	-18104	-20530	-1120	-19	-1049	-1018 -479
8 -8-78	829	185.9	158.0	-.37160	55.04	72.7	-18168	-20594	-1123	-17	-1051	-1021 -481
8-15-78	843	192.9	165.0	-.37168	55.03	72.6	-18260	-20686	-1128	-18	-1056	-1025 -485
8-22-78	859	200.0	172.0	-.37175	55.02	72.5	-18365	-20791	-1134	-20	-1062	-1029 -489
8-29-78	1011	207.0	179.1	-.37150	55.05	72.9	-18381	-20807	-1135	-19	-1063	-1031 -491
9 -5-78	832	213.9	186.0	-.37176	55.02	72.5	-18407	-20833	-1136	-19	-1064	-1032 -492
9-19-78	821	227.9	200.0	-.37136	55.07	73.1	-18439	-21065	-1149	-19	-1076	-1044 -504
10 -3-78	1444	242.2	214.3	-.37128	55.08	73.2	-18784	-21210	-1157	-19	-1083	-1051 -511
10-17-78	1645	256.3	228.3	-.37160	55.04	72.7	-18819	-21245	-1159	-18	-1085	-1054 -514
11 -1-78	1550	271.2	243.3	-.37165	55.03	72.7	-19051	-21477	-1171	-16	-1096	-1067 -527
11-28-78	1045	298.0	270.1	-.37201	54.99	72.2	-19396	-21722	-1195	-20	-1110	-1077 -537
12-12-78	1745	312.0	284.1	-.37200	54.99	72.2	-19374	-21800	-1189	-17	-1113	-1083 -543
12-19-78	1542	319.2	291.3	-.37207	54.98	72.1	-19454	-21880	-1193	-21	-1117	-1083 -543
1 -3-79	1101	334.0	306.1	-.37243	54.93	71.6	-19529	-21955	-1197	-21	-1121	-1097 -547
1 -9-79	1423	340.2	312.2	-.37207	54.98	72.1	-19574	-22000	-1200	-22	-1124	-1089 -549
2 -2-79	853	364.0	336.0	-.37248	54.93	71.5	-19712	-22138	-1207	-23	-1130	-1094 -554
* ? -2-79	854	364.0	334.0	SPECIMEN FULLY UNLOADED, ZERO APPLIED TEST STRESS								RECOVERY
2 -2-79	854	363.95		-.37261	54.91	71.4	-12363	-14788	-806	-23	-806	-770 0
2 -2-79	856	363.96		-.37268	54.90	71.3	-11551	-13977	-762	-23	-762	-726 44
2 -2-79	858	363.96		-.37268	54.90	71.3	-11506	-13932	-760	-23	-760	-724 46
2 -2-79	901	363.96		-.37268	54.90	71.3	-11473	-13899	-758	-23	-758	-722 48
2 -2-79	904	363.96		-.37266	54.90	71.3	-11456	-13882	-757	-23	-757	-721 49
2 -2-79	1051	364.04		-.37256	54.92	71.4	-11226	-13652	-744	-23	-744	-708 62
2 -2-79	1249	364.12		-.37248	54.93	71.5	-11156	-13582	-740	-23	-740	-704 66
2 -2-79	1455	364.20		-.37241	54.93	71.6	-11094	-13520	-737	-23	-737	-701 69
2 -3-79	1236	365.11		-.37258	54.91	71.4	-10875	-13301	-725	-23	-725	-689 81
2 -4-79	752	365.74		-.37281	54.88	71.1	-10771	-13197	-719	-23	-719	-683 87
2 -5-79	1021	367.01		-.37240	54.94	71.6	-10646	-13072	-713	-23	-713	-677 93
2 -6-79	1408	368.3		-.37241	54.94	71.6	-10601	-13027	-710	-23	-710	-674 96
2 -7-79	1019	369.0		-.37236	54.94	71.7	-10556	-12982	-708	-23	-708	-672 98
2 -8-79	919	370.0		-.37233	54.95	71.7	-10518	-12944	-706	-23	-706	-670 100
2 -9-79	1004	371.1		-.37251	54.92	71.5	-10423	-12849	-700	-23	-700	-664 106
2-16-79	1101	378.0		-.37221	54.96	71.9	-10185	-12611	-687	-23	-687	-651 119
2-20-79	1003	382.0		-.37243	54.93	71.6	-10161	-12587	-686	-23	-686	-650 120
2-23-79	1623	385.3		-.37282	54.88	71.1	-10051	-12477	-680	-23	-680	-644 126
2-27-79	1511	389.2		-.37282	54.88	71.1	-10004	-12430	-678	-23	-678	-642 128
3 -2-79	1424	392.2		-.37288	54.88	71.0	-9970	-12396	-676	-23	-676	-640 130
3 -6-79	1417	396.2		-.37271	54.90	71.2	-9885	-12311	-671	-23	-671	-635 135
3-13-79	1326	403.1		-.37271	54.90	71.2	-9823	-12249	-668	-23	-668	-632 138
3-20-79	1549	410.2		-.37271	54.90	71.2	-9738	-12164	-663	-23	-663	-627 143
3-28-79	830	417.9		-.37287	54.88	71.0	-9694	-12120	-661	-23	-661	-625 145
4 -4-79	1548	425.2		-.37257	54.91	71.4	-9649	-12075	-658	-23	-658	-622 148
4-18-79	1011	439.0		-.37280	54.89	71.1	-9549	-11975	-653	-23	-653	-617 153
5 -1-79	1019	452.0		-.37270	54.90	71.2	-9466	-11892	-648	-23	-648	-612 158
5-33-79	1444	474.2		-.37262	54.91	71.3	-9375	-11802	-643	-23	-643	-607 163
6-14-79	859	496.0		-.37232	54.95	71.8	-9286	-11712	-638	-23	-638	-602 168
* 6-14-79	1700	496.3	END OF TEST									

MODULUS: LOADING E= 3.9 AT 72 F., AGE 28 DAYS (STRESS LEVEL 0 TO 2100 PSI)

UNLOADING E= 6.5 AT 71 F., AGE 364 DAYS (STRESS LEVEL 2100 TO 0 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 12 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TC1PA ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.46 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.79 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.93 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 12915 TO -19580 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.12)

STRAIN METER NO. : 1116 20-03
AGE AT LOADING : 28 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (28 DAY) : 5460. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 38.5 PERCENT OF COMP. STR.
AUTOGENOUS SPECIMEN NO.S : 1117 73-18
1499 73-19

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	TEMP. VOLTS	METER OHMS	TEMP. F.	STRAIN READING VOLTS	RESIST.	MICRO-IN	CHANGE	MICROSTRAIN TOTAL INDI- CATED	AVG. AUTOG. VALUE	TOTAL FROM AGE ONE DAY	ELASTIC PLUS ONE DAY	CREEP
* 2 -3-78	1000	0		SPECIMEN CAST											
2-16-78	1442	13.2		-.37126	55.08	71.4	3747	0	0		0				
2-23-78	1421	20.2		-.37091	55.13	71.9	3525	-221	-11		-11				
2-28-78	806	24.9		-.37112	55.10	71.6	3464	-283	-15		-15				
3 -1-78	1705	26.3		-.37034	55.20	72.7	3474	-273	-14		-14				
* 3 -3-78	835	27.94	LOADING BEGINS												
3 -3-78	835	27.94	-.0007	-.37046	55.18	72.5	3453	-294	-16	0	-16	0			
* 3 -3-78	835	27.94	SPECIMEN FULLY LOADED. APPLIED TEST STRESS 2100 PSI												
3 -3-78	836	27.94	0.	-.37039	55.19	72.7	-7382	-11129	-622	0	-557	-541	0		
3 -3-78	841	27.95	.0035	-.37034	55.20	72.7	-7980	-11527	-650	0	-582	-566	-25		
3 -3-78	848	27.95	.0083	-.37034	55.20	72.7	-8144	-11891	-665	0	-595	-579	-38		
3 -3-78	906	27.96	.0208	-.37026	55.21	72.8	-8439	-12186	-681	0	-610	-594	-53		
3 -3-78	930	27.98	.0375	-.37021	55.21	72.9	-8639	-12386	-693	0	-620	-604	-63		
3 -3-78	1050	28.03	.0931	-.37013	55.23	73.0	-8983	-12730	-712	0	-637	-621	-80		
3 -3-78	1438	28.19	.2486	-.37008	55.23	73.1	-9396	-13143	-735	0	-658	-642	-101		
3 -3-78	1556	28.25	.3056	-.37012	55.23	73.0	-9499	-13246	-741	0	-663	-647	-105		
3 -4-78	923	28.97	1.0326	-.37031	55.20	72.7	-10175	-13923	-779	0	-697	-681	-140		
3 -5-78	1010	30.0	2.1	-.37031	55.20	72.7	-10749	-14496	-811	-1	-726	-709	-168		
3 -6-78	1034	31.0	3.1	-.37018	55.22	72.9	-11143	-14887	-833	-2	-746	-728	-187		
3 -7-78	840	31.9	4.0	-.37012	55.23	73.0	-11408	-15155	-848	-2	-759	-741	-200		
3 -8-78	1310	33.1	5.2	-.37002	55.24	73.2	-11750	-15497	-867	-2	-776	-758	-217		
3 -9-78	904	34.0	6.0	-.37018	55.22	72.9	-11925	-15672	-877	-2	-785	-767	-226		
3-10-78	815	34.9	7.0	-.37031	55.20	72.7	-12108	-15855	-887	-2	-794	-776	-235		
3-14-78	1434	39.2	11.2	-.37003	55.24	73.1	-12803	-16550	-926	-1	-829	-812	-271		
3-15-78	1621	40.7	12.3	-.36980	55.27	73.5	-12996	-16643	-931	-1	-833	-816	-275		
3-17-78	1152	42.1	14.1	-.36981	55.27	73.4	-13118	-16765	-943	-1	-844	-827	-286		
3-22-78	1120	47.1	19.1	-.37023	55.21	72.9	-13671	-17418	-974	-1	-871	-854	-313		
3-28-78	1541	53.2	25.3	-.36987	55.26	73.4	-14271	-18019	-1008	-1	-902	-885	-344		
4-10-78	1441	66.2	38.3	-.37003	55.24	73.1	-15040	-18787	-1051	-2	-940	-922	-381		
4-19-78	852	75.0	47.0	-.36999	55.24	73.2	-15329	-19076	-1067	-3	-955	-936	-395		
5 -9-78	814	94.9	67.0	-.36956	55.30	73.9	-16065	-19812	-1109	-5	-992	-971	-430		
5-16-78	1111	102.0	74.1	-.36997	55.25	73.3	-16291	-20038	-1121	-7	-1003	-980	-439		
5-23-78	910	108.9	81.0	-.36996	55.25	73.2	-16445	-20192	-1130	-8	-1012	-988	-447		
5-30-78	932	115.9	88.0	-.36986	55.26	73.4	-16639	-20386	-1141	-9	-1021	-996	-455		
6 -6-78	1355	123.2	95.2	-.37000	55.24	73.2	-16816	-20563	-1151	-14	-1031	-1001	-463		
6-13-78	1122	130.1	102.1	-.37011	55.23	73.0	-16998	-20745	-1161	-14	-1040	-1010	-469		
6-20-78	906	136.9	109.0	-.37014	55.22	73.0	-17165	-20912	-1170	-14	-1048	-1018	-477		
6-27-78	1119	144.1	116.1	-.36995	55.25	73.3	-17334	-21081	-1180	-14	-1057	-1027	-486		
7 -4-78	1003	151.0	123.1	-.37023	55.21	72.9	-17457	-21204	-1186	-15	-1062	-1031	-490		
7-11-78	1712	158.3	130.4	-.36985	55.26	73.4	-17601	-21348	-1194	-15	-1069	-1038	-497		
7-18-78	1642	165.3	137.3	-.36964	55.29	73.7	-17718	-21465	-1201	-16	-1076	-1044	-503		
7-25-78	1028	172.0	144.1	-.37012	55.23	73.0	-17889	-21636	-1211	-16	-1085	-1053	-512		
8 -1-78	954	179.0	151.1	-.37000	55.24	73.2	-17999	-21746	-1217	-18	-1089	-1056	-515		
8 -8-78	829	185.9	158.0	-.36990	55.26	73.3	-18093	-21840	-1222	-17	-1095	-1062	-521		
8-15-78	843	192.9	165.0	-.36997	55.25	73.2	-18197	-21944	-1228	-18	-1100	-1066	-525		
8-22-78	859	200.0	172.0	-.37003	55.24	73.1	-18295	-22042	-1233	-20	-1105	-1069	-528		
8-29-78	1011	207.0	179.1	-.36980	55.27	73.5	-18333	-22080	-1235	-19	-1106	-1071	-530		
9 -5-78	832	213.9	186.0	-.37001	55.24	73.2	-18427	-22174	-1241	-19	-1112	-1077	-536		
9-19-78	821	227.9	200.0	-.36962	55.29	73.7	-18662	-22409	-1254	-19	-1123	-1088	-547		
10 -3-78	1444	242.2	214.3	-.36958	55.30	73.8	-18809	-22556	-1262	-19	-1131	-1096	-555		
10-17-78	1645	256.3	228.3	-.36992	55.25	73.3	-18929	-22676	-1263	-18	-1131	-1097	-556		
11 -1-78	1550	271.2	243.3	-.36997	55.25	73.2	-19044	-22791	-1275	-16	-1142	-1110	-569		
11-28-78	1045	298.0	270.1	-.37026	55.21	72.8	-19304	-23051	-1290	-20	-1156	-1120	-579		
12-12-78	1045	312.0	284.1	-.37015	55.22	73.0	-19416	-23163	-1296	-17	-1161	-1128	-587		
12-19-78	1542	319.2	291.3	-.37025	55.21	72.8	-19456	-23203	-1298	-21	-1163	-1126	-585		
1 -3-79	1101	334.0	306.1	-.37051	55.18	72.5	-19571	-23318	-1305	-21	-1169	-1132	-591		
1 -9-79	1423	340.2	312.2	-.37019	55.22	72.9	-19627	-23374	-1308	-22	-1172	-1134	-593		
2 -2-79	853	364.0	336.0	-.37053	55.18	72.5	-19772	-23519	-1316	-23	-1179	-1140	-599		
* 2 -2-79	854	364.0		SPECIMEN FULLY UNLOADED. ZERO APPLIED TEST STRESS											RECOVERY
2 -2-79	854	363.995		-.37078	55.14	72.1	-11926	-15673	-877	-23	-877	-838	0		
2 -2-79	856	363.996		-.37078	55.14	72.1	-11748	-15495	-867	-23	-867	-828	10		
2 -2-79	858	363.996		-.37081	55.14	72.1	-11706	-15453	-864	-23	-864	-825	13		
2 -2-79	901	363.996		-.37081	55.14	72.1	-11671	-15418	-862	-23	-862	-823	15		
2 -2-79	904	363.996		-.37078	55.14	72.1	-11644	-15395	-861	-23	-861	-822	16		
2 -2-79	1051	364.04		-.37068	55.16	72.3	-11428	-15175	-849	-23	-849	-810	28		
2 -2-79	1249	364.12		-.37063	55.16	72.3	-11343	-15090	-844	-23	-844	-805	33		
2 -2-79	1455	364.20		-.37061	55.16	72.3	-11292	-15039	-841	-23	-841	-802	36		
2 -3-79	1236	365.11		-.37078	55.14	72.1	-11025	-14772	-826	-23	-826	-787	51		
2 -4-79	752	365.74		-.37108	55.11	71.7	-10936	-14683	-821	-23	-821	-782	56		
2 -5-79	1021	367.01		-.37062	55.16	72.3	-10799	-14546	-814	-23	-814	-775	63		
2 -6-79	1608	368.3		-.37061	55.17	72.3	-10736	-14483	-810	-23	-810	-771	67		
2 -7-79	1019	369.0		-.37066	55.16	72.3	-10691	-14438	-807	-23	-807	-768	70		
2 -8-79	919	370.0		-.37067	55.16	72.3	-10643	-14390	-805	-23	-805	-766	72		
2 -9-79	1004	371.0		-.37068	55.16	72.3	-10601	-14348	-802	-23	-802	-763	75		
2-16-79	1101	378.0		-.37051	55.18	72.5	-10385	-14132	-790	-23	-790	-751	87		
2-20-79	1003	382.0		-.37061	55.17	72.3	-10298	-14045	-785	-23	-785	-746	92		
2-23-79	1623	385.3		-.37130	55.08	71.4	-10281	-14028	-784	-23	-784	-745	93		
2-27-79	1511	389.2		-.37132	55.07	71.4	-10229	-13976	-782	-23	-782	-743	95		
3 -2-79	1424	392.2		-.37133	55.07	71.4	-10193	-13940	-780	-23	-780	-741	97		
3 -6-79	1417	396.2		-.37121	55.09	71.5	-10113	-13860	-775	-23	-775	-736	102		
3-13-79	1326	403.1		-.37121	55.09	71.5	-10064	-13811	-772	-23	-772	-733	105		
3-20-79	1549	410.2		-.37119	55.09	71.5	-9978	-13725	-767	-23	-767	-728	110		
3-28-79	830	417.9		-.37140	55.06	71.3	-9935	-13682	-765	-23	-765	-726	112		
4 -4-79	1548	425.2		-.37110	55.10	71.7	-9895	-13642	-763	-23	-763	-724	114		
4-18-79	1011	439.0		-.37130	55.08	71.4	-9786	-13533	-757	-23	-757	-718	120		
5 -1-79	1019	452.0		-.37120	55.09	71.5	-9711	-13458	-753	-23	-753	-714	124		
5-23-79	1444	474.2		-.37112	55.10	71.6	-9621	-13368	-748	-23	-748	-709	129		
6-14-79	859	496.0		-.37087	55.13	72.0	-9529	-13276	-742	-23	-742	-703	135		
* 6-14-79	1700	496.3	END OF TEST												

MODULUS: LOADING E= 3.9 AT 73 F., AGE 28 DAYS (STRESS LEVEL 0 TO 2100 PSI)

UNLOADING E= 7.0 AT 72 F., AGE 364 DAYS (STRESS LEVEL 2100 TO 0 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 12

Table 13 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TC2A ES7446
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.33 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.50 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.99 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 11742 TO -20850 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.13)

STRAIN METER NO. : 1483 20-00
AGE AT LOADING : 28 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (28 DAY) : 6050. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 34.7 PERCENT OF COMP. STR.
AUTOGENOUS SPECIMEN NO.S : 1488 73-14
1495 73-15

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	TEMP. READING, VOLTS	METER RESIST., OHMS	TEMP., DEGREES F.	STRAIN READING MICRO-VOLTS	CHANGE IN	MICROSTRAIN TOTAL INDICATED	AVG. AUTOG. VALUE	TOTAL FROM AGE ONE DAY	ELASTIC PLUS CREEP	CREEP
* 2 -1-78	1000	0	SPECIMEN CAST										
2-16-78	1442	15.2		-.37088	55.13	71.4	746	0	0		0		
2-23-78	1421	22.2		-.37031	55.20	72.2	617	-129	-6		-6		
2-28-78	906	26.9		-.36982	55.27	72.8	547	-199	-10		-10		
* 3 -1-78	900	27.96	LOADING BEGINS										
3 -1-78	900	27.96	-.0007	-.36879	55.40	74.2	557	-189	-10	0	-10	0	
* 3 -1-78	900	27.96	SPECIMEN FULLY LOADED. APPLIED TEST STRESS 2100 PSI										
3 -1-78	901	27.96	0.	-.36872	55.41	74.3	-10047	-10793	-600	0	-532	-522	0
3 -1-78	907	27.96	.0042	-.36864	55.42	74.4	-10571	-11317	-629	0	-558	-548	-26
3 -1-78	915	27.97	.0097	-.36867	55.41	74.4	-10860	-11606	-645	0	-572	-562	-40
3 -1-78	935	27.98	.0236	-.36864	55.42	74.4	-11122	-11868	-659	0	-584	-574	-52
3 -1-78	1009	28.01	.0472	-.36862	55.42	74.4	-11330	-12076	-671	0	-595	-585	-63
3 -1-78	1103	28.04	.0847	-.36867	55.41	74.4	-11535	-12281	-682	0	-605	-595	-73
3 -1-78	1506	28.21	.2535	-.36862	55.42	74.4	-11982	-12728	-707	0	-627	-617	-95
3 -1-78	1705	28.30	.3361	-.36852	55.43	74.6	-12125	-12871	-715	1	-634	-625	-103
3 -2-78	801	28.92	.9583	-.36923	55.34	73.6	-12670	-13416	-745	1	-660	-651	-129
3 -3-78	830	29.94	1.9785	-.36927	55.34	73.6	-13239	-13985	-777	0	-689	-679	-157
3 -4-78	923	31.0	3.0	-.36928	55.33	73.5	-13602	-14348	-797	0	-706	-696	-174
3 -5-78	1010	32.0	4.0	-.36932	55.33	73.5	-13887	-14633	-813	-1	-721	-710	-188
3 -6-78	1034	33.0	5.1	-.36922	55.34	73.6	-14127	-14873	-826	-2	-732	-720	-198
3 -7-78	840	33.9	6.0	-.36912	55.36	73.8	-14304	-15050	-836	-2	-741	-729	-207
3 -8-78	1310	35.1	7.2	-.36901	55.37	73.9	-14542	-15288	-850	-2	-754	-742	-220
3 -9-78	904	36.0	8.0	-.36918	55.35	73.7	-14667	-15413	-856	-2	-759	-747	-225
3-14-78	1434	41.2	13.2	-.36906	55.36	73.8	-15329	-16075	-893	-4	-792	-778	-256
3-15-78	1621	42.3	14.3	-.36880	55.40	74.2	-15466	-16212	-901	-4	-799	-785	-263
3-17-78	1152	44.1	16.1	-.36876	55.40	74.3	-15627	-16373	-910	-5	-807	-792	-270
3-22-78	1120	49.1	21.1	-.36928	55.33	73.6	-16015	-16761	-931	-7	-826	-809	-287
3-28-78	1541	55.2	27.3	-.36890	55.38	74.1	-16434	-17180	-955	-7	-847	-830	-308
4-10-78	1441	68.2	40.2	-.36908	55.36	73.8	-17032	-17778	-988	-11	-877	-856	-334
4-19-78	852	77.0	49.0	-.36904	55.37	73.9	-17270	-18016	-1001	-12	-888	-866	-344
5 -9-78	814	96.9	69.0	-.36861	55.42	74.4	-17480	-18226	-1035	-15	-919	-894	-372
5-16-78	1111	104.0	76.1	-.36892	55.38	74.0	-18076	-18822	-1046	-16	-929	-903	-381
5-23-78	810	110.9	83.0	-.36903	55.37	73.9	-18246	-18992	-1056	-19	-938	-909	-387
5-30-78	832	117.9	90.0	-.36886	55.39	74.1	-18384	-19130	-1063	-19	-944	-915	-393
6 -6-78	1355	125.2	97.2	-.36905	55.36	73.9	-18510	-19256	-1070	-20	-950	-920	-398
6-13-78	1122	132.1	104.1	-.36916	55.35	73.7	-18631	-19377	-1077	-21	-957	-926	-404
6-20-78	905	138.9	111.0	-.36926	55.34	73.6	-18746	-19492	-1083	-20	-962	-932	-410
6-27-78	1119	146.1	118.1	-.36905	55.36	73.9	-18866	-19612	-1090	-20	-968	-938	-416
7 -4-78	1003	153.0	125.0	-.36935	55.33	73.5	-18928	-19674	-1093	-21	-971	-940	-418
7-11-78	1712	160.3	132.3	-.36895	55.38	74.0	-19097	-19843	-1103	-19	-979	-950	-428
7-18-78	1642	167.3	139.3	-.36872	55.41	74.3	-19184	-19930	-1108	-20	-984	-954	-432
7-25-78	1028	174.0	146.1	-.36917	55.35	73.7	-19286	-20032	-1113	-20	-988	-958	-436
8 -1-78	954	181.0	153.0	-.36912	55.36	73.8	-19324	-20070	-1115	-17	-990	-963	-441
8 -8-78	829	187.9	160.0	-.36895	55.38	74.0	-19367	-20113	-1118	-16	-992	-966	-444
8-15-78	843	194.9	167.0	-.36901	55.37	73.9	-19459	-20205	-1123	-17	-997	-970	-448
8-22-78	859	202.0	174.0	-.36905	55.36	73.9	-19552	-20298	-1128	-17	-1001	-974	-452
8-29-78	1011	209.0	181.0	-.36885	55.39	74.1	-19587	-20333	-1130	-18	-1003	-975	-453
9 -5-78	832	215.9	188.0	-.36908	55.36	73.8	-19612	-20358	-1132	-20	-1005	-975	-453
9-19-78	821	229.9	202.0	-.36866	55.41	74.4	-19884	-20630	-1147	-20	-1018	-988	-466
10 -3-78	1444	244.2	216.2	-.36858	55.42	74.5	-20024	-20770	-1154	-18	-1024	-996	-474
10-17-78	1645	258.3	230.3	-.36890	55.38	74.1	-20044	-20790	-1156	-17	-1026	-999	-477
11 -1-78	1550	273.2	245.3	-.36895	55.38	74.0	-20251	-20997	-1167	-15	-1036	-1011	-489
11-28-78	1045	300.0	272.1	-.36931	55.33	73.5	-20519	-21265	-1182	-19	-1049	-1020	-498
12-12-78	1045	314.0	286.1	-.36932	55.33	73.5	-20611	-21357	-1187	-17	-1054	-1027	-505
12-19-78	1442	321.2	293.3	-.36930	55.33	73.5	-20819	-21565	-1199	-21	-1065	-1034	-512
1 -9-79	1423	342.2	314.2	-.36937	55.32	73.4	-20854	-21600	-1201	-22	-1067	-1035	-513
1-23-79	1456	356.2	328.2	-.36933	55.33	73.5	-21030	-21776	-1210	-22	-1074	-1042	-520
1-30-79	1405	363.2	335.2	-.36952	55.30	73.2	-21019	-21765	-1210	-23	-1075	-1042	-520
2 -1-79	1008	365.0	337.0	-.36978	55.27	72.9	-21084	-21830	-1213	-23	-1077	-1044	-522
* 2 -1-79	1009	365.0	337.0	SPECIMEN FULLY UNLOADED. ZERO APPLIED TEST STRESS									RECOVERY
2 -1-79	1009	365.01		-.36990	55.25	72.7	-13406	-14152	-786	-23	-786	-753	0
2 -1-79	1010	365.01		-.36985	55.26	72.8	-13189	-13935	-774	-23	-774	-741	12
2 -1-79	1013	365.01		-.36993	55.25	72.7	-13138	-13884	-771	-23	-771	-738	15
2 -1-79	1016	365.01		-.36990	55.25	72.7	-13083	-13829	-768	-23	-768	-735	18
2 -1-79	1019	365.01		-.36985	55.26	72.8	-13054	-13900	-767	-23	-767	-734	19
2 -1-79	1206	365.09		-.36990	55.25	72.7	-12633	-13379	-743	-23	-743	-710	43
2 -1-79	1407	365.17		-.36985	55.26	72.8	-12546	-13292	-738	-23	-738	-705	48
2 -1-79	1612	365.26		-.36980	55.27	72.8	-12466	-13212	-734	-23	-734	-701	52
2 -2-79	1051	366.04		-.36990	55.25	72.7	-12353	-13099	-728	-23	-728	-695	58
2 -3-79	1236	367.11		-.36998	55.24	72.6	-12135	-12881	-716	-23	-716	-683	70
2 -4-79	352	367.7		-.37012	55.23	72.4	-12101	-12847	-714	-23	-714	-681	72
2 -5-79	1021	369.0		-.36972	55.28	73.0	-11996	-12742	-708	-23	-708	-675	78
2 -6-79	1608	370.3		-.36970	55.28	73.0	-11941	-12687	-705	-23	-705	-672	81
2 -7-79	1019	371.0		-.36968	55.28	73.0	-11873	-12619	-701	-23	-701	-668	85
2 -8-79	919	372.0		-.36970	55.28	73.0	-11823	-12569	-698	-23	-698	-665	88
2-15-79	1601	379.3		-.36940	55.32	73.4	-11706	-12452	-692	-23	-692	-659	94
2-20-79	1003	384.0		-.36975	55.27	72.9	-11526	-12272	-682	-23	-682	-649	104
2-22-79	919	386.0		-.36970	55.28	73.0	-11580	-12326	-685	-23	-685	-652	101
2-27-79	1511	391.2		-.37015	55.22	72.4	-11341	-12087	-671	-23	-671	-638	115
3 -1-79	1241	393.1		-.37024	55.21	72.3	-11307	-12053	-669	-23	-669	-636	117
3 -6-79	1417	398.2		-.36995	55.25	72.6	-11221	-11967	-665	-23	-665	-632	121
3-13-79	1326	405.1		-.37001	55.24	72.6	-11162	-11908	-661	-23	-661	-628	125
3-20-79	1549	412.2		-.37004	55.24	72.5	-11074	-11820	-657	-23	-657	-624	129
3-28-79	830	419.9		-.37030	55.20	72.2	-11038	-11784	-654	-23	-654	-621	132
4 -4-79	1548	427.2		-.36990	55.26	72.7	-10988	-11734	-652	-23	-652	-619	134
4-18-79	1011	441.0		-.37010	55.23	72.4	-10889	-11635	-646	-23	-646	-613	140
5 -1-79	1019	454.0		-.36995	55.25	72.6	-10814	-11560	-642	-23	-642	-609	144
5-23-79	1444	476.2		-.36985	55.26	72.8	-10749	-11495	-638	-23	-638	-605	148
6-14-79	859	498.0		-.36965	55.29	73.1	-10634	-11380	-632	-23	-632	-599	154
* 6-14-79	1700	498.3	END OF TEST										

MODULUS: LOADING E= 4.0 AT 74 F., AGE 28 DAYS (STRESS LEVEL 0 TO 2100 PSI)
UNLOADING E= 7.2 AT 73 F., AGE 365 DAYS (STRESS LEVEL 2100 TO 0 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 14 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TC2A ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.23 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.48 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.77 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 11855 TO -20630 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.11)

STRAIN METER NO. : 1487 20-01
AGE AT LOADING : 28 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (28 DAY) : 6050. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 34.7 PERCENT OF COMP. STR.
AUTOGENOUS SPECIMEN NO.S : 1488 73-14
1495 73-15

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	METER READING, VOLTS	TEMP. RESIST, OHMS	TEMP. DEGREES F.	MICROSTRAIN: STRAIN READING VOLTS	MICROSTRAIN: CHANGE IN	MICROSTRAIN: TOTAL AVG. INDICATED	MICROSTRAIN: ELASTIC AUTOG. VALUE	MICROSTRAIN: CREEP FROM AGE	MICROSTRAIN: ELASTIC PLUS ONE DAY	MICROSTRAIN: CREEP
* 2 -1-78	1000	0		SPECIMEN CAST									
2-16-78	1442	15.2		-.37108	55.10	72.0	2375	0	0		0		
2-28-78	806	26.9		-.37047	55.18	72.9	2151	-224	-12		-12		
* 3 -1-78	900	27.96		LOADING BEGINS									
3 -1-78	900	27.96	-.0007	-.36932	55.33	74.4	2159	-216	-12	0	-12	0	
* 3 -1-78	900	27.96		SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
3 -1-78	901	27.96	0.	-.36932	55.33	74.4	-7856	-10231	-583	0	-526	-514	0
3 -1-78	907	27.96	.0042	-.36923	55.34	74.5	-8324	-10699	-609	0	-550	-538	-24
3 -1-78	915	27.97	.0097	-.36927	55.34	74.5	-8588	-10963	-624	0	-563	-551	-37
3 -1-78	935	27.98	.0236	-.36924	55.34	74.5	-8840	-11215	-639	0	-577	-565	-51
3 -1-78	1009	28.01	.0472	-.36918	55.35	74.6	-9074	-11449	-652	0	-589	-577	-63
3 -1-78	1101	28.04	.0847	-.36927	55.34	74.5	-9295	-11670	-665	0	-600	-588	-74
3 -1-78	1536	28.21	.2535	-.36919	55.35	74.6	-9735	-12110	-690	0	-623	-611	-97
3 -1-78	1705	28.30	.3361	-.36912	55.35	74.7	-9875	-12250	-698	1	-630	-619	-105
3 -2-78	801	29.92	.9583	-.36989	55.26	73.6	-10406	-12781	-728	1	-657	-646	-132
3 -3-78	830	29.94	1.9785	-.36987	55.26	73.7	-10969	-13344	-760	0	-686	-674	-160
3 -4-78	923	31.0	3.0	-.36992	55.25	73.6	-11380	-13755	-783	0	-707	-695	-181
3 -5-78	1010	32.0	4.0	-.36992	55.25	73.6	-11665	-14040	-800	-1	-722	-709	-195
3 -6-78	1034	33.0	5.1	-.36979	55.27	73.8	-11905	-14280	-813	-2	-734	-720	-206
3 -7-78	840	33.9	6.0	-.36969	55.28	73.9	-12075	-14450	-823	-2	-743	-729	-215
3 -8-78	1310	35.1	7.2	-.36961	55.29	74.0	-12315	-14690	-837	-2	-755	-741	-227
3 -9-78	904	36.0	8.0	-.36981	55.27	73.7	-12433	-14808	-843	-2	-761	-747	-233
3-14-78	1434	41.2	13.2	-.36963	55.29	74.0	-13093	-15468	-881	-4	-795	-779	-265
3-15-78	1621	42.3	14.3	-.36935	55.33	74.4	-13181	-15556	-886	-4	-800	-784	-270
3-17-78	1152	44.1	16.1	-.36936	55.32	74.4	-13338	-15713	-895	-5	-808	-791	-277
3-22-78	1120	49.1	21.1	-.36983	55.26	73.7	-13716	-16091	-917	-7	-828	-809	-295
3-28-78	1541	55.2	27.3	-.36947	55.31	74.2	-14124	-16499	-940	-7	-849	-830	-316
4-10-78	1441	68.2	40.2	-.36963	55.29	74.0	-14757	-17132	-976	-11	-882	-859	-345
4-19-78	852	77.0	49.0	-.36962	55.29	74.0	-15026	-17401	-991	-12	-895	-871	-357
5 -9-78	814	96.9	69.0	-.36916	55.35	74.6	-15703	-18078	-1030	-15	-931	-904	-390
5-16-78	1111	104.0	76.1	-.36950	55.31	74.2	-15907	-18282	-1042	-16	-942	-914	-400
5-23-78	810	110.9	83.0	-.36981	55.29	74.0	-16162	-18537	-1056	-19	-954	-923	-409
5-30-78	832	117.9	90.0	-.36943	55.32	74.3	-16319	-18694	-1065	-19	-963	-932	-418
6 -6-78	1355	125.2	97.2	-.36960	55.29	74.0	-16449	-18824	-1072	-20	-969	-937	-423
6-13-78	1122	132.1	104.1	-.36971	55.28	73.9	-16585	-18960	-1080	-21	-976	-943	-429
6-20-78	806	138.9	111.0	-.36979	55.27	73.8	-16713	-19088	-1087	-20	-982	-950	-436
6-27-78	1119	146.1	118.1	-.36957	55.30	74.1	-16836	-19211	-1094	-20	-989	-957	-443
7 -4-78	1003	153.0	125.0	-.36985	55.26	73.7	-16942	-19317	-1100	-21	-994	-961	-447
7-11-78	1712	160.3	132.3	-.36947	55.31	74.2	-17058	-19433	-1107	-19	-1000	-969	-455
7-18-78	1642	167.3	139.3	-.36927	55.34	74.5	-17153	-19528	-1113	-20	-1006	-974	-460
7-25-78	1028	174.0	146.1	-.36975	55.27	73.8	-17244	-19619	-1118	-20	-1010	-978	-464
8 -1-78	954	181.0	153.0	-.36962	55.29	74.0	-17349	-19724	-1124	-17	-1015	-986	-472
8 -8-78	829	187.9	160.0	-.36945	55.31	74.2	-17396	-19771	-1126	-16	-1017	-989	-475
8-15-78	843	194.9	167.0	-.36954	55.30	74.1	-17492	-19867	-1132	-17	-1023	-994	-480
8-22-78	859	202.0	174.0	-.36963	55.29	74.0	-17585	-19960	-1137	-17	-1027	-998	-484
8-29-78	1011	209.0	181.0	-.36937	55.32	74.3	-17608	-19983	-1139	-18	-1029	-999	-485
9 -5-78	832	215.9	188.0	-.36962	55.29	74.0	-17669	-20044	-1142	-20	-1032	-1000	-486
9-19-78	821	229.9	202.0	-.36923	55.34	74.5	-17897	-20272	-1155	-20	-1044	-1012	-498
10 -3-78	1444	244.2	216.2	-.36913	55.35	74.7	-18041	-20416	-1163	-18	-1051	-1021	-507
10-17-78	1645	258.3	230.3	-.36952	55.30	74.1	-18074	-20449	-1165	-17	-1052	-1023	-509
11 -1-78	1550	273.2	245.3	-.36960	55.29	74.0	-18309	-20684	-1178	-15	-1064	-1037	-523
11-28-78	1045	300.0	272.1	-.36996	55.25	73.5	-18579	-20954	-1194	-19	-1079	-1048	-534
12-12-78	1045	314.0	286.1	-.36985	55.26	73.7	-18724	-21099	-1202	-17	-1086	-1057	-543
12-19-78	1542	321.2	293.3	-.36995	55.25	73.6	-18774	-21149	-1205	-21	-1089	-1056	-542
1 -3-79	1101	336.0	308.1	-.37026	55.21	73.1	-18876	-21251	-1211	-21	-1094	-1061	-547
1 -9-79	1423	342.2	314.2	-.36989	55.26	73.6	-18934	-21309	-1214	-22	-1097	-1063	-549
1-23-79	1456	356.2	328.2	-.36993	55.25	73.6	-19066	-21441	-1222	-22	-1104	-1070	-556
1-30-79	1405	363.2	335.2	-.37003	55.24	73.5	-19124	-21499	-1225	-23	-1107	-1072	-558
2 -1-79	1008	365.0	337.0	-.37031	55.20	73.1	-19104	-21479	-1224	-23	-1106	-1071	-557
* 2 -1-79	1009	365.0	337.0	SPECIMEN FULLY UNLOADED, ZERO APPLIED TEST STRESS									RECOVERY
2 -1-79	1009	365.01		-.37068	55.16	72.6	-10931	-13306	-758	-23	-758	-723	0
2 -1-79	1010	365.01		-.37062	55.16	72.7	-10751	-13126	-747	-23	-747	-712	11
2 -1-79	1013	365.01		-.37068	55.16	72.6	-10703	-13078	-745	-23	-745	-710	13
2 -1-79	1016	365.01		-.37068	55.16	72.6	-10676	-13051	-743	-23	-743	-708	15
2 -1-79	1019	365.01		-.37062	55.16	72.7	-10651	-13026	-742	-23	-742	-707	16
2 -1-79	1206	365.09		-.37058	55.17	72.7	-10433	-12808	-729	-23	-729	-694	29
2 -1-79	1407	365.17		-.37051	55.18	72.8	-10371	-12746	-726	-23	-726	-691	32
2 -1-79	1612	365.26		-.37046	55.18	72.9	-10306	-12681	-722	-23	-722	-687	36
2 -2-79	1051	366.04		-.37054	55.17	72.7	-10141	-12516	-713	-23	-713	-678	45
2 -3-79	1236	367.11		-.37066	55.16	72.6	-10015	-12390	-705	-23	-705	-670	53
2 -4-79	352	367.7		-.37086	55.13	72.3	-9962	-12337	-702	-23	-702	-667	56
2 -5-79	1021	369.0		-.37042	55.19	72.9	-9876	-12251	-698	-23	-698	-663	60
2 -6-79	1608	370.3		-.37037	55.19	73.0	-9830	-12205	-695	-23	-695	-660	63
2 -7-79	1019	371.0		-.37040	55.19	72.9	-9782	-12157	-692	-23	-692	-657	66
2 -8-79	919	372.0		-.37040	55.19	72.9	-9740	-12115	-690	-23	-690	-655	68
2-15-79	1601	379.3		-.37012	55.23	73.3	-9536	-11911	-678	-23	-678	-643	80
2-20-79	1003	384.0		-.37040	55.19	72.9	-9455	-11830	-674	-23	-674	-639	84
2-22-79	919	386.0		-.37040	55.19	72.9	-9425	-11800	-672	-23	-672	-637	86
2-27-79	1511	391.2		-.37097	55.12	72.2	-9376	-11751	-669	-23	-669	-634	89
3 -1-79	1241	393.1		-.37106	55.11	72.1	-9351	-11726	-668	-23	-668	-633	90
3 -6-79	1417	398.2		-.37078	55.14	72.5	-9270	-11645	-663	-23	-663	-628	95
3-13-79	1326	405.1		-.37084	55.13	72.4	-9226	-11601	-660	-23	-660	-625	98
3-20-79	1549	412.2		-.37079	55.14	72.4	-9156	-11531	-656	-23	-656	-621	102
3-28-79	830	419.9		-.37107	55.11	72.1	-9129	-11504	-655	-23	-655	-620	103
4 -4-79	1548	427.2		-.37072	55.15	72.5	-9092	-11467	-653	-23	-653	-618	105
4-18-79	1011	441.0		-.37090	55.13	72.3	-9014	-11389	-648	-23	-648	-613	110
5 -1-79	1019	454.0		-.37077	55.14	72.5	-8951	-11326	-645	-23	-645	-610	113
5-23-79	1444	476.2		-.37070	55.15	72.6	-8894	-11269	-642	-23	-642	-607	116
6-14-79	859	498.0		-.37045	55.18	72.9	-8831	-11206	-638	-23	-638	-603	120
* 6-14-79	1700	498.3		END OF TEST									

MODULUS: LOADING E= 4.1 AT 74 F., AGE 28 DAYS (STRESS LEVEL 0 TO 2100 PSI)
UNLOADING E= 6.0 AT 73 F., AGE 365 DAYS (STRESS LEVEL 2100 TO 0 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 15 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TCIPA ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.60 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.79 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 9.09 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 13010 TO -19180 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.00)

STRAIN METER NO. : 1119 73-16
AGE AT LOADING : 180 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (180 DAY) : 6600. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 31.8 PERCENT OF COMP. STR.
AUTOGENOUS SPECIMEN NO.S : 1117 73-18
1498 73-19

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	TEMP. READING, VOLTS	METER RESIST, OHMS	TEMP., DEGREES F.	STRAIN READING MICRO-VOLTS	CHANGE IN	TOTAL MICROSTRAIN INITIATED	AVG. AUTOG. VALUE	TOTAL FROM AGE ONE DAY	ELASTIC PLUS CREEP	CREEP
* 2-3-78	1000	0	SPECIMEN CAST										
2-16-78	1442	13.2		-.36993	55.25	71.8	3237	0	0		0		
2-23-78	1421	20.2		-.36951	55.21	72.4	2954	-283	-15		-15		
2-28-78	906	24.9		-.37017	55.22	71.4	2941	-296	-15		-15		
3 -1-78	1705	26.3		-.36927	55.34	72.7	2819	-418	-22		-22		
3 -6-78	1034	31.0		-.37002	55.24	71.7	2716	-521	-28		-28		
3-14-78	1434	39.2		-.36993	55.25	71.8	2665	-572	-30		-30		
3-22-78	1120	47.1		-.37011	55.23	71.5	2591	-646	-35		-35		
3-28-78	1541	53.2		-.36980	55.27	71.9	2562	-675	-36		-36		
4-10-78	1441	66.2		-.37018	55.22	71.4	2461	-776	-42		-42		
4-19-78	952	75.0		-.36997	55.25	71.7	2391	-846	-46		-46		
5 -9-78	814	94.9		-.36949	55.31	72.4	2228	-1009	-55		-55		
5-16-78	1111	102.0		-.36980	55.27	72.0	2169	-1069	-58		-58		
5-23-78	810	108.9		-.36981	55.27	71.9	2101	-1136	-62		-62		
5-30-78	832	115.9		-.36981	55.27	71.9	2055	-1182	-64		-64		
6 -6-78	1355	123.2		-.36990	55.26	71.8	1989	-1248	-68		-68		
6-13-78	1122	130.1		-.37009	55.23	71.5	1927	-1310	-71		-71		
6-20-78	806	136.9		-.37009	55.23	71.6	1893	-1344	-73		-73		
6-27-78	1119	144.1		-.36987	55.26	71.9	1885	-1352	-73		-73		
7 -4-78	1003	151.0		-.37025	55.21	71.3	1841	-1396	-76		-76		
7-11-78	1712	158.3		-.36985	55.26	71.9	1815	-1421	-77		-77		
7-18-78	1642	165.3		-.36972	55.28	72.1	1784	-1453	-79		-79		
7-25-78	1028	172.0		-.37012	55.23	71.5	1755	-1482	-80		-80		
8 -1-78	933	179.0		-.37013	55.23	71.5	1722	-1515	-82		-82		
8 -2-78	907	179.9		-.36998	55.25	71.7	1690	-1547	-84		-84		
* 8 -2-78	904	179.96	LOADING BEGINS										
8 -2-78	904	179.96	-.0017	-.36999	55.24	71.7	1706	-1531	-83	0	-83	0	
* 8 -2-78	904	179.96	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI										
8 -2-78	905	179.96	0.	-.36997	55.25	71.7	-7103	-10340	-558	0	-569	-485	0
8 -2-78	909	179.96	.0028	-.36997	55.25	71.7	-7286	-10523	-578	0	-578	-495	-10
8 -2-78	915	179.97	.0069	-.36994	55.25	71.8	-7383	-10620	-583	0	-583	-500	-15
8 -2-78	936	179.98	.0215	-.36998	55.25	71.7	-7442	-10779	-592	0	-592	-509	-24
8 -2-78	1105	180.05	.0833	-.36994	55.25	71.8	-7771	-11108	-594	-1	-604	-520	-35
8 -2-78	1303	180.13	.1653	-.37001	55.24	71.7	-7907	-11144	-512	-1	-612	-528	-43
8 -2-78	1501	180.21	.2472	-.37003	55.24	71.6	-7989	-11226	-516	0	-616	-537	-48
8 -3-78	814	180.93	.9646	-.37013	55.23	71.5	-8306	-11543	-534	1	-634	-552	-67
8 -4-78	816	181.93	1.9660	-.37016	55.22	71.4	-8513	-11750	-645	1	-645	-563	-78
8 -5-78	1301	183.1	3.2	-.36995	55.25	71.7	-8662	-11899	-554	1	-654	-572	-87
8 -6-78	1154	184.1	4.1	-.36986	55.26	71.9	-8756	-11993	-559	1	-659	-577	-92
8 -7-78	811	184.9	5.0	-.36987	55.26	71.9	-8875	-12113	-565	0	-665	-582	-97
8 -8-78	807	185.9	6.0	-.37005	55.24	71.6	-8914	-12151	-467	2	-667	-586	-101
8 -9-78	909	186.9	7.0	-.37004	55.24	71.6	-9001	-12238	-472	-1	-673	-588	-103
8-16-78	1637	194.3	14.3	-.37012	55.23	71.5	-9405	-12642	-694	2	-694	-613	-128
8-23-78	944	201.0	21.0	-.37006	55.23	71.6	-9678	-12915	-709	-2	-709	-624	-139
8-30-78	930	208.0	28.0	-.36992	55.25	71.8	-9971	-13208	-726	1	-726	-644	-159
9 -5-78	815	213.9	34.0	-.37006	55.24	71.6	-10106	-13343	-733	0	-733	-650	-165
10 -3-78	1435	242.2	62.2	-.36975	55.27	72.0	-10681	-13918	-765	0	-765	-682	-197
10-17-78	1436	256.3	76.3	-.36992	55.25	71.8	-10981	-14118	-776	1	-776	-694	-209
11 -1-78	1340	271.2	91.3	-.36995	55.25	71.7	-11031	-14268	-784	3	-784	-704	-219
11-28-78	1026	298.0	118.1	-.37051	55.18	71.0	-11478	-14715	-808	-1	-808	-724	-239
12-12-78	1036	312.0	132.1	-.37077	55.14	70.6	-11581	-14818	-814	2	-814	-733	-248
12-19-78	1504	319.2	139.2	-.37076	55.14	70.6	-11723	-14960	-822	-2	-822	-737	-252
1 -9-79	1414	340.2	160.2	-.37084	55.14	70.5	-11925	-15162	-833	-3	-833	-747	-262
1-23-79	1437	354.2	174.2	-.37091	55.13	70.4	-12030	-15267	-839	-4	-839	-752	-267
1-30-79	954	361.0	181.0	-.37124	55.08	70.0	-12149	-15386	-845	-4	-845	-758	-273
2 -2-79	820	363.9	184.0	-.37115	55.10	70.1	-12174	-15411	-847	-4	-847	-760	-275
* 2 -2-79	821	363.9	184.0	SPECIMEN FULLY UNLOADED, ZERO APPLIED TEST STRESS									RECOVERY
2 -2-79	821	363.93		-.37115	55.10	70.1	-4364	-7601	-417	-4	-417	-330	0
2 -2-79	823	363.93		-.37112	55.10	70.1	-4224	-7461	-409	-4	-409	-322	8
2 -2-79	825	363.93		-.37112	55.10	70.1	-4184	-7421	-407	-4	-407	-320	10
2 -2-79	829	363.94		-.37112	55.10	70.1	-4159	-7396	-406	-4	-406	-319	11
2 -2-79	831	363.94		-.37112	55.10	70.1	-4129	-7366	-404	-4	-404	-317	13
2 -2-79	1021	364.01		-.37116	55.09	70.1	-3912	-7149	-392	-4	-392	-305	25
2 -2-79	1221	364.10		-.37112	55.10	70.1	-3861	-7098	-389	-4	-389	-302	28
2 -2-79	1421	364.18		-.37116	55.09	70.1	-3782	-7019	-385	-4	-385	-298	32
2 -3-79	1240	365.11		-.37116	55.09	70.1	-3535	-6772	-371	-4	-371	-284	46
2 -4-79	345	365.74		-.37118	55.09	70.1	-3457	-6694	-367	-4	-367	-280	50
2 -5-79	1026	367.02		-.37118	55.09	70.1	-3319	-6556	-359	-4	-359	-272	58
2 -6-79	1518	368.2		-.37111	55.10	70.1	-3239	-6476	-355	-4	-355	-268	62
2 -7-79	1014	369.0		-.37102	55.11	70.3	-3211	-6448	-354	-4	-354	-267	63
2 -8-79	924	370.0		-.37106	55.11	70.2	-3142	-6379	-350	-4	-350	-263	67
2 -9-79	1001	371.0		-.37111	55.10	70.1	-3101	-6338	-347	-4	-347	-260	70
2-16-79	1051	378.0		-.37086	55.13	70.5	-2891	-6128	-336	-4	-336	-249	81
2-20-79	918	382.0		-.37114	55.10	70.1	-2802	-6039	-331	-4	-331	-244	86
2-23-79	1618	385.3		-.37047	55.18	71.0	-2685	-5923	-325	-4	-325	-238	92
2-27-79	1506	389.2		-.37066	55.16	70.8	-2576	-5813	-319	-4	-319	-232	98
3 -2-79	1420	392.2		-.37071	55.15	70.7	-2576	-5813	-319	-4	-319	-232	98
3 -6-79	1412	396.2		-.37076	55.15	70.6	-2534	-5771	-316	-4	-316	-229	101
3-28-79	824	417.9		-.37073	55.15	70.7	-2316	-5553	-304	-4	-304	-217	113
4 -4-79	1543	425.2		-.37056	55.17	70.9	-2329	-5566	-305	-4	-305	-218	112
4-18-79	1024	439.0		-.37062	55.16	70.8	-2324	-5561	-305	-4	-305	-218	112
5 -1-79	1026	452.0		-.37055	55.17	70.9	-2294	-5531	-303	-4	-303	-216	114
5-23-79	1456	474.2		-.37052	55.18	71.0	-2036	-5273	-289	-4	-289	-202	128
6-14-79	848	495.9		-.37030	55.20	71.3	-1934	-5171	-283	-4	-283	-196	134
* 6-14-79	1700	496.3	END OF TEST										

MODULUS: LOADING E= 4.3 AT 72 F., AGE 180 DAYS (STRESS LEVEL 0 TO 2100 PSI)
UNLOADING E= 4.9 AT 70 F., AGE 364 DAYS (STRESS LEVEL 2100 TO 0 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 16 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MTX TCIPA ES7448

SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.53 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.40 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.83 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 11365 TO -21150 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.00)

STRAIN METER NO. : 1497 73-17
AGE AT LOADING : 180 DAYS
TEST TEMPERATURE : 73 DEG. F.

COMP. STRENGTH (180 DAY) : 6600. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 31.8 PERCENT OF COMP. STR.
AUTOGENOUS SPECIMEN NO.S : 1117 73-18
1498 73-19

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	TEMP. READING, VOLTS	METER RESIST. OHMS	TEMP. DEGREES F.	STRAIN READING MICRO-IN VOLTS	TOTAL CHANGE CATED	AVG. INDI- CATED	TOTAL AUTOG. VALUE	ELASTIC FROM AGE ONE DAY	CREEP PLUS CREEP
* 2 -1-78	1000	0	SPECIMEN CAST									
2-16-78	1442	13.2		-.37093	55.12	71.2	1650	1	0	0		
2-23-78	1421	20.2		-.37046	55.18	71.9	1480	-169	-9	-9		
2-28-78	906	24.9		-.37117	55.09	70.9	1446	-203	-10	-10		
3 -1-78	1705	26.3		-.37034	55.20	72.0	1461	-188	-10	-10		
3 -6-78	1034	31.0		-.37067	55.16	71.6	1424	-225	-12	-12		
3-14-78	1434	39.2		-.37061	55.16	71.6	1412	-237	-12	-12		
3-22-78	1120	47.1		-.37069	55.16	71.6	1362	-287	-15	-15		
3-28-78	1541	53.2		-.37047	55.18	71.8	1340	-309	-17	-17		
4-10-78	1441	66.2		-.37073	55.15	71.5	1265	-384	-21	-21		
4-19-78	852	75.0		-.37062	55.16	71.6	1217	-432	-24	-24		
5 -9-78	814	94.9		-.37004	55.24	72.4	1127	-522	-29	-29		
5-16-78	1111	102.0		-.37037	55.20	72.0	1107	-542	-30	-30		
5-23-78	810	108.9		-.37043	55.19	71.9	1085	-564	-31	-31		
5-30-78	832	115.9		-.37033	55.20	72.0	1079	-577	-32	-32		
6 -6-78	1355	123.2		-.37050	55.18	71.8	1041	-608	-33	-33		
6-13-78	1122	130.1		-.37061	55.16	71.6	1037	-619	-34	-34		
6-20-78	906	136.9		-.37069	55.15	71.5	1025	-623	-34	-34		
6-27-78	1119	144.1		-.37052	55.18	71.8	1035	-614	-34	-34		
7 -4-78	1003	151.0		-.37083	55.14	71.4	1016	-633	-35	-35		
7-11-78	1712	158.3		-.37047	55.18	71.8	1015	-634	-35	-35		
7-18-78	1442	165.3		-.37037	55.20	72.0	994	-655	-36	-36		
7-25-78	1029	172.0		-.37075	55.15	71.5	1020	-629	-35	-35		
8 -1-78	933	179.0		-.37053	55.17	71.9	1017	-632	-35	-35		
8 -2-78	907	179.9		-.37041	55.19	71.9	1005	-644	-36	-36		
* 8 -9-78	904	179.96	LOADING BEGINS									
8 -2-78	904	179.96	-.0007	-.37044	55.19	71.9	994	-655	-36	0	-36	0
* 8 -2-78	904	179.96	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
8 -2-78	905	179.96	0.	-.37042	55.19	71.9	-7831	-9480	-536	0	-536	-500 0
8 -2-78	909	179.96	.0028	-.37042	55.19	71.9	-7981	-9630	-544	0	-544	-508 -8
8 -2-78	915	179.97	.0069	-.37039	55.19	72.0	-8066	-9715	-549	0	-549	-513 -13
8 -2-78	936	179.98	.0215	-.37041	55.19	71.9	-8231	-9880	-559	0	-559	-523 -23
8 -2-78	1105	180.05	.0833	-.37039	55.19	72.0	-8853	-10502	-571	-1	-571	-534 -34
8 -2-78	1303	180.13	.1453	-.37046	55.18	71.9	-8861	-10210	-577	-1	-577	-540 -40
8 -2-78	1501	180.21	.2072	-.37048	55.18	71.9	-8638	-10287	-582	0	-582	-546 -46
8 -3-78	914	180.93	.9646	-.37056	55.17	71.7	-8936	-10585	-608	1	-598	-563 -63
8 -4-78	816	181.93	1.9660	-.37061	55.16	71.6	-9135	-10784	-610	1	-610	-575 -75
8 -5-78	1301	183.1	3.2	-.37040	55.19	71.9	-9285	-10934	-618	1	-618	-583 -83
8 -6-78	1154	184.1	4.1	-.37034	55.20	72.0	-9366	-11015	-623	1	-623	-588 -88
8 -7-78	811	184.9	5.0	-.37030	55.20	72.1	-9476	-11125	-629	0	-629	-593 -93
8 -8-78	907	185.9	6.0	-.37047	55.18	71.8	-9524	-11173	-632	2	-632	-598 -98
8 -9-78	908	186.9	7.0	-.37046	55.18	71.9	-9401	-11250	-636	-1	-636	-599 -99
8-16-78	1637	194.3	14.3	-.37052	55.18	71.8	-9905	-11644	-658	2	-658	-624 -124
8-23-78	944	201.0	21.0	-.37051	55.18	71.8	-10283	-11932	-675	-2	-675	-637 -137
8-30-78	930	208.0	28.0	-.37037	55.20	72.0	-10536	-12185	-689	1	-689	-654 -154
9 -6-78	915	213.9	34.0	-.37046	55.18	71.9	-10666	-12315	-696	0	-696	-660 -160
10 -3-78	1435	242.2	62.2	-.37102	55.11	71.1	-11229	-12878	-728	0	-728	-692 -192
10-17-78	1636	256.3	76.3	-.37040	55.19	71.9	-11401	-13050	-738	1	-738	-703 -203
11 -1-78	1540	271.2	91.3	-.37032	55.20	72.1	-11524	-13173	-745	3	-745	-712 -212
11-28-78	1025	298.0	118.1	-.37081	55.14	71.4	-11783	-13432	-771	-1	-771	-734 -234
12-12-78	1336	312.0	132.1	-.37097	55.12	71.2	-12044	-13733	-777	2	-777	-743 -243
12-19-78	1504	319.2	139.2	-.37096	55.12	71.2	-12220	-13869	-784	-2	-784	-746 -246
1 -3-79	1053	334.0	154.1	-.37151	55.05	70.4	-12368	-14017	-793	-2	-793	-755 -255
1 -9-79	1414	340.2	160.2	-.37102	55.11	71.1	-12430	-14079	-796	-3	-796	-757 -257
1-23-79	1437	354.2	174.2	-.37098	55.12	71.1	-12510	-14179	-802	-4	-802	-762 -262
1-30-79	954	361.0	181.0	-.37139	55.06	70.6	-12557	-14306	-809	-4	-809	-765 -265
2 -2-79	820	363.9	184.0	-.37145	55.06	70.5	-12669	-14319	-810	-4	-810	-770 -270
* 2 -2-79	921	363.9	184.0	SPECIMEN FULLY UNLOADED, ZERO APPLIED TEST STRESS								RECOVERY
2 -2-79	921	363.93		-.37150	55.05	70.4	-4795	-4445	-364	-4	-364	-324 0
2 -2-79	823	363.93		-.37152	55.05	70.4	-4649	-6298	-356	-4	-356	-316 8
2 -2-79	825	363.93		-.37152	55.05	70.4	-4606	-4255	-353	-4	-353	-313 11
2 -2-79	828	363.94		-.37152	55.05	70.4	-4581	-6230	-352	-4	-352	-312 12
2 -2-79	831	363.94		-.37152	55.05	70.4	-4559	-6208	-350	-4	-350	-310 14
2 -2-79	1021	364.01		-.37143	55.06	70.5	-4335	-5984	-338	-4	-338	-298 26
2 -2-79	1034	364.02		-.37143	55.06	70.5	-4342	-5991	-338	-4	-338	-298 26
2 -2-79	1221	364.10		-.37132	55.07	70.7	-4286	-5935	-335	-4	-335	-295 29
2 -2-79	1421	364.18		-.37136	55.07	70.6	-4255	-5904	-333	-4	-333	-293 31
2 -3-79	1240	365.11		-.37153	55.05	70.4	-3970	-5619	-317	-4	-317	-277 47
2 -4-79	345	365.74		-.37158	55.04	70.3	-3875	-5524	-312	-4	-312	-272 52
2 -5-79	1025	367.02		-.37138	55.07	70.6	-3752	-5401	-305	-4	-305	-265 59
2 -6-79	1518	368.2		-.37128	55.08	70.7	-3662	-5311	-300	-4	-300	-260 64
2 -7-79	1014	369.0		-.37115	55.10	70.9	-3644	-5293	-299	-4	-299	-259 65
2 -8-79	924	370.0		-.37121	55.09	70.9	-3567	-5216	-294	-4	-294	-254 70
2 -9-79	1001	371.0		-.37133	55.07	70.7	-3537	-5186	-293	-4	-293	-253 71
2-16-79	1051	378.0		-.37113	55.10	70.9	-3311	-4960	-280	-4	-280	-240 84
2-20-79	918	382.0		-.37139	55.06	70.6	-3295	-4974	-275	-4	-275	-235 89
2-23-79	1618	385.3		-.37110	55.10	71.0	-3111	-4750	-269	-4	-269	-229 95
3 -2-79	1420	392.2		-.37121	55.09	70.8	-3011	-4660	-263	-4	-263	-223 101
3 -6-79	1412	396.2		-.37123	55.09	70.8	-2949	-4598	-259	-4	-259	-219 105
3-20-79	1544	410.2		-.37115	55.10	70.9	-2777	-4426	-250	-4	-250	-210 114
4 -4-79	1543	425.2		-.37119	55.09	70.8	-2740	-4389	-247	-4	-247	-207 117
4-18-79	1024	439.0		-.37125	55.08	70.8	-2724	-4373	-247	-4	-247	-207 117
5 -1-79	1026	452.0		-.37117	55.09	70.9	-2688	-4338	-245	-4	-245	-205 119
5-23-79	1456	474.2		-.37115	55.10	70.9	-2534	-4183	-236	-4	-236	-196 128
6-14-79	849	495.9		-.37092	55.12	71.2	-2431	-4080	-230	-4	-230	-190 134
* 6-14-79	1700	496.3	END OF TEST									

MODULUS: LOADING E= 4.2 AT 72 F., AGE 180 DAYS (STRESS LEVEL 0 TO 2100 PSI)
UNLOADING E= 4.7 AT 70 F., AGE 364 DAYS (STRESS LEVEL 2100 TO 0 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 17 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION I MIX TC2A ES7448

SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.19 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.53 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.90 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 9335 TO -24170 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.00)

STRAIN METER NO. : 1490 73-12
AGE AT LOADING : 180 DAYS
TEST TEMPERATURE : 73 DEG. F.

COMP. STRENGTH (180 DAY) : 7040. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 29.8 PERCENT OF COMP. STR.

AUTOGENOUS SPECIMEN NO.S : 1488 73-14
1495 73-15

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	TEMP. READING, VOLTS	METER RESIST. OHMS	TEMP.. DEGREES F.	STRAIN READING MICRO-VOLTS	CHANGE IN	TOTAL INDI-CATED	AVG. AUTOG. VALUE	MICROSTRAIN TOTAL FROM AGE ONE DAY	ELASTIC PLUS CREEP	CREEP RECOVERY
* 2 -1-78	1000	0	SPECIMEN CAST										
2-16-78	1442	15.2		-.37168	55.03	72.0	-1161	1	0		0		
2-23-78	1421	22.2		-.37128	55.08	72.5	-1366	-204	-11		-11		
2-28-78	806	26.9		-.37152	55.05	72.2	-1433	-271	-14		-14		
3 -1-78	1705	28.3		-.37062	55.16	73.4	-1419	-257	-14		-14		
3 -6-78	1034	33.0		-.37118	55.09	72.7	-1485	-323	-17		-17		
3-28-78	1541	55.2		-.37097	55.12	73.0	-1754	-592	-32		-32		
3-14-78	1434	41.2		-.37116	55.09	72.7	-1579	-417	-22		-22		
3-22-78	1120	49.1		-.37128	55.08	72.5	-1686	-524	-28		-28		
4-10-78	1441	68.2		-.37131	55.08	72.5	-1889	-727	-40		-40		
4-19-78	852	77.0		-.37114	55.10	72.7	-1900	-738	-41		-41		
5 -9-78	814	96.9		-.37064	55.16	73.4	-1994	-832	-46		-46		
5-16-78	1111	104.0		-.37092	55.13	73.0	-2025	-863	-48		-48		
5-23-78	810	110.9		-.37091	55.13	73.0	-2035	-873	-48		-48		
5-30-78	832	117.9		-.37093	55.12	73.0	-2046	-884	-49		-49		
6 -6-78	1355	125.2		-.37108	55.10	72.8	-2080	-918	-51		-51		
6-13-78	1122	132.1		-.37119	55.09	72.7	-2115	-953	-53		-53		
6-20-78	806	138.9		-.37121	55.09	72.6	-2113	-951	-52		-52		
6-27-78	1119	146.1		-.37105	55.11	72.8	-2096	-934	-52		-52		
7 -4-78	1003	153.0		-.37140	55.06	72.4	-2076	-914	-50		-50		
7-11-78	1712	160.3		-.37100	55.11	72.9	-2102	-940	-52		-52		
7-18-78	1642	167.3		-.37089	55.13	73.1	-2113	-951	-53		-53		
7-25-78	1028	174.0		-.37130	55.08	72.5	-2104	-942	-52		-52		
7-31-78	826	179.9		-.37136	55.07	72.4	-2093	-931	-51		-51		
* 7-31-78	1055	180.04	LOADING BEGINS										
7-31-78	1055	180.04	-.0007	-.37131	55.08	72.5	-2060	-898	-49	0	-49	0	
* 7-31-78	1055	180.04	SPECIMEN FULLY LOADED. APPLIED TEST STRESS 2100 PSI										
7-31-78	1056	180.04	0.	-.37129	55.08	72.5	-10417	-9255	-519	0	-519	-470	0
7-31-78	1058	180.04	.0014	-.37131	55.08	72.5	-10528	-9366	-525	1	-525	-477	-7
7-31-78	1106	180.05	.0069	-.37128	55.08	72.5	-10796	-9634	-540	0	-540	-491	-21
7-31-78	1112	180.05	.0111	-.37128	55.08	72.5	-10836	-9674	-543	1	-543	-495	-25
7-31-78	1300	180.12	.0861	-.37126	55.08	72.6	-11106	-9944	-558	1	-558	-510	-40
7-31-78	1655	180.29	.2493	-.37123	55.09	72.6	-11306	-10144	-569	1	-569	-521	-51
8 -1-78	933	180.98	.9424	-.37136	55.07	72.4	-11563	-10401	-583	1	-583	-535	-65
8 -2-78	807	181.92	1.8826	-.37121	55.09	72.6	-11763	-10601	-595	1	-595	-547	-77
8 -3-78	821	182.9	2.9	-.37136	55.07	72.4	-11906	-10744	-603	2	-603	-556	-86
8 -4-78	815	183.9	3.9	-.37138	55.07	72.4	-12008	-10846	-608	2	-608	-561	-91
8 -5-78	1301	185.1	5.1	-.37121	55.09	72.6	-12106	-10944	-614	2	-614	-567	-97
8 -6-78	1154	186.1	6.0	-.37124	55.08	72.6	-12174	-11012	-618	2	-618	-571	-101
8 -7-78	811	186.9	6.9	-.37107	55.11	72.8	-12231	-11069	-621	1	-621	-573	-103
8 -8-78	807	187.9	7.9	-.37122	55.09	72.6	-12264	-11102	-623	2	-623	-576	-106
8-15-78	804	194.9	14.9	-.37139	55.06	72.4	-12655	-11493	-645	1	-645	-597	-127
8-21-78	1630	201.3	21.2	-.37133	55.07	72.5	-12883	-11721	-658	1	-658	-610	-140
8-28-78	1544	208.2	28.2	-.37120	55.09	72.7	-13126	-11964	-671	0	-671	-622	-152
9 -5-78	815	215.9	35.9	-.37128	55.08	72.5	-13306	-12144	-681	-2	-681	-630	-160
10 -3-78	1435	244.2	64.2	-.37092	55.12	73.0	-13821	-12659	-710	0	-710	-661	-191
10-17-78	1636	258.3	78.2	-.37112	55.10	72.8	-14014	-12852	-721	1	-721	-673	-203
11 -1-78	1540	273.2	93.2	-.37122	55.09	72.6	-14116	-12954	-727	3	-727	-681	-211
11-28-78	1026	300.0	120.0	-.37183	55.01	71.8	-14565	-13403	-752	-1	-752	-702	-232
12-12-78	1036	314.0	134.0	-.37205	54.98	71.5	-14649	-13487	-757	1	-757	-709	-239
12-19-78	1504	321.2	141.2	-.37198	54.99	71.6	-14795	-13633	-765	-3	-765	-713	-243
1 -3-79	1053	336.0	156.0	-.37266	54.90	70.7	-14927	-13765	-772	-3	-772	-720	-250
1 -9-79	1414	342.2	162.1	-.37209	54.98	71.5	-14994	-13832	-776	-4	-776	-723	-253
1-23-79	1437	356.2	176.2	-.37211	54.97	71.4	-15096	-13934	-782	-4	-782	-729	-259
2 -1-79	1029	365.0	185.0	-.37246	54.93	71.0	-15205	-14043	-788	-5	-788	-734	-264
* 2 -1-79	1030	365.0	185.0	SPECIMEN FULLY UNLOADED. ZERO APPLIED TEST STRESS									RECOVERY
2 -1-79	1030	365.02		-.37244	54.93	71.0	-7707	-6545	-367	-5	-367	-313	0
2 -1-79	1032	365.02		-.37254	54.92	70.8	-7480	-6318	-354	-5	-354	-300	13
2 -1-79	1034	365.02		-.37249	54.92	70.9	-7437	-6275	-351	-5	-351	-297	16
2 -1-79	1037	365.03		-.37254	54.92	70.8	-7410	-6248	-350	-5	-350	-296	17
2 -1-79	1040	365.03		-.37249	54.92	70.9	-7387	-6225	-349	-5	-349	-295	18
2 -1-79	1231	365.10		-.37244	54.93	71.0	-7180	-6018	-337	-5	-337	-283	30
2 -1-79	1527	365.23		-.37242	54.93	71.0	-7076	-5914	-331	-5	-331	-277	36
2 -2-79	1034	366.02		-.37228	54.95	71.2	-6830	-5668	-317	-5	-317	-263	50
2 -3-79	1240	367.11		-.37243	54.93	71.0	-6705	-5543	-310	-5	-310	-256	57
2 -4-79	345	367.7		-.37251	54.92	70.9	-6645	-5483	-307	-5	-307	-253	60
2 -5-79	1026	369.0		-.37223	54.96	71.3	-6530	-5368	-301	-5	-301	-247	66
2 -6-79	1518	370.2		-.37208	54.98	71.5	-6475	-5313	-297	-5	-297	-243	70
2 -7-79	1014	371.0		-.37200	54.99	71.6	-6471	-5309	-297	-5	-297	-243	70
2 -8-79	924	372.0		-.37204	54.98	71.5	-6385	-5223	-292	-5	-292	-238	75
2-15-79	1605	379.3		-.37168	55.03	72.0	-6115	-4953	-277	-5	-277	-223	90
2-20-79	918	384.0		-.37214	54.97	71.4	-6063	-4901	-274	-5	-274	-220	93
2-22-79	913	386.0		-.37213	54.97	71.4	-5910	-4748	-266	-5	-266	-212	101
2-27-79	1506	391.2		-.37191	55.00	71.7	-5850	-4686	-262	-5	-262	-208	105
3 -6-79	1412	398.2		-.37178	55.02	71.9	-5800	-4638	-260	-5	-260	-206	107
3-13-79	1313	405.1		-.37179	55.01	71.9	-5605	-4443	-249	-5	-249	-195	118
3-28-79	824	419.9		-.37181	55.01	71.8	-5572	-4410	-247	-5	-247	-193	120
4 -4-79	1543	427.2		-.37176	55.02	71.9	-5577	-4415	-247	-5	-247	-193	120
4-18-79	1024	441.0		-.37180	55.01	71.8	-5584	-4422	-247	-5	-247	-193	120
5 -1-79	1026	454.0		-.37170	55.03	72.0	-5554	-4392	-246	-5	-246	-192	121
5-23-79	1456	476.2		-.37170	55.03	72.0	-5179	-4017	-225	-5	-225	-171	142
6-14-79	848	497.9		-.37150	55.05	72.2	-5066	-3904	-218	-5	-218	-164	149
* 6-14-79	1700	498.3	END OF TEST										

MODULUS: LOADING E= 4.5 AT 73 F., AGE 180 DAYS (STRESS LEVEL 0 TO 2100 PSI)
UNLOADING E= 5.0 AT 71 F., AGE 365 DAYS (STRESS LEVEL 2100 TO 0 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 18 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TC2A ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.45 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.48 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.96 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 9127 TO -24150 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.00)

STRAIN METER NO. : 1493 73-13
AGE AT LOADING : 180 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (180 DAY) : 7040. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 29.8 PERCENT OF COMP. STR.
AUTOGENOUS SPECIMEN NO.S : 1488 73-14
1495 73-15

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	TEMP. READING, VOLTS	METER RESIST., OHMS	TEMP., DEGREES F.	STRAIN READING CHANGE, MICRO-IN	TOTAL INDICATED	AVG. AUTOG. VALUE	MICROSTRAIN: TOTAL FROM ONE DAY	ELASTIC PLUS CREEP	CREEP
* 2 -1-78	1000	0	SPECIMEN CAST									
2-16-78	1442	15.2		-.36991	55.25	71.3	819	0	0	0		
2-23-78	1421	22.2		-.36933	55.33	72.1	691	-128	-6	-6		
2-28-78	806	26.9		-.36962	55.29	71.7	674	-145	-7	-7		
3 -1-78	1705	28.3		-.36882	55.39	72.8	699	-120	-6	-6		
3 -6-78	1034	33.0		-.36877	55.40	72.8	681	-138	-7	-7		
3-14-78	1434	41.2		-.36871	55.41	72.9	689	-130	-6	-6		
3-22-78	1120	49.1		-.36881	55.40	72.8	709	-110	-5	-5		
3-28-78	1541	55.2		-.36857	55.43	73.1	727	-92	-4	-4		
4-10-78	1441	68.2		-.36883	55.39	72.8	729	-90	-4	-4		
4-19-78	852	77.0		-.36872	55.41	72.9	706	-113	-5	-5		
5 -9-78	814	96.9		-.36819	55.47	73.6	585	-234	-12	-12		
5-16-78	1111	104.0		-.36850	55.43	73.2	530	-289	-15	-15		
5-23-78	810	110.9		-.36856	55.43	73.1	465	-354	-19	-19		
5-30-78	832	117.9		-.36848	55.44	73.2	412	-407	-22	-22		
6 -6-78	1355	125.2		-.36860	55.42	73.1	350	-469	-25	-25		
6-13-78	1122	132.1		-.36876	55.40	72.8	300	-519	-28	-28		
6-20-78	806	138.9		-.36884	55.39	72.7	265	-554	-30	-30		
6-27-78	1119	146.1		-.36862	55.42	73.0	235	-584	-32	-32		
7 -4-78	1003	153.0		-.36893	55.38	72.6	197	-622	-34	-34		
7-11-78	1712	160.3		-.36857	55.43	73.1	172	-647	-35	-35		
7-18-78	1642	167.3		-.36844	55.44	73.3	147	-672	-37	-37		
7-25-78	1028	174.0		-.36882	55.39	72.8	125	-694	-38	-38		
7-31-78	826	179.9		-.36868	55.41	73.0	35	-784	-43	-43		
* 7-31-78	1055	180.04	LOADING BEGINS									
7-31-78	1055	180.04	-.0007	-.36863	55.42	73.0	75	-744	-41	0 -41	0	
* 7-31-78	1055	180.04	SPECIMEN FULLY LOADED. APPLIED TEST STRESS 2100 PSI									
7-31-78	1055	180.04	0.	-.36859	55.42	73.1	-8466	-9285	-517	0 -517	-476	0
7-31-78	1058	180.04	.0014	-.36861	55.42	73.1	-8571	-9390	-523	1 -523	-483	-7
7-31-78	1106	180.05	.0069	-.36858	55.42	73.1	-8841	-9660	-538	0 -538	-497	-21
7-31-78	1112	180.05	.0111	-.36858	55.42	73.1	-8881	-9700	-540	1 -540	-500	-24
7-31-78	1300	180.12	.0861	-.36856	55.43	73.1	-9166	-9985	-556	1 -556	-516	-40
7-31-78	1655	180.29	.2493	-.36853	55.43	73.2	-9358	-10177	-567	1 -567	-527	-51
8 -1-78	933	180.98	.9424	-.36863	55.42	73.0	-9620	-10439	-582	1 -582	-542	-66
8 -2-78	807	181.92	1.8826	-.36848	55.44	73.2	-9823	-10642	-593	1 -593	-553	-77
8 -3-78	821	182.9	2.9	-.36866	55.41	73.0	-9978	-10797	-602	2 -602	-563	-87
8 -4-78	816	183.9	3.9	-.36871	55.41	72.9	-10090	-10909	-608	2 -608	-569	-93
8 -5-78	1301	185.1	5.1	-.36851	55.43	73.2	-10196	-11015	-614	2 -614	-575	-99
8 -6-78	1154	186.1	6.0	-.36849	55.44	73.2	-10259	-11078	-617	2 -617	-578	-102
8 -7-78	811	186.9	6.9	-.36835	55.45	73.4	-10334	-11153	-622	1 -622	-582	-106
8 -8-78	807	187.9	7.9	-.36852	55.43	73.2	-10370	-11189	-624	2 -624	-585	-109
8-15-78	804	194.9	14.9	-.36867	55.41	73.0	-10777	-11596	-648	1 -646	-606	-130
8-21-78	1630	201.3	21.2	-.36863	55.42	73.0	-11039	-11858	-661	1 -661	-621	-145
8-28-78	1544	208.2	28.2	-.36847	55.44	73.2	-11265	-12084	-674	0 -674	-633	-157
9 -5-78	815	215.9	35.9	-.36856	55.43	73.1	-11483	-12302	-686	-2 -686	-643	-167
10 -3-78	1435	244.2	64.2	-.36822	55.47	73.6	-12096	-12915	-720	0 -720	-679	-203
10-17-78	1636	258.3	78.2	-.36845	55.44	73.3	-12279	-13098	-730	1 -730	-690	-214
11 -1-78	1540	273.2	93.2	-.36842	55.44	73.3	-12401	-13220	-737	3 -737	-699	-223
11-28-78	1026	300.0	120.0	-.36893	55.38	72.6	-12858	-13677	-762	-1 -762	-720	-244
12-12-78	1036	314.0	134.0	-.36907	55.36	72.4	-12924	-13743	-766	1 -766	-726	-250
12-19-78	1504	321.2	141.2	-.36908	55.36	72.4	-13063	-13882	-774	-3 -774	-730	-254
1 -3-79	1053	336.0	156.0	-.36961	55.29	71.7	-13198	-14017	-781	-3 -781	-737	-261
1 -9-79	1414	342.2	162.1	-.36912	55.35	72.4	-13294	-14113	-787	-4 -787	-742	-266
1-23-79	1437	356.2	176.2	-.36909	55.36	72.4	-13407	-14226	-793	-4 -793	-748	-272
1-30-79	954	363.0	183.0	-.36944	55.31	71.9	-13544	-14363	-801	-5 -801	-755	-279
2 -1-79	1029	365.0	185.0	-.36956	55.30	71.8	-13537	-14356	-800	-5 -800	-754	-278
* 2 -1-79	1030	365.0	185.0	SPECIMEN FULLY UNLOADED. ZERO APPLIED TEST STRESS								RECOVERY
2 -1-79	1030	365.02		-.36956	55.30	71.8	-5905	-6724	-374	-5 -374	-328	0
2 -1-79	1032	365.02		-.36956	55.30	71.8	-5737	-6556	-365	-5 -365	-319	9
2 -1-79	1034	365.02		-.36956	55.30	71.8	-5702	-6521	-363	-5 -363	-317	11
2 -1-79	1037	365.03		-.36959	55.29	71.7	-5680	-6499	-362	-5 -362	-316	12
2 -1-79	1040	365.03		-.36961	55.29	71.7	-5662	-6481	-361	-5 -361	-315	13
2 -1-79	1231	365.10		-.36956	55.30	71.8	-5472	-6291	-350	-5 -350	-304	24
2 -1-79	1527	365.23		-.36957	55.30	71.8	-5336	-6155	-343	-5 -343	-297	31
2 -2-79	1036	366.02		-.36944	55.31	71.9	-5115	-5934	-330	-5 -330	-284	44
2 -3-79	1240	367.11		-.36952	55.30	71.8	-4975	-5794	-322	-5 -322	-276	52
2 -4-79	345	367.7		-.36957	55.30	71.8	-4920	-5739	-319	-5 -319	-273	55
2 -5-79	1026	369.0		-.36954	55.30	71.8	-4855	-5674	-316	-5 -316	-270	58
2 -6-79	1518	370.2		-.36958	55.30	71.7	-4767	-5586	-311	-5 -311	-265	63
2 -7-79	1014	371.0		-.36951	55.30	71.8	-4754	-5573	-310	-5 -310	-264	64
2 -8-79	924	372.0		-.37004	55.24	71.1	-4685	-5504	-306	-5 -306	-260	68
2-15-79	1605	379.3		-.36933	55.33	72.1	-4551	-5370	-299	-5 -299	-253	75
2-20-79	918	384.0		-.37009	55.23	71.1	-4495	-5314	-296	-5 -296	-250	78
2-22-79	913	386.0		-.36998	55.25	71.2	-4457	-5276	-293	-5 -293	-247	81
2-27-79	1506	391.2		-.36980	55.27	71.4	-4395	-5214	-290	-5 -290	-244	84
3 -1-79	1235	393.1		-.36984	55.26	71.4	-4380	-5199	-289	-5 -289	-243	85
3 -6-79	1412	398.2		-.36973	55.28	71.6	-4330	-5149	-286	-5 -286	-240	88
3-13-79	1313	405.1		-.36971	55.28	71.6	-4280	-5099	-284	-5 -284	-238	90
3-20-79	1544	412.2		-.36970	55.28	71.6	-4216	-5035	-280	-5 -280	-234	94
3-28-79	824	419.9		-.36970	55.28	71.6	-4165	-4984	-277	-5 -277	-231	97
4 -4-79	1543	427.2		-.36951	55.30	71.8	-4135	-4954	-276	-5 -276	-230	98
4-18-79	1024	441.0		-.36957	55.30	71.8	-4071	-4890	-272	-5 -272	-226	102
5 -1-79	1026	454.0		-.36945	55.31	71.9	-4031	-4850	-270	-5 -270	-224	104
5-23-79	1456	476.2		-.36930	55.33	72.1	-3981	-4800	-267	-5 -267	-221	107
6-14-79	848	497.9		-.36922	55.34	72.2	-3941	-4760	-265	-5 -265	-219	109
* 6-14-79	1700	498.3	END OF TEST									

MODULUS: LOADING E= 4.4 AT 73 F., AGE 180 DAYS (STRESS LEVEL 0 TO 2100 PSI)
UNLOADING E= 4.9 AT 72 F., AGE 365 DAYS (STRESS LEVEL 2100 TO 0 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 19 SPECIMENES TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MIX TC1PA ES7448

SPECIMEN: SEALED 6 BY 15 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 68.23 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.58 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.65 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 13807 TO -21650 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.

CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.00)

STRAIN METER NO. : 1117 73-18
AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.

COMP. STRENGTH (365 DAY) : 6950. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 30.2 PERCENT OF COMP. STR.

AUTOGENOUS SPECIMEN NO.S : 1117 73-18
1498 73-19

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS UNDER LOAD	DAYS	TEMP. READING, VOLTS	METER RESIST, OHMS	TEMP., DEGREES F.	STRAIN READING VOLTS	MICRO-IN	TOTAL CHANGE INDICATED	AVG. AUTOG. VALUE	MICROSTRAIN TOTAL FROM AGE ONE DAY	ELASTIC PLUS CREEP	CREEP
* 2 -3-78	1000	0		SPECIMEN CAST									
2-16-78	1442	13.2		-.37198	54.99	71.5	3242	1	0		0		
* 2 -2-79	836	363.94		LOADING BEGINS									
2 -2-79	836	363.94	-.0007	-.37307	54.85	70.0	2390	-851	-48	0	-48	0	
* 2 -2-79	836	363.94		SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
2 -2-79	837	363.94	0.	-.37300	54.86	70.1	-5455	-8697	-502	0	-502	-454	0
2 -2-79	839	363.94	.0014	-.37306	54.85	70.1	-5640	-8881	-512	0	-512	-464	-10
2 -2-79	841	363.95	.0028	-.37306	54.85	70.1	-5700	-8941	-516	0	-516	-468	-14
2 -2-79	844	363.95	.0049	-.37306	54.85	70.1	-5747	-8988	-518	0	-518	-470	-16
2 -2-79	846	363.95	.0063	-.37303	54.86	70.1	-5775	-9016	-520	0	-520	-472	-18
2 -2-79	1014	364.02	.0813	-.37309	54.85	70.0	-6090	-9331	-538	0	-538	-490	-36
2 -2-79	1236	364.11	.1860	-.37308	54.85	70.0	-6225	-9466	-546	0	-546	-498	-44
2 -2-79	1429	364.19	.2744	-.37310	54.85	70.0	-6286	-9527	-550	0	-550	-502	-48
2 -3-79	1240	365.11	1.1698	-.37306	54.85	70.1	-6570	-9811	-566	0	-566	-518	-64
2 -4-79	345	365.74	1.7972	-.37301	54.86	70.1	-6660	-9901	-571	0	-571	-523	-69
2 -5-79	1026	367.0	3.1	-.37306	54.85	70.1	-6782	-10023	-578	0	-578	-530	-76
2 -6-79	1518	368.2	4.3	-.37313	54.84	70.0	-6877	-10118	-584	0	-584	-536	-82
2 -7-79	1014	369.0	5.1	-.37302	54.86	70.1	-6996	-10237	-591	0	-591	-543	-89
2 -8-79	924	370.0	6.0	-.37304	54.85	70.1	-7002	-10243	-591	0	-591	-543	-89
2 -9-79	1031	371.0	7.1	-.37313	54.84	70.0	-7027	-10268	-592	0	-592	-544	-90
2-16-79	1051	378.0	14.1	-.37288	54.88	70.3	-7330	-10571	-610	0	-610	-562	-108
2-20-79	918	382.0	18.0	-.37310	54.85	70.0	-7397	-10638	-614	0	-614	-566	-112
2-23-79	1618	385.3	21.3	-.37281	54.89	70.4	-7401	-10642	-614	0	-614	-566	-112
2-27-79	1506	389.2	25.3	-.37288	54.88	70.3	-7427	-10668	-616	0	-616	-568	-114
3 -2-79	1430	392.2	28.2	-.37281	54.88	70.4	-7535	-10776	-622	0	-622	-574	-120
3 -6-79	1412	396.2	32.2	-.37283	54.88	70.4	-7627	-10868	-627	0	-627	-579	-125
3-13-79	1313	403.1	39.2	-.37281	54.88	70.4	-7627	-10868	-627	0	-627	-579	-125
3-20-79	1544	410.2	46.3	-.37280	54.89	70.4	-7827	-11068	-639	0	-639	-591	-137
3-28-79	924	417.9	54.0	-.37278	54.89	70.4	-7937	-11168	-644	0	-644	-596	-142
4 -4-79	1543	423.2	61.3	-.37264	54.91	70.6	-8378	-11519	-665	0	-665	-617	-163
4-10-79	1024	429.0	75.1	-.37270	54.90	70.5	-8396	-11537	-672	0	-672	-624	-170
5 -1-79	1325	452.0	88.1	-.37260	54.91	70.7	-8366	-11507	-681	0	-681	-633	-179
5-23-79	1454	474.2	110.3	-.37257	54.91	70.7	-8477	-11620	-682	0	-682	-634	-180
6-14-79	848	495.9	132.0	-.37235	54.94	71.0	-8859	-12100	-698	0	-698	-650	-196
* 6-14-79	1700	496.3	END OF TEST										

MODULUS: LOADING E= 4.6 AT 70 F., AGE 364 DAYS (STRESS LEVEL 0 TO 2100 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 21 SPECIMENS TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TC2A ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.44 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.49 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.86 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 8012 TO -24120 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.04)

STRAIN METER NO. : 1488 73-14
AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.

COMP. STRENGTH (365 DAY) : 7380. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 28.5 PERCENT OF COMP. STR.

AUTOGENOUS SPECIMEN NO.S : 1117 73-18
1498 73-19

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	UNDER LOAD, DAYS	TEMP. READING, VOLTS	METER RESIST., OHMS	TEMP., DEGREES F.	STRAIN READING MICRO-VOLTS	CHANGE IN	TOTAL INDICATED	AVG. AUTOG. VALUE	MICROSTRAIN FROM AGE ONE DAY	ELASTIC PLUS	CREEP
* 2-1-78	1000	0	SPECIMEN CAST										
2-16-78	1442	15.2		-.36996	55.25	71.4	-4304	1	0		0		
* 2-1-79	934	364.98	LOADING BEGINS										
2-1-79	934	364.98	-.0007	-.37002	55.24	71.3	-5001	-696	-38	0	-38	0	
* 2-1-79	934	364.98	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI										
2-1-79	935	364.98	0.	-.36988	55.26	71.5	-13371	-9066	-511	0	-493	-455	0
2-1-79	937	364.98	.0014	-.36990	55.26	71.5	-13524	-9219	-519	0	-501	-463	-8
2-1-79	940	364.99	.0035	-.36995	55.25	71.4	-13588	-9283	-523	0	-504	-466	-11
2-1-79	943	364.99	.0056	-.36995	55.25	71.4	-13643	-9338	-526	0	-507	-469	-14
2-1-79	946	364.99	.0076	-.36990	55.26	71.5	-13686	-9381	-528	0	-509	-471	-16
2-1-79	1133	365.06	.0819	-.36995	55.25	71.4	-13993	-9688	-546	0	-526	-488	-33
2-1-79	1335	365.15	.1667	-.37004	55.24	71.3	-14090	-9785	-551	0	-531	-493	-38
2-1-79	1533	365.23	.2486	-.37004	55.24	71.3	-14085	-9780	-551	0	-531	-493	-38
2-2-79	1034	366.02	1.0410	-.37016	55.22	71.2	-14433	-10128	-571	0	-551	-513	-58
2-3-79	1240	367.1	2.1	-.37026	55.21	71.0	-14588	-10283	-579	0	-559	-520	-65
2-4-79	345	367.7	2.8	-.37035	55.20	70.9	-14678	-10373	-584	0	-563	-525	-70
2-5-79	1025	369.0	4.0	-.37003	55.24	71.3	-14761	-10456	-589	0	-568	-530	-75
2-6-79	1518	370.2	5.2	-.36993	55.25	71.5	-14821	-10516	-592	0	-571	-533	-78
2-7-79	1014	371.0	6.0	-.36985	55.26	71.6	-14894	-10589	-597	0	-576	-538	-83
2-8-79	924	372.0	7.0	-.36984	55.26	71.6	-14943	-10638	-599	0	-577	-539	-84
2-15-79	1605	379.3	14.3	-.36953	55.30	72.0	-15239	-10934	-616	0	-594	-556	-101
2-20-79	913	384.0	19.0	-.37001	55.24	71.3	-15395	-11090	-625	0	-602	-564	-109
2-27-79	1506	391.2	26.2	-.36968	55.28	71.8	-15466	-11161	-629	0	-606	-568	-113
3-1-79	1235	393.1	28.1	-.36969	55.28	71.8	-15630	-11325	-638	0	-615	-577	-122
3-6-79	1412	398.2	33.2	-.36960	55.29	71.9	-15673	-11368	-641	0	-618	-580	-125
3-13-79	1313	405.1	40.2	-.36956	55.30	71.9	-15689	-11383	-641	0	-618	-580	-125
3-20-79	1544	412.2	47.3	-.36955	55.30	72.0	-15917	-11612	-654	0	-630	-592	-137
3-28-79	824	419.9	55.0	-.36957	55.30	71.9	-16008	-11703	-659	0	-635	-597	-142
4-4-79	1543	427.2	62.3	-.36944	55.31	72.1	-16210	-11905	-671	0	-647	-609	-154
4-18-79	1024	441.0	76.0	-.36950	55.31	72.0	-16369	-12064	-680	0	-655	-617	-162
5-1-79	1026	454.0	89.0	-.36937	55.32	72.2	-16579	-12274	-692	0	-667	-629	-174
5-23-79	1455	476.2	111.2	-.36932	55.33	72.3	-16584	-12279	-692	0	-667	-629	-174
6-14-79	848	497.9	133.0	-.36910	55.36	72.6	-16914	-12609	-711	0	-685	-647	-192
* 6-14-79	1700	498.3	END OF TEST										

MODULUS: LOADING E= 4.6 AT 72 F., AGE 365 DAYS (STRESS LEVEL 0 TO 2100 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

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Table 22 SPECIMENES TOTAL, ELASTIC AND CREEP STRAINS -- CORRECTED FOR TEMPERATURE CHANGE
SAN ONOFRE OPTION 1 MIX TC2A ES7448
SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

METER CONSTANTS (8 IN. CARLSON METER) :
RESISTANCE AT 0.0 DEGREES F. = 48.23 OHMS
TEMPERATURE CALIBRA. CONSTANT = 10.50 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 9.03 MICROVOLTS PER VOLT PER MICROSTRAIN
CALIBRATED STRAIN RANGE = 14222 TO -18730 MICROVOLTS
COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN PER DEGREE F.
CONCRETE CONSTANTS :
COEFF. OF THERMAL EXPANSION = 6.8 MICROSTRAIN PER DEGREE F.
STRAIN IN CONCRETE UNDER APPLIED LOAD = METER STRAIN/(1.00+.00)

STRAIN METER NO. : 1495 73-15
AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.

COMP. STRENGTH (365 DAY) : 7380. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 28.5 PERCENT OF COMP. STR.

AUTOGENOUS SPECIMEN NO.S : 1117 73-18
1498 73-19

NOTE: APPLIED BRIDGE VOLTAGE FOR TEMP. AND STRAIN READINGS = 2.0000 VOLTS

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	TEMP. READING, VOLTS	METER RESIST. OHMS	TEMP., DEGREES F.	STRAIN READING VOLTS	MICROSTRAIN MICRO-IN	TOTAL CHANGE INDICATED	AVG. AUTOG. VALUE	TOTAL FROM AGE ONE DAY	ELASTIC PLUS CREEP	CREEP
* 2-1-78	1000	0		SPECIMEN CAST									
2-16-78	1442	15.2		-.37121	55.09	72.0	3790	0	0		0		
* 2-1-79	934	364.98		LOADING BEGINS									
2-1-79	934	364.98	-.0007	-.37197	54.99	71.0	3542	-248	-13	0	-13	0	
* 2-1-79	934	364.98		SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
2-1-79	935	364.98	0.	-.37203	54.98	70.9	-4670	-8460	-467	0	-467	-454	0
2-1-79	937	364.98	.0014	-.37195	54.99	71.0	-4821	-8611	-476	0	-476	-463	-9
2-1-79	940	364.99	.0035	-.37198	54.99	71.0	-4892	-8682	-480	0	-480	-467	-13
2-1-79	943	364.99	.0056	-.37196	54.99	71.0	-4935	-8725	-482	0	-482	-469	-15
2-1-79	946	364.99	.0076	-.37190	55.00	71.1	-4969	-8759	-484	0	-484	-471	-17
2-1-79	1133	365.06	.0819	-.37168	55.03	71.4	-5265	-9055	-500	0	-500	-487	-33
2-1-79	1335	365.15	.1667	-.37161	55.04	71.5	-5365	-9155	-506	0	-506	-493	-39
2-1-79	1533	365.23	.2486	-.37146	55.06	71.7	-5465	-9255	-511	0	-511	-498	-44
2-2-79	1034	366.02	1.0410	-.37153	55.05	71.6	-5730	-9520	-526	0	-526	-513	-59
2-3-79	1240	367.1	2.1	-.37163	55.03	71.5	-5877	-9667	-534	0	-534	-521	-67
2-4-79	745	367.7	2.8	-.37171	55.02	71.3	-5927	-9717	-537	0	-537	-524	-70
2-5-79	1026	369.0	4.0	-.37141	55.06	71.7	-6045	-9835	-544	0	-544	-531	-77
2-6-79	1518	370.2	5.2	-.37136	55.07	71.8	-6107	-9897	-547	0	-547	-534	-80
2-7-79	1014	371.0	6.0	-.37122	55.09	72.0	-6166	-9956	-550	0	-550	-537	-83
2-8-79	924	372.0	7.0	-.37126	55.08	71.9	-6208	-9998	-553	0	-553	-540	-86
2-15-79	1605	379.3	14.3	-.37108	55.10	72.2	-6478	-10268	-568	0	-568	-555	-101
2-20-79	918	384.0	19.0	-.37149	55.05	71.6	-6615	-10405	-575	0	-575	-562	-108
2-27-79	1506	391.2	26.2	-.37116	55.09	72.1	-6662	-10452	-578	0	-578	-565	-111
3-1-79	1235	393.1	28.1	-.37121	55.09	72.0	-6815	-10605	-596	0	-586	-573	-119
3-6-79	1412	398.2	33.2	-.37113	55.10	72.1	-6855	-10645	-598	0	-588	-575	-121
3-13-79	1313	405.1	40.2	-.37111	55.10	72.1	-6870	-10660	-589	0	-589	-576	-122
3-20-79	1544	412.2	47.3	-.37110	55.10	72.2	-7093	-10883	-602	0	-602	-589	-135
3-28-79	824	419.9	55.0	-.37113	55.10	72.1	-7187	-10977	-607	0	-607	-594	-140
4-4-79	1543	427.2	62.3	-.37104	55.11	72.2	-7285	-11275	-623	0	-623	-610	-156
4-18-79	1324	441.0	76.0	-.37117	55.09	72.1	-7584	-11374	-629	0	-629	-616	-162
5-1-79	1026	454.0	89.0	-.37102	55.11	72.3	-7789	-11579	-640	0	-640	-627	-173
5-23-79	1456	476.2	111.2	-.37105	55.11	72.2	-7991	-11781	-651	0	-651	-638	-184
6-14-79	948	497.9	133.0	-.37085	55.13	72.5	-8101	-11891	-657	0	-657	-644	-190
* 6-14-79	1700	498.3	END OF TEST										

MODULUS: LOADING E= 4.6 AT 71 F., AGE 365 DAYS (STRESS LEVEL 0 TO 2100 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES TIME WHEN SPECIMEN IS BEING LOADED

Table 23 AVERAGE TOTAL, ELASTIC, CREEP AND AUTOGENOUS STRAINS, -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MIX TC19A ES7448

SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

SPECIMEN	METER NO.	CHANNEL	EL. MOD., MPSI
NO.1	1499	20-02	3.9
NO.2	1116	20-03	3.9
AUTOG.1	1117	73-18	
AUTOG.2	1498	73-19	

AGE AT LOADING : 28 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (28 DAY) : 5460. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 38.5 PERCENT OF COMP. STR.

DATE	TIME	CONCRETE AGE, DAYS	UNDER LOAD	TEMP. DEG.F.	AUTOG. STRAIN	MICROSTRAIN (FROM TIME OF LOADING) TOTAL SPECIMEN NO.1	TOTAL SPECIMEN NO.2	TOTAL AVG.	ELASTIC PLUS CREEP SPECIMEN NO.1	ELASTIC PLUS CREEP SPECIMEN NO.2	ELASTIC PLUS CREEP AVG.	CREEP SPECIMEN NO.1	CREEP SPECIMEN NO.2	CREEP AVG.	AVERAGE SPECIFIC CREEP, STRAIN/PSI
* 2 -3-78	1000	0		SPECIMENS CAST											
* 3 -3-78	835	27.94		LOADING BEGINS											
3 -3-78	835	27.94	-.0007	72.4	0 **	0	0	0 **	0	0	0 **	0	0	0 **	0.
* 3 -3-78	835	27.94		SPECIMENS FULLY LOADED, APPLIED TEST STRESS 2100 PSI											
3 -3-78	836	27.94	0.	72.5	0 **	-540	-541	-540 **	-540	-541	-540 **	0	0	0 **	0.
3 -3-78	841	27.95	.0035	72.5	0 **	-564	-566	-565 **	-564	-566	-565 **	-24	-25	-24 **	-.01143
3 -3-78	848	27.95	.0083	72.5	0 **	-578	-579	-578 **	-578	-579	-578 **	-38	-38	-38 **	-.01810
3 -3-78	906	27.96	.0208	72.6	0 **	-592	-594	-593 **	-592	-594	-593 **	-52	-53	-52 **	-.02476
3 -3-78	930	27.98	.0375	72.7	0 **	-601	-604	-602 **	-601	-604	-602 **	-61	-63	-62 **	-.02952
3 -3-78	1050	28.03	.0931	72.8	0 **	-619	-621	-620 **	-619	-621	-620 **	-79	-80	-79 **	-.03762
3 -3-78	1434	28.19	.2486	72.8	0 **	-638	-642	-640 **	-638	-642	-640 **	-98	-101	-99 **	-.04714
3 -3-78	1556	28.25	.3056	72.8	0 **	-644	-647	-645 **	-644	-647	-645 **	-104	-106	-105 **	-.05000
3 -4-78	923	28.97	1.0326	72.5	0 **	-677	-681	-679 **	-677	-681	-679 **	-137	-140	-138 **	-.06571
3 -5-78	1010	30.0	2.1	72.5	-1 **	-705	-710	-707 **	-704	-709	-706 **	-164	-168	-166 **	-.07905
3 -6-78	1034	31.0	3.1	72.7	-2 **	-723	-730	-726 **	-721	-728	-724 **	-181	-187	-184 **	-.08762
3 -7-78	840	31.9	4.0	72.8	-2 **	-737	-743	-740 **	-735	-741	-738 **	-195	-200	-197 **	-.09381
3 -8-78	1310	33.1	5.2	72.9	-2 **	-752	-760	-756 **	-750	-758	-754 **	-210	-217	-213 **	-.10143
3 -9-78	904	34.0	6.0	72.7	-2 **	-761	-769	-765 **	-759	-767	-763 **	-219	-226	-222 **	-.10571
3-10-78	816	34.9	7.0	72.5	-2 **	-769	-778	-773 **	-767	-776	-771 **	-227	-235	-231 **	-.11000
3-14-78	1434	39.2	11.2	72.9	-1 **	-801	-813	-807 **	-800	-812	-806 **	-260	-271	-265 **	-.12619
3-15-78	1621	40.3	12.3	73.2	-1 **	-806	-817	-811 **	-805	-816	-810 **	-265	-275	-270 **	-.12857
3-17-78	1152	42.1	14.1	73.2	-1 **	-816	-828	-822 **	-815	-827	-821 **	-275	-286	-280 **	-.13333
3-22-78	1120	47.1	19.1	72.6	-1 **	-839	-855	-847 **	-838	-854	-846 **	-298	-313	-305 **	-.14524
3-28-78	1541	53.2	25.3	73.1	-1 **	-862	-886	-874 **	-861	-885	-873 **	-321	-344	-332 **	-.15810
4-10-78	1441	66.2	38.3	72.8	-2 **	-897	-924	-910 **	-895	-922	-908 **	-355	-381	-368 **	-.17524
4-19-78	852	75.0	47.0	72.9	-3 **	-911	-939	-925 **	-908	-936	-922 **	-368	-395	-381 **	-.18143
5 -9-78	814	94.9	67.0	73.5	-5 **	-949	-975	-962 **	-944	-971	-957 **	-404	-430	-417 **	-.19857
5-16-78	1111	102.0	74.1	73.0	-7 **	-961	-987	-974 **	-954	-980	-967 **	-414	-439	-426 **	-.20286
5-23-78	810	108.9	81.0	73.0	-8 **	-969	-996	-982 **	-961	-988	-974 **	-421	-447	-434 **	-.20667
5-30-78	832	115.9	88.0	73.1	-9 **	-974	-1005	-991 **	-969	-996	-982 **	-429	-455	-442 **	-.21048
6 -6-78	1358	123.2	95.2	72.9	-14 **	-987	-1015	-1001 **	-973	-1001	-987 **	-433	-460	-446 **	-.21238
6-13-78	1122	130.1	102.1	72.7	-14 **	-996	-1024	-1010 **	-982	-1010	-996 **	-442	-469	-455 **	-.21667
6-20-78	806	136.9	109.0	72.7	-14 **	-1003	-1032	-1017 **	-989	-1018	-1303 **	-449	-477	-463 **	-.22048
6-27-78	1119	144.1	116.1	73.0	-14 **	-1009	-1041	-1025 **	-995	-1027	-1011 **	-455	-486	-470 **	-.22381
7 -4-78	1003	151.0	123.1	72.5	-15 **	-1015	-1046	-1030 **	-1000	-1031	-1015 **	-460	-490	-475 **	-.22619
7-11-78	1712	158.3	130.4	73.1	-15 **	-1022	-1053	-1037 **	-1007	-1038	-1022 **	-467	-497	-482 **	-.22952
7-18-78	1642	165.2	137.3	73.4	-16 **	-1027	-1060	-1043 **	-1011	-1044	-1027 **	-471	-503	-487 **	-.23190
7-25-78	1028	172.0	144.1	72.7	-16 **	-1031	-1069	-1050 **	-1015	-1053	-1034 **	-475	-512	-493 **	-.23476
8 -1-78	954	179.0	151.1	72.9	-18 **	-1036	-1074	-1055 **	-1019	-1056	-1037 **	-478	-515	-496 **	-.23619
8 -8-78	829	185.9	158.0	73.0	-17 **	-1039	-1079	-1058 **	-1021	-1062	-1041 **	-481	-521	-501 **	-.23857
8-15-78	843	192.9	165.0	72.9	-18 **	-1043	-1084	-1063 **	-1025	-1066	-1045 **	-485	-525	-505 **	-.24048
8-22-78	859	200.0	172.0	72.8	-20 **	-1049	-1089	-1069 **	-1029	-1069	-1049 **	-489	-528	-508 **	-.24190
8-29-78	1011	207.0	179.1	73.2	-19 **	-1050	-1090	-1070 **	-1031	-1071	-1051 **	-491	-530	-510 **	-.24286
9 -5-78	832	213.9	186.0	72.9	-19 **	-1051	-1096	-1073 **	-1032	-1077	-1054 **	-492	-536	-514 **	-.24476
9-19-78	821	227.9	200.0	73.4	-19 **	-1043	-1107	-1085 **	-1044	-1088	-1066 **	-504	-547	-525 **	-.25000
10 -3-78	1444	242.2	214.3	73.5	-19 **	-1070	-1115	-1092 **	-1051	-1096	-1073 **	-511	-555	-533 **	-.25381
10-17-78	1645	256.3	228.3	73.0	-18 **	-1072	-1115	-1093 **	-1054	-1097	-1075 **	-514	-556	-535 **	-.25476
11 -1-78	1550	271.2	243.3	73.0	-16 **	-1083	-1126	-1104 **	-1067	-1110	-1088 **	-527	-569	-548 **	-.26095
11-28-78	1045	298.0	270.1	72.5	-20 **	-1097	-1140	-1118 **	-1077	-1120	-1098 **	-537	-579	-558 **	-.26571
12-12-78	1045	312.0	284.1	72.6	-17 **	-1100	-1145	-1122 **	-1083	-1128	-1105 **	-543	-587	-565 **	-.26905
12-19-78	1542	319.2	291.3	72.5	-21 **	-1104	-1147	-1125 **	-1083	-1124	-1104 **	-543	-585	-564 **	-.26857
1 -3-79	1101	334.0	306.1	72.0	-21 **	-1108	-1153	-1130 **	-1087	-1132	-1109 **	-547	-591	-569 **	-.27095
1 -9-79	1423	340.2	312.2	72.5	-22 **	-1111	-1156	-1133 **	-1089	-1134	-1111 **	-549	-593	-571 **	-.27190
2 -2-79	853	364.0	336.0	72.0	-23 **	-1117	-1161	-1140 **	-1094	-1140	-1117 **	-554	-599	-576 **	-.27429
* 2 -2-79	854	364.0	336.0		SPECIMENS FULLY UNLOADED, ZERO APPLIED TEST STRESS							CREEP RECOVERY			
2 -2-79	854	364.0		71.7	-23 **	-793	-861	-827 **	-770	-838	-804 **	0	0	0 **	
2 -2-79	856	364.0		71.7	-23 **	-749	-851	-800 **	-726	-828	-777 **	44	10	27 **	
2 -2-79	858	364.0		71.7	-23 **	-747	-849	-797 **	-724	-825	-774 **	46	13	29 **	
2 -2-79	901	364.0		71.7	-23 **	-745	-846	-795 **	-722	-823	-772 **	48	15	31 **	
2 -2-79	904	364.0		71.7	-23 **	-744	-845	-794 **	-721	-822	-771 **	49	16	32 **	
2 -2-79	1051	364.0		71.8	-23 **	-731	-833	-782 **	-708	-810	-759 **	62	28	45 **	
2 -2-79	1249	364.1		71.9	-23 **	-727	-828	-777 **	-704	-805	-754 **	66	33	49 **	
2 -2-79	1455	364.2		72.0	-23 **	-724	-825	-774 **	-701	-802	-751 **	69	36	52 **	
2 -3-79	1236	365.1		71.7	-23 **	-712	-810	-761 **	-689	-787	-738 **	81	51	66 **	
2 -4-79	352	365.7		71.4	-23 **	-706	-805	-755 **	-683	-782	-732 **	87	56	71 **	
2 -5-79	1021	367.0		72.0	-23 **	-700	-798	-749 **	-677	-775	-726 **	93	63	78 **	
2 -6-79	1608	368.3		72.0	-23 **	-697	-794	-745 **	-674	-771	-722 **	96	67	81 **	
2 -7-79	1019	369.0		72.0	-23 **	-695	-791	-743 **	-672	-768	-720 **	98	70	84 **	
2 -8-79	919	370.0		72.0	-23 **	-693	-789	-741 **	-670	-765	-718 **	100	72	86 **	
2 -9-79	1004	371.0		71.9	-23 **	-687	-786	-736 **	-664	-763	-713 **	106	75	90 **	
2-16-79	1101	378.0		72.2	-23 **	-674	-774	-724 **	-651	-751	-701 **	119	87	103 **	
2-20-79	1003	382.0		72.0	-23 **	-673	-769	-721 **	-650	-746	-698 **	120	92	106 **	
2-23-79	1623	385.3		71.2	-23 **	-667	-768	-717 **	-644	-745	-694 **	126	93	109 **	
2-27-79	1511	389.2		71.2	-23 **	-665	-766	-715 **	-642	-743	-692 **	128	95	111 **	
3 -2-79	1424	392.2		71.2	-23 **	-663	-764	-713 **	-640	-741	-690 **	130	97	113 **	
3 -6-79	1417	396.2		71.4	-23 **	-658	-759	-708 **	-635	-736	-685 **	135	102	118 **	
3-13-79	1326	403.1		71.4	-23 **	-655	-756	-705 **	-632	-733	-682 **	138	105	121 **	
3-20-79	1549	410.2		71.4	-23 **	-650	-751	-700 **	-627	-728	-677 **	143	110	126 **	
3-28-79	830	417.9		71.1	-23 **	-648	-749	-698 **	-625	-726	-675 **	145	112	128 **	
4 -4-79	1548	425.2		71.5	-23 **	-645	-747	-696 **	-622	-724	-673 **	148	114	131 **	
4-18-79	1011	439.0		71.2	-23 **	-640	-741	-690 **	-617	-718	-667 **	153	120	136 **	
5 -1-79	1019	452.0		71.4	-23 **	-635	-737	-686 **	-612	-714	-663 **	158	124	141 **	
5-23-79	1444	474.2		71.5	-23 **	-630	-732	-681 **	-607	-709	-658 **	163	129	146 **	
6-14-79	859	496.0		71.9	-23 **	-625	-726	-675 **	-602	-703	-652 **	168	135	151 **	
* 6-14-79	1700	496.0	END OF TEST												

TABLE 23

Table 24 AVERAGE TOTAL, ELASTIC, CREEP AND AUTOGENOUS STRAINS, -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MIX TC2A ES7448

SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

SPECIMEN	METER NO.	CHANNEL	EL. MOD., MPSI
NO.1	1483	20-00	4.0
NO.2	1487	20-01	4.1
AUTOG.1	1488	73-14	
AUTOG.2	1495	73-15	

AGE AT LOADING : 28 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (28 DAY) : 6050. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 34.7 PERCENT OF COMP. STR.

DATE	TIME	CONCRETE AGE, DAYS	UNDER LOAD	TEMP. DEG.F.	AUTOG. STRAIN	MICROSTRAIN (FROM TIME OF LOADING) TOTAL NO.1	TOTAL NO.2	TOTAL AVG.	ELASTIC PLUS CREEP NO.1	ELASTIC PLUS CREEP NO.2	ELASTIC PLUS CREEP AVG.	CREEP NO.1	CREEP NO.2	CREEP AVG.	AVERAGE SPECIFIC CREEP, STRAIN/PSI
* 2 -1-78	1000	0	SPECIMENS CAST												
* 3 -1-78	900	27.96	LOADING BEGINS												
3 -1-78	900	27.96	-.0007	74.3		0 **	0	0	0 **	0	0	0 **	0	0	0 **	0.
* 3 -1-78	900	27.96	SPECIMENS FULLY LOADED, APPLIED TEST STRESS 2100 PSI												
3 -1-78	901	27.96	0.	74.4		0 **	-522	-514	-518 **	-522	-514	-518 **	0	0	0 **	0.
3 -1-78	907	27.96	.0042	74.5		0 **	-548	-538	-543 **	-548	-538	-543 **	-26	-24	-25 **	-.01190
3 -1-78	915	27.97	.0097	74.4		0 **	-562	-551	-556 **	-562	-551	-556 **	-40	-37	-38 **	-.01810
3 -1-78	935	27.98	.0236	74.5		0 **	-574	-565	-569 **	-574	-565	-569 **	-52	-51	-51 **	-.02429
3 -1-78	1009	28.01	.0472	74.5		0 **	-585	-577	-581 **	-585	-577	-581 **	-63	-63	-63 **	-.03000
3 -1-78	1103	28.04	.0847	74.4		0 **	-595	-588	-591 **	-595	-588	-591 **	-73	-74	-73 **	-.03476
3 -1-78	1506	28.21	.2535	74.5		0 **	-617	-611	-614 **	-617	-611	-614 **	-95	-97	-96 **	-.04571
3 -1-78	1705	28.30	.3361	74.6		1 **	-624	-618	-621 **	-625	-619	-622 **	-103	-105	-104 **	-.04952
3 -2-78	801	28.92	.9583	73.6		1 **	-650	-645	-647 **	-651	-646	-648 **	-129	-132	-130 **	-.06190
3 -3-78	830	29.94	1.9785	73.6		0 **	-679	-674	-676 **	-679	-674	-676 **	-157	-160	-158 **	-.07524
3 -4-78	923	31.0	3.0	73.6		0 **	-696	-695	-695 **	-696	-695	-695 **	-174	-181	-177 **	-.08429
3 -5-78	1010	32.0	4.0	73.6		-1 **	-711	-710	-710 **	-710	-709	-709 **	-188	-195	-191 **	-.09095
3 -6-78	1034	33.0	5.1	73.7		-2 **	-722	-722	-722 **	-720	-720	-720 **	-198	-206	-202 **	-.09619
3 -7-78	840	33.9	6.0	73.8		-2 **	-731	-731	-731 **	-729	-729	-729 **	-207	-215	-211 **	-.10048
3 -8-78	1310	35.1	7.2	74.0		-2 **	-744	-743	-743 **	-742	-741	-741 **	-220	-227	-223 **	-.10619
3 -9-78	904	36.0	8.0	73.7		-2 **	-749	-749	-749 **	-747	-747	-747 **	-225	-233	-229 **	-.10905
3-14-78	1434	41.2	13.2	73.9		-4 **	-782	-783	-782 **	-778	-779	-778 **	-256	-265	-260 **	-.12381
3-15-78	1621	42.3	14.3	74.3		-4 **	-789	-788	-788 **	-785	-784	-784 **	-263	-270	-266 **	-.12667
3-17-78	1152	44.1	16.1	74.3		-5 **	-797	-796	-796 **	-792	-791	-791 **	-270	-277	-273 **	-.13000
3-22-78	1120	49.1	21.1	73.6		-7 **	-816	-816	-816 **	-809	-809	-809 **	-287	-295	-291 **	-.13857
3-28-78	1541	55.2	27.3	74.1		-7 **	-837	-837	-837 **	-830	-830	-830 **	-308	-316	-312 **	-.14857
4-10-78	1441	68.2	40.2	73.9		-11 **	-867	-870	-868 **	-856	-859	-857 **	-334	-345	-339 **	-.16143
4-19-78	852	77.0	49.0	73.9		-12 **	-878	-883	-880 **	-866	-871	-868 **	-344	-357	-350 **	-.16667
5 -9-78	814	96.9	69.0	74.5		-15 **	-909	-919	-914 **	-894	-904	-899 **	-372	-390	-381 **	-.18143
5-16-78	1111	104.0	76.1	74.1		-16 **	-919	-930	-924 **	-903	-914	-908 **	-381	-400	-390 **	-.18571
5-23-78	810	110.9	83.0	74.0		-19 **	-928	-942	-935 **	-909	-923	-916 **	-387	-409	-398 **	-.18952
5-30-78	832	117.9	90.0	74.2		-19 **	-934	-951	-942 **	-915	-932	-923 **	-393	-418	-405 **	-.19286
6 -6-78	1355	125.2	97.2	73.9		-20 **	-940	-957	-949 **	-920	-937	-928 **	-398	-423	-410 **	-.19524
6-13-78	1122	132.1	104.1	73.8		-21 **	-947	-964	-955 **	-926	-943	-934 **	-404	-429	-416 **	-.19810
6-20-78	806	138.9	111.0	73.7		-20 **	-952	-970	-961 **	-932	-950	-941 **	-410	-436	-423 **	-.20143
6-27-78	1119	146.1	118.1	74.0		-20 **	-958	-977	-967 **	-938	-957	-947 **	-416	-443	-429 **	-.20429
7 -4-78	1003	153.0	125.0	73.6		-21 **	-961	-982	-971 **	-940	-961	-950 **	-418	-447	-432 **	-.20571
7-11-78	1712	160.3	132.3	74.1		-19 **	-969	-988	-978 **	-950	-969	-959 **	-428	-455	-441 **	-.21000
7-18-78	1642	167.3	139.3	74.4		-20 **	-974	-994	-984 **	-954	-974	-964 **	-432	-460	-446 **	-.21238
7-25-78	1028	174.0	146.1	73.8		-20 **	-978	-998	-988 **	-958	-978	-968 **	-436	-464	-450 **	-.21429
8 -1-78	954	181.0	153.0	73.9		-17 **	-980	-1003	-991 **	-963	-986	-974 **	-441	-472	-456 **	-.21714
8 -8-78	829	187.9	160.0	74.1		-16 **	-982	-1005	-993 **	-966	-989	-977 **	-444	-475	-459 **	-.21857
8-15-78	843	194.9	167.0	74.0		-17 **	-987	-1011	-999 **	-970	-994	-982 **	-448	-480	-464 **	-.22095
8-22-78	859	202.0	174.0	73.9		-17 **	-991	-1015	-1003 **	-974	-998	-986 **	-452	-484	-468 **	-.22286
8-29-78	1011	209.0	181.0	74.2		-18 **	-993	-1017	-1005 **	-975	-999	-987 **	-453	-485	-469 **	-.22333
9 -5-78	832	215.9	188.0	73.9		-20 **	-995	-1020	-1007 **	-975	-1000	-987 **	-453	-486	-469 **	-.22333
9-19-78	821	229.9	202.0	74.5		-20 **	-1008	-1032	-1020 **	-988	-1012	-1000 **	-466	-498	-482 **	-.22952
10 -3-78	1444	244.2	216.2	74.6		-18 **	-1014	-1039	-1026 **	-996	-1021	-1008 **	-474	-507	-490 **	-.23333
10-17-78	1645	258.3	230.3	74.1		-17 **	-1016	-1040	-1028 **	-999	-1023	-1011 **	-477	-509	-493 **	-.23476
11 -1-78	1550	273.2	245.3	74.0		-15 **	-1026	-1052	-1039 **	-1011	-1037	-1024 **	-489	-523	-506 **	-.24095
11-28-78	1045	300.0	272.1	73.5		-19 **	-1039	-1067	-1053 **	-1020	-1048	-1034 **	-498	-534	-516 **	-.24571
12-12-78	1045	314.0	286.1	73.6		-17 **	-1044	-1074	-1059 **	-1027	-1057	-1042 **	-505	-543	-524 **	-.24952
12-19-78	1542	321.2	293.3	73.5		-21 **	-1055	-1077	-1066 **	-1034	-1056	-1045 **	-512	-542	-527 **	-.25095
1 -9-79	1423	342.2	314.2	73.5		-22 **	-1057	-1085	-1071 **	-1035	-1063	-1049 **	-513	-549	-531 **	-.25286
1-23-79	1456	356.2	328.2	73.5		-22 **	-1064	-1092	-1078 **	-1042	-1070	-1056 **	-520	-556	-538 **	-.25619
1-30-79	1405	363.2	335.2	73.3		-23 **	-1065	-1095	-1080 **	-1042	-1072	-1057 **	-520	-558	-539 **	-.25667
2 -1-79	1008	365.0	337.0	73.0		-23 **	-1067	-1094	-1080 **	-1044	-1071	-1057 **	-522	-557	-539 **	-.25667
* 2 -1-79	1009	365.0	337.0	SPECIMENS FULLY UNLOADED, ZERO APPLIED TEST STRESS									CREEP RECOVERY			
2 -1-79	1009	365.0		72.6	-23 **	-775	-746	-761 **	-753	-723	-738 **	0	0	0 **	
2 -1-79	1010	365.0		72.7	-23 **	-764	-735	-749 **	-741	-712	-725 **	12	11	11 **	
2 -1-79	1013	365.0		72.6	-23 **	-761	-733	-747 **	-738	-710	-724 **	15	13	14 **	
2 -1-79	1016	365.0		72.6	-23 **	-758	-731	-744 **	-735	-708	-721 **	18	15	16 **	
2 -1-79	1019	365.0		72.7	-23 **	-757	-730	-743 **	-734	-707	-720 **	19	16	17 **	
2 -1-79	1206	365.1		72.7	-23 **	-733	-717	-725 **	-710	-694	-702 **	43	29	36 **	
2 -1-79	1407	365.2		72.8	-23 **	-728	-714	-721 **	-705	-691	-698 **	48	32	40 **	
2 -1-79	1612	365.3		72.9	-23 **	-724	-710	-717 **	-701	-687	-694 **	52	36	44 **	
2 -2-79	1051	366.0		72.7	-23 **	-718	-701	-709 **	-695	-678	-686 **	58	45	51 **	
2 -3-79	1236	367.1		72.6	-23 **	-706	-693	-699 **	-683	-670	-676 **	70	53	61 **	
2 -4-79	352	367.7		72.4	-23 **	-704	-690	-697 **	-681	-667	-674 **	72	56	64 **	
2 -5-79	1021	369.0		72.9	-23 **	-698	-686	-692 **	-675	-663	-669 **	78	60	69 **	
2 -6-79	1608	370.3		73.0	-23 **	-695	-683	-689 **	-672	-660	-666 **	81	63	72 **	
2 -7-79	1019	371.0		73.0	-23 **	-691	-680	-685 **	-668	-657	-662 **	85	66	75 **	
2 -8-79	919	372.0		73.0	-23 **	-688	-678	-683 **	-665	-655	-660 **	88	68	78 **	
2-15-79	1601	379.3		73.4	-23 **	-682	-666	-674 **	-659	-643	-651 **	94	80	87 **	
2-20-79	1003	384.0		72.9	-23 **	-672	-662	-667 **	-649	-639	-644 **	104	84	94 **	
2-22-79	919	386.0		73.0	-23 **	-675	-660	-667 **	-652	-637	-644 **	101	86	93 **	
2-27-79	1511	391.2		72.3	-23 **	-661	-657	-659 **	-638	-634	-636 **	115	89	102 **	
3 -1-79	1241	393.1		72.2	-23 **	-659	-656	-657 **	-636	-633	-634 **	117	90	103 **	
3 -6-79	1417	398.2		72.5	-23 **	-655	-651	-653 **	-632	-628	-630 **	121	95	108 **	
3-13-79	1326	405.1		72.5	-23 **	-651	-648	-649 **	-628	-625	-626 **	125	98	111 **	
3-20-79	1549	412.2		72.5	-23 **	-647	-644	-645 **	-624	-621	-622 **	129	102	115 **	
3-26-79	830	419.9		72.1	-23 **	-644	-643	-643 **	-621	-620	-620 **	132	103	117 **	
4 -4-79	1548	427.2		72.6	-23 **	-642	-641	-641 **	-619	-618	-618 **	134	105	119 **	
4-18-79	1011	441.0		72.4	-23 **	-636	-636	-636 **	-613	-613	-613 **	140	110	125 **	
5 -1-79	1019	454.0		72.6	-23 **	-632	-633	-632 **	-609	-610	-609 **	144	113	128 **	
5-23-79	1444	476.2		72.7	-23 **	-628	-630	-629 **	-605	-607	-606 **	148	116	132 **	
6-14-79	859	498.0		73.0	-23 **	-622	-626	-624 **	-599	-603	-601 **	154	120	137 **	
* 6-14-79	1700	498.0	END OF TEST												

Table 25 AVERAGE TOTAL, ELASTIC, CREEP AND AUTOGENOUS STRAINS. -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MIX TCIPA ES7448

SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

SPECIMEN	METER NO.	CHANNEL	EL. MOD., MPSI
NO.1	1119	73-16	4.3
NO.2	1497	73-17	4.2
AUTOG.1	1117	73-18	
AUTOG.2	1498	73-19	

AGE AT LOADING : 180 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (180 DAY) : 6600. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 31.8 PERCENT OF COMP. STR.

DATE	TIME	CONCRETE AGE, DAYS	AVG. LOAD	AVG. TEMP. DEG.F.	MICROSTRAIN (FROM TIME OF LOADING) TOTAL NO.1	TOTAL NO.2	TOTAL AVG.	ELASTIC PLUS CREEP NO.1	ELASTIC PLUS CREEP NO.2	ELASTIC PLUS CREEP AVG.	CREEP NO.1	CREEP NO.2	CREEP AVG.	AVERAGE SPECIFIC STRAIN/PSI
2-3-78	1000	0	SPECIMENS CAST											
2-8-78	904	179.96	LOADING BEGINS											
2-8-78	904	179.96	-.0007	71.8	0	0	0	0	0	0	0	0	0	0.
2-8-78	904	179.96	SPECIMENS FULLY LOADED, APPLIED TEST STRESS 2100 PSI											
2-8-78	935	179.96	0.	71.3	0	-485	-500	-492	-485	-500	-492	0	0	0 0.
2-8-78	909	179.96	.0028	71.8	0	-495	-508	-501	-495	-508	-501	-10	-8	-9 -.00429
2-8-78	915	179.97	.0069	71.9	0	-500	-513	-506	-500	-513	-506	-15	-13	-14 -.00667
2-8-78	936	179.98	.0215	71.8	0	-509	-523	-516	-509	-523	-516	-24	-23	-23 -.01095
2-8-78	1105	180.05	.0833	71.9	-1	-521	-535	-528	-520	-534	-527	-35	-34	-34 -.01619
2-8-78	1303	180.13	.1653	71.8	-1	-529	-541	-535	-528	-540	-534	-43	-40	-41 -.01952
2-8-78	1501	180.21	.2472	71.7	0	-533	-546	-539	-533	-545	-539	-48	-46	-47 -.02238
3-3-78	814	180.93	.9646	71.6	1	-551	-562	-556	-552	-563	-557	-67	-63	-65 -.03095
3-4-78	816	181.93	1.9660	71.5	1	-562	-574	-568	-563	-575	-569	-78	-75	-76 -.03619
3-5-78	1301	183.1	3.2	71.8	1	-571	-582	-576	-572	-583	-577	-87	-83	-85 -.04048
3-6-78	1154	184.1	4.1	71.9	1	-576	-587	-581	-577	-588	-582	-92	-88	-90 -.04286
3-7-78	811	184.9	5.0	72.0	0	-582	-593	-587	-582	-593	-587	-97	-93	-95 -.04524
3-8-78	807	185.9	6.0	71.7	2	-584	-596	-590	-586	-598	-592	-101	-98	-99 -.04714
3-9-78	808	186.9	7.0	71.7	-1	-589	-600	-594	-588	-599	-593	-103	-99	-101 -.04810
3-16-78	1537	194.3	14.3	71.6	2	-611	-622	-616	-613	-624	-618	-128	-124	-126 -.06000
3-23-78	944	201.0	21.0	71.7	-2	-625	-639	-632	-624	-637	-630	-139	-137	-138 -.06571
3-30-78	930	208.0	28.0	71.9	1	-643	-653	-648	-644	-654	-649	-159	-154	-156 -.07429
4-5-78	815	213.9	34.0	71.7	0	-650	-660	-655	-650	-660	-655	-165	-160	-162 -.07714
4-3-78	1435	242.2	62.2	71.6	0	-682	-692	-687	-682	-692	-687	-197	-192	-194 -.09238
4-17-78	1636	256.3	76.3	71.9	1	-693	-702	-697	-694	-703	-698	-209	-203	-206 -.09810
5-1-78	1540	271.2	91.3	71.9	3	-701	-709	-705	-704	-712	-708	-219	-212	-215 -.10238
5-28-78	1026	298.0	118.1	71.2	-1	-725	-735	-730	-724	-734	-729	-239	-234	-236 -.11238
6-12-78	1036	312.0	132.1	70.9	2	-731	-741	-736	-733	-743	-738	-248	-243	-245 -.11667
6-19-78	1504	319.2	139.2	70.9	-2	-739	-748	-743	-737	-746	-741	-252	-246	-249 -.11857
7-9-78	1414	340.2	160.2	70.9	-3	-750	-760	-755	-747	-757	-752	-262	-257	-259 -.12333
7-23-78	1437	354.2	174.2	70.8	-4	-756	-766	-761	-752	-762	-757	-267	-262	-264 -.12571
7-30-78	954	361.0	181.0	70.3	-4	-762	-773	-767	-758	-769	-763	-273	-269	-271 -.12905
8-2-78	820	363.9	184.0	70.3	-4	-764	-774	-769	-760	-770	-765	-275	-270	-272 -.12952
8-2-78	821	363.9	184.0	SPECIMENS FULLY UNLOADED, ZERO APPLIED TEST STRESS							CREEP RECOVERY			
8-2-78	821	363.9		70.3	-4	-334	-328	-331	-330	-324	-327	0	0	0
8-2-78	823	363.9		70.3	-4	-326	-320	-323	-322	-316	-319	8	8	8
8-2-78	825	363.9		70.3	-4	-324	-317	-320	-320	-313	-316	10	11	10
8-2-78	828	363.9		70.3	-4	-323	-316	-319	-319	-312	-315	11	12	11
8-2-78	831	363.9		70.3	-4	-321	-314	-317	-317	-310	-313	13	14	13
8-2-78	1021	364.0		70.3	-4	-309	-302	-305	-305	-298	-301	25	24	25
8-2-78	1221	364.1		70.4	-4	-306	-299	-302	-302	-295	-298	28	29	29
8-2-78	1421	364.2		70.4	-4	-303	-297	-299	-298	-293	-295	32	31	31
8-3-78	1240	365.1		70.2	-4	-288	-281	-284	-284	-277	-280	46	47	46
8-4-78	345	365.7		70.2	-4	-284	-276	-280	-290	-272	-276	50	52	51
8-5-78	1026	367.0		70.3	-4	-276	-269	-272	-272	-265	-268	58	59	59
8-6-78	1518	368.2		70.4	-4	-272	-264	-268	-258	-260	-264	62	64	63
8-7-78	1314	369.0		70.6	-4	-271	-263	-267	-267	-259	-263	63	65	64
8-8-78	924	370.0		70.5	-4	-267	-258	-262	-253	-254	-258	67	70	68
8-9-78	1001	371.0		70.4	-4	-264	-257	-260	-260	-253	-256	70	71	70
8-16-78	1051	378.0		70.7	-4	-253	-244	-248	-240	-240	-244	81	84	82
8-20-78	918	382.0		70.3	-4	-248	-239	-243	-244	-235	-239	86	89	87
8-23-78	1618	385.3		71.0	-4	-242	-233	-237	-238	-229	-233	92	95	93
9-2-78	1420	392.2		70.8	-4	-236	-227	-231	-232	-223	-227	98	101	99
9-6-78	1412	396.2		70.7	-4	-233	-223	-228	-229	-219	-224	101	105	103
9-14-78	1543	425.2		70.9	-4	-222	-211	-216	-219	-207	-212	112	117	114
9-18-78	1024	439.0		70.8	-4	-222	-211	-216	-218	-207	-212	112	117	114
10-1-78	1026	452.0		70.9	-4	-220	-209	-214	-216	-205	-210	114	119	116
10-23-78	1456	474.2		70.9	-4	-206	-200	-203	-202	-196	-199	128	128	128
10-18-78	848	495.9		71.2	-4	-200	-196	-197	-196	-190	-193	134	134	134
10-18-78	1700	495.9	END OF TEST											

Table 26 AVERAGE TOTAL, ELASTIC, CREEP AND AUTOGENOUS STRAINS. -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MIX TC2A ES7466

SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

SPECIMEN	METER NO.	CHANNEL	EL. MOD., MPSI			
NO.1	1490	73-12	4.5	AGE AT LOADING	: 180	DAYS
NO.2	1493	73-13	4.4	TEST TEMPERATURE	: 73	DEG. F.
AUTOG.1	1488	73-14		COMP. STRENGTH (180 DAY)	: 7040.	PSI
AUTOG.2	1495	73-15		APPLIED TEST STRESS	: 2100.	PSI
				LEVEL OF STRESS APPLIED	: 29.8	PERCENT OF COMP. STR.

DATE	TIME	AGE, DAYS	CONCRETE TEMP. UNDER LOAD DEG.F.	DAYS AVG. LOAD	AVG. AUTOG. STRAIN	MICROSTRAIN (FROM TIME OF LOADING) TOTAL NO.1	TOTAL NO.2	TOTAL AVG.	ELASTIC PLUS CREEP NO.1	ELASTIC PLUS CREEP NO.2	ELASTIC PLUS CREEP AVG.	CREEP NO.1	CREEP NO.2	CREEP AVG.	AVERAGE SPECIFIC CREEP, STRAIN/PSI
* 2 -1-78	1000	0	SPECIMENS CAST												
* 7-31-78	1055	180.04	LOADING BEGINS												
7-31-78	1055	180.04	-.0007	72.8	0 **	0	0	0 **	0	0	0 **	0	0	0 **	0.
* 7-31-78	1055	180.04	SPECIMENS FULLY LOADED, APPLIED TEST STRESS 2100 PSI												
7-31-78	1056	180.04	0.	72.8	0 **	-470	-476	-473 **	-470	-476	-473 **	0	0	0 **	0.
7-31-78	1058	180.04	.0014	72.8	1 **	-476	-482	-479 **	-477	-483	-480 **	-7	-7	-7 **	-.00333
7-31-78	1106	180.05	.0069	72.8	0 **	-491	-497	-494 **	-491	-497	-494 **	-21	-21	-21 **	-.01000
7-31-78	1112	180.05	.0111	72.8	1 **	-494	-499	-496 **	-495	-500	-497 **	-25	-24	-24 **	-.01143
7-31-78	1300	180.12	.0861	72.8	1 **	-509	-515	-512 **	-510	-516	-513 **	-40	-40	-40 **	-.01905
7-31-78	1655	180.29	.2493	72.9	1 **	-520	-526	-523 **	-521	-527	-524 **	-51	-51	-51 **	-.02429
8 -1-78	933	180.98	.9424	72.7	1 **	-534	-541	-537 **	-535	-542	-538 **	-65	-66	-65 **	-.03095
8 -2-78	807	181.92	1.8826	72.9	1 **	-546	-552	-549 **	-547	-553	-550 **	-77	-77	-77 **	-.03667
8 -3-78	821	182.9	2.9	72.7	2 **	-554	-561	-557 **	-556	-563	-559 **	-86	-87	-86 **	-.04095
8 -4-78	816	183.9	3.9	72.7	2 **	-559	-567	-563 **	-561	-569	-565 **	-91	-93	-92 **	-.04381
8 -5-78	1301	185.1	5.1	72.9	2 **	-565	-573	-569 **	-567	-575	-571 **	-97	-99	-98 **	-.04667
8 -6-78	1154	186.1	6.0	72.9	2 **	-569	-576	-572 **	-571	-578	-574 **	-101	-102	-101 **	-.04810
8 -7-78	811	186.9	6.9	73.1	1 **	-572	-581	-576 **	-573	-582	-577 **	-103	-106	-104 **	-.04952
8 -8-78	807	187.9	7.9	72.9	2 **	-574	-583	-578 **	-576	-585	-580 **	-106	-109	-107 **	-.05095
8-15-78	804	194.9	14.9	72.7	1 **	-596	-605	-600 **	-597	-606	-601 **	-127	-130	-128 **	-.06095
8-21-78	1530	201.3	21.2	72.8	1 **	-609	-620	-614 **	-610	-621	-615 **	-140	-145	-142 **	-.06762
8-28-78	1544	208.2	28.2	72.9	0 **	-622	-633	-627 **	-622	-633	-627 **	-152	-157	-154 **	-.07333
9 -5-78	815	215.9	35.9	72.8	-2 **	-632	-645	-638 **	-630	-643	-636 **	-160	-167	-163 **	-.07762
10 -3-78	1435	244.2	64.2	73.3	0 **	-661	-679	-670 **	-661	-679	-670 **	-191	-203	-197 **	-.09381
10-17-78	1636	258.3	78.2	73.0	1 **	-672	-689	-680 **	-673	-690	-681 **	-203	-214	-208 **	-.09905
11 -1-78	1540	273.2	93.2	73.0	3 **	-678	-696	-687 **	-681	-699	-690 **	-211	-223	-217 **	-.10333
11-28-78	1026	300.0	120.0	72.2	-1 **	-703	-721	-712 **	-702	-720	-711 **	-232	-244	-238 **	-.11333
12-12-78	1036	314.0	134.0	72.0	1 **	-708	-725	-716 **	-709	-726	-717 **	-239	-250	-244 **	-.11619
12-19-78	1504	321.2	141.2	72.0	-3 **	-716	-733	-724 **	-713	-730	-721 **	-243	-254	-248 **	-.11810
1 -3-79	1053	336.0	156.0	71.2	-3 **	-723	-740	-731 **	-720	-737	-728 **	-250	-261	-255 **	-.12143
1 -9-79	1414	342.2	162.1	71.9	-4 **	-727	-746	-736 **	-723	-742	-732 **	-253	-266	-259 **	-.12333
1-23-79	1437	356.2	176.2	71.9	-4 **	-733	-752	-742 **	-729	-748	-738 **	-259	-272	-265 **	-.12619
2 -1-79	1029	365.0	185.0	71.4	-5 **	-739	-759	-749 **	-734	-754	-744 **	-264	-278	-271 **	-.12905
* 2 -1-79	1030	365.0	185.0	SPECIMENS FULLY UNLOADED, ZERO APPLIED TEST STRESS								CREEP RECOVERY			
2 -1-79	1030	365.0		71.4	-5 **	-318	-333	-325 **	-313	-328	-320 **	0	0	0 **	
2 -1-79	1032	365.0		71.3	-5 **	-305	-324	-314 **	-300	-319	-309 **	13	9	11 **	
2 -1-79	1034	365.0		71.3	-5 **	-302	-322	-312 **	-297	-317	-307 **	16	11	13 **	
2 -1-79	1037	365.0		71.3	-5 **	-301	-321	-311 **	-296	-316	-306 **	17	12	14 **	
2 -1-79	1040	365.0		71.3	-5 **	-300	-320	-310 **	-295	-315	-305 **	18	13	15 **	
2 -1-79	1231	365.1		71.4	-5 **	-288	-309	-298 **	-283	-304	-293 **	30	24	27 **	
2 -1-79	1527	365.2		71.4	-5 **	-282	-302	-292 **	-277	-297	-287 **	36	31	33 **	
2 -2-79	1034	366.0		71.6	-5 **	-268	-289	-278 **	-263	-284	-273 **	50	44	47 **	
2 -3-79	1240	367.1		71.4	-5 **	-261	-281	-271 **	-256	-276	-266 **	57	52	54 **	
2 -4-79	345	367.7		71.3	-5 **	-258	-278	-268 **	-253	-273	-263 **	60	55	57 **	
2 -5-79	1026	369.0		71.5	-5 **	-252	-275	-263 **	-247	-270	-258 **	66	58	62 **	
2 -6-79	1518	370.2		71.6	-5 **	-245	-270	-259 **	-243	-265	-254 **	70	63	66 **	
2 -7-79	1314	371.0		71.7	-5 **	-248	-269	-258 **	-243	-264	-253 **	70	64	67 **	
2 -8-79	924	372.0		71.3	-5 **	-243	-265	-254 **	-238	-260	-249 **	75	68	71 **	
2-15-79	1605	379.3		72.0	-5 **	-228	-258	-243 **	-223	-253	-238 **	90	75	82 **	
2-20-79	918	384.0		71.2	-5 **	-225	-255	-240 **	-220	-250	-235 **	93	78	85 **	
2-22-79	913	386.0		71.3	-5 **	-217	-252	-234 **	-212	-247	-229 **	101	81	91 **	
2-27-79	1506	391.2		71.6	-5 **	-213	-249	-231 **	-208	-244	-226 **	105	84	94 **	
3 -6-79	1412	398.2		71.7	-5 **	-211	-245	-228 **	-206	-240	-223 **	107	88	97 **	
3-13-79	1313	405.1		71.7	-5 **	-200	-243	-221 **	-195	-238	-216 **	115	90	104 **	
3-28-79	824	419.9		71.7	-5 **	-198	-236	-217 **	-193	-231	-212 **	120	97	109 **	
4 -4-79	1543	427.2		71.9	-5 **	-198	-235	-216 **	-193	-230	-211 **	120	98	109 **	
4-18-79	1024	441.0		71.8	-5 **	-194	-231	-214 **	-193	-226	-209 **	120	102	111 **	
5 -1-79	1026	454.0		71.9	-5 **	-197	-229	-213 **	-192	-224	-208 **	121	104	112 **	
5-23-79	1456	476.2		72.1	-5 **	-176	-226	-201 **	-171	-221	-196 **	142	107	124 **	
6-14-79	848	497.9		72.2	-5 **	-169	-224	-196 **	-164	-219	-191 **	149	109	129 **	
* 6-14-79	1700	497.9	END OF TEST												

Table 27 AVERAGE TOTAL, ELASTIC, CREEP AND AUTOGENOUS STRAINS. -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MIX TCIPA ES7448

SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

SPECIMEN	METER NO.	CHANNEL	EL. MOD., MPSI
NO.1	1117	73-18	4.6
NO.2	1498	73-19	4.4
AUTOG.1	1117	73-18	
AUTOG.2	1498	73-19	

AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (365 DAY) : 6950. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 30.2 PERCENT OF COMP. STR.

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	AVG. TEMP. DEG.F.	AVG. AUTOG. STRAIN	MICROSTRAIN (FROM TIME OF LOADING) TOTAL NO.1	TOTAL NO.2	TOTAL AVG.	ELASTIC PLUS CREEP NO.1	ELASTIC PLUS CREEP NO.2	ELASTIC PLUS CREEP AVG.	CREEP NO.1	CREEP NO.2	CREEP AVG.	AVERAGE SPECIFIC CREEP, STRAIN/PSI
* 2 -3-78	1000	0	SPECIMENS CAST												
* 2 -2-79	836	363.94	LOADING BEGINS												
2 -2-79	836	363.94	-.0007	70.3	0 **	0	0	0 **	0	0	0 **	0	0	0 **	0.
* 2 -2-79	836	363.94	SPECIMENS FULLY LOADED. APPLIED TEST STRESS 2100 PSI												
2 -2-79	837	363.94	0.	70.3	0 **	-454	-480	-467 **	-454	-480	-467 **	0	0	0 **	0.
2 -2-79	839	363.94	.0014	70.3	0 **	-464	-489	-476 **	-464	-489	-476 **	-10	-9	-9 **	-.00429
2 -2-79	841	363.95	.0028	70.3	0 **	-468	-492	-480 **	-468	-492	-480 **	-14	-12	-13 **	-.00619
2 -2-79	844	363.95	.0049	70.3	0 **	-470	-495	-482 **	-470	-495	-482 **	-16	-15	-15 **	-.00714
2 -2-79	846	363.95	.0063	70.3	0 **	-472	-497	-484 **	-472	-497	-484 **	-18	-17	-17 **	-.00810
2 -2-79	1034	364.02	.0813	70.1	0 **	-490	-515	-502 **	-490	-515	-502 **	-36	-35	-35 **	-.01667
2 -2-79	1236	364.11	.1660	70.3	0 **	-498	-522	-510 **	-498	-522	-510 **	-44	-42	-43 **	-.02048
2 -2-79	1429	364.19	.2444	70.3	0 **	-502	-526	-514 **	-502	-526	-514 **	-48	-46	-47 **	-.02238
2 -3-79	1240	365.11	1.1688	70.3	0 **	-518	-544	-531 **	-518	-544	-531 **	-64	-64	-64 **	-.03048
2 -4-79	345	365.74	1.7972	70.3	0 **	-523	-550	-536 **	-523	-550	-536 **	-69	-70	-69 **	-.03286
2 -5-79	1026	367.0	3.1	70.5	0 **	-530	-558	-544 **	-530	-558	-544 **	-76	-78	-77 **	-.03667
2 -6-79	1518	368.2	4.3	70.4	0 **	-536	-564	-550 **	-536	-564	-550 **	-82	-84	-83 **	-.03952
2 -7-79	1014	369.0	5.1	70.6	0 **	-543	-568	-555 **	-543	-568	-555 **	-89	-88	-88 **	-.04190
2 -8-79	924	370.0	6.0	70.6	0 **	-543	-571	-557 **	-543	-571	-557 **	-89	-91	-90 **	-.04286
2 -9-79	1001	371.0	7.1	70.4	0 **	-544	-574	-559 **	-544	-574	-559 **	-90	-94	-92 **	-.04381
2-16-79	1051	378.0	14.1	70.8	0 **	-562	-591	-576 **	-562	-591	-576 **	-108	-111	-109 **	-.05190
2-20-79	918	382.0	18.0	70.7	0 **	-566	-597	-581 **	-566	-597	-581 **	-112	-117	-114 **	-.05429
2-23-79	1618	385.3	21.3	70.9	0 **	-566	-599	-582 **	-566	-599	-582 **	-112	-119	-115 **	-.05476
2-27-79	1506	389.2	25.3	70.8	0 **	-568	-601	-584 **	-568	-601	-584 **	-114	-121	-117 **	-.05571
3 -2-79	1420	392.2	29.2	70.8	0 **	-574	-607	-590 **	-574	-607	-590 **	-120	-127	-123 **	-.05857
3 -6-79	1412	396.2	32.2	70.8	0 **	-579	-612	-595 **	-579	-612	-595 **	-125	-132	-128 **	-.06095
3-13-79	1313	403.1	39.2	70.8	0 **	-579	-614	-596 **	-579	-614	-596 **	-125	-134	-129 **	-.06143
3-20-79	1544	410.2	46.3	70.9	0 **	-591	-626	-608 **	-591	-626	-608 **	-137	-146	-141 **	-.06714
3-28-79	824	417.9	54.0	70.9	0 **	-596	-632	-614 **	-596	-632	-614 **	-142	-152	-147 **	-.07000
4 -4-79	1543	425.2	61.3	71.0	0 **	-617	-648	-632 **	-617	-648	-632 **	-163	-168	-165 **	-.07857
4-18-79	1024	439.0	75.1	70.9	0 **	-624	-657	-640 **	-624	-657	-640 **	-170	-177	-173 **	-.08238
5 -1-79	1026	452.0	88.1	71.1	0 **	-633	-667	-650 **	-633	-667	-650 **	-179	-187	-183 **	-.08714
5-23-79	1456	474.2	110.3	71.1	0 **	-634	-669	-651 **	-634	-669	-651 **	-180	-189	-184 **	-.08762
6-14-79	848	495.9	132.0	71.4	0 **	-650	-686	-668 **	-650	-686	-668 **	-196	-206	-201 **	-.09571
* 6-14-79	1700	495.9	END OF TEST												

Table 27

Table 28 AVERAGE TOTAL, ELASTIC, CREEP AND AUTOGENOUS STRAINS. -- CORRECTED FOR TEMPERATURE CHANGE

SAN ONOFRE OPTION 1 MIX TC2A ES7448

SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYLINDER

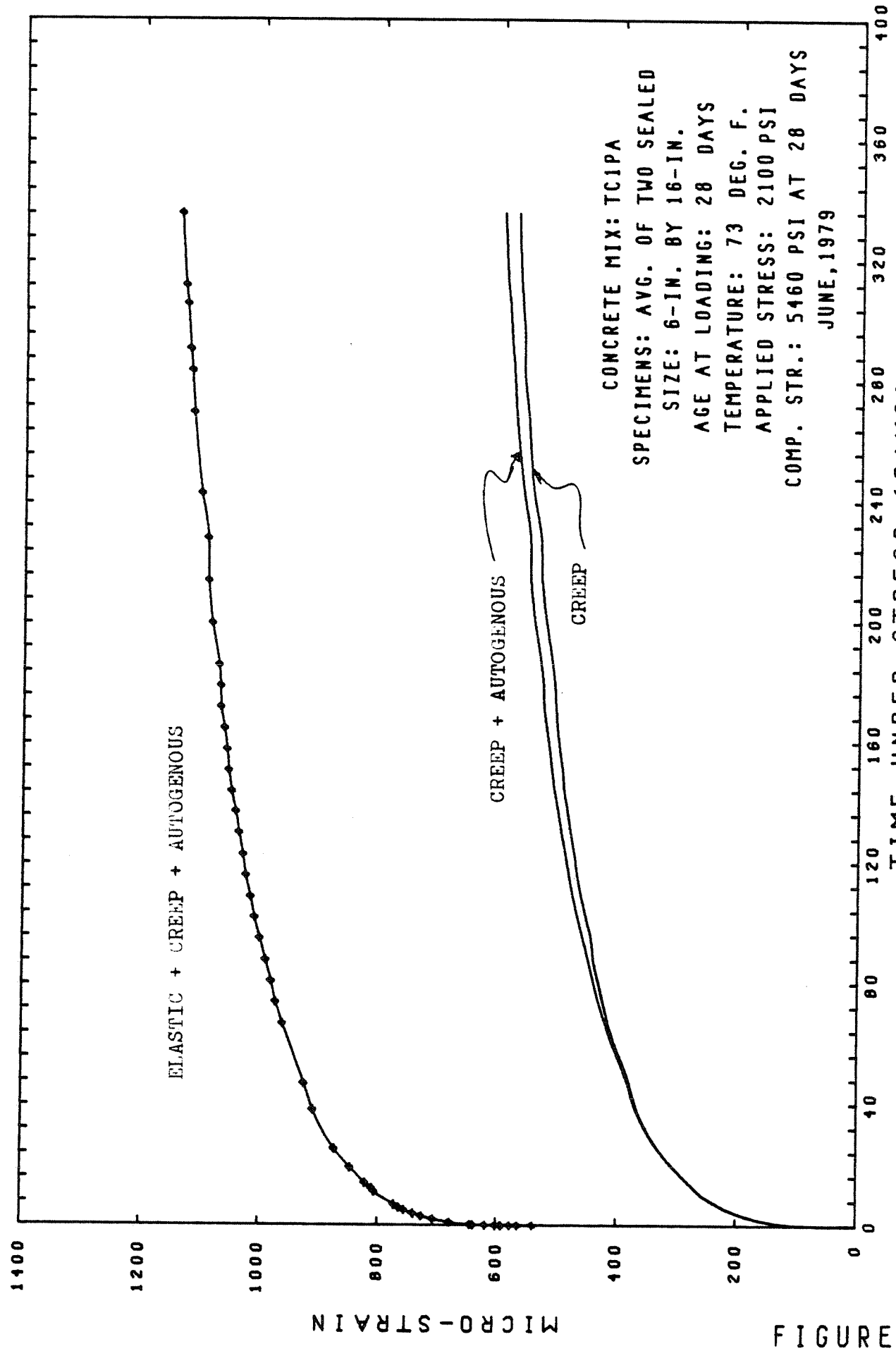
SPECIMEN	METER NO.	CHANNEL	EL. MOD., MPSI
NO.1	1488	73-14	4.6
NO.2	1495	73-15	4.6
AUTOG.1	1117	73-18	
AUTOG.2	1498	73-19	

AGE AT LOADING : 365 DAYS
TEST TEMPERATURE : 73 DEG. F.
COMP. STRENGTH (365 DAY) : 7380. PSI
APPLIED TEST STRESS : 2100. PSI
LEVEL OF STRESS APPLIED : 28.5 PERCENT OF COMP. STR.

DATE	TIME	CONCRETE AGE, DAYS	DAYS UNDER LOAD	AVG. TEMP. DEG.F.	AVG. AUTOG. STRAIN	MICROSTRAIN (FROM TIME OF LOADING) TOTAL SPECIMEN NO.1	TOTAL SPECIMEN NO.2	TOTAL AVG.	ELASTIC PLUS CREEP SPECIMEN NO.1	ELASTIC PLUS CREEP SPECIMEN NO.2	ELASTIC PLUS CREEP AVG.	CREEP SPECIMEN NO.1	CREEP SPECIMEN NO.2	CREEP AVG.	AVERAGE SPECIFIC CREEP, STRAIN/PSI
* 2 -1-78	1000	0	SPECIMENS CAST												
* 2 -1-79	934	364.98	LOADING BEGINS												
2 -1-79	934	364.98	-.0007	71.2	0 **	0	0	0 **	0	0	0 **	0	0	0 **	0.
* 2 -1-79	934	364.98	SPECIMENS FULLY LOADED, APPLIED TEST STRESS 2100 PSI												
2 -1-79	935	364.98	0.	71.2	0 **	-455	-454	-454 **	-455	-454	-454 **	0	0	0 **	0.
2 -1-79	937	364.98	.0014	71.3	0 **	-463	-463	-463 **	-463	-463	-463 **	-8	-9	-8 **	-.00381
2 -1-79	940	364.99	.0035	71.2	0 **	-466	-467	-466 **	-466	-467	-466 **	-11	-13	-12 **	-.00571
2 -1-79	943	364.99	.0056	71.2	0 **	-469	-469	-469 **	-469	-469	-469 **	-14	-15	-14 **	-.00667
2 -1-79	946	364.99	.0076	71.3	0 **	-471	-471	-471 **	-471	-471	-471 **	-16	-17	-16 **	-.00762
2 -1-79	1133	365.06	.0819	71.4	0 **	-488	-487	-487 **	-488	-487	-487 **	-33	-33	-33 **	-.01571
2 -1-79	1335	365.15	.1667	71.4	0 **	-493	-493	-493 **	-493	-493	-493 **	-38	-39	-38 **	-.01810
2 -1-79	1533	365.23	.2486	71.5	0 **	-493	-498	-495 **	-493	-498	-495 **	-38	-44	-41 **	-.01952
2 -2-79	1034	366.02	1.0410	71.4	0 **	-513	-513	-513 **	-513	-513	-513 **	-58	-59	-58 **	-.02762
2 -3-79	1240	367.1	2.1	71.2	0 **	-520	-521	-520 **	-520	-521	-520 **	-65	-67	-66 **	-.03143
2 -4-79	345	367.7	2.8	71.1	0 **	-525	-524	-524 **	-525	-524	-524 **	-70	-70	-70 **	-.03333
2 -5-79	1026	369.0	4.0	71.5	0 **	-530	-531	-530 **	-530	-531	-530 **	-75	-77	-76 **	-.03619
2 -6-79	1518	370.2	5.2	71.6	0 **	-533	-534	-533 **	-533	-534	-533 **	-78	-80	-79 **	-.03762
2 -7-79	1014	371.0	6.0	71.8	0 **	-538	-537	-537 **	-538	-537	-537 **	-83	-83	-83 **	-.03952
2 -8-79	924	372.0	7.0	71.8	0 **	-539	-540	-539 **	-539	-540	-539 **	-84	-86	-85 **	-.04048
2-15-79	1605	379.3	14.3	72.1	0 **	-556	-555	-555 **	-556	-555	-555 **	-101	-101	-101 **	-.04810
2-20-79	918	384.0	19.0	71.5	0 **	-564	-562	-563 **	-564	-562	-563 **	-109	-108	-108 **	-.05143
2-27-79	1506	391.2	26.2	71.9	0 **	-568	-565	-566 **	-568	-565	-566 **	-113	-111	-112 **	-.05333
3 -1-79	1235	393.1	28.1	71.9	0 **	-577	-573	-575 **	-577	-573	-575 **	-122	-119	-120 **	-.05714
3 -6-79	1412	398.2	33.2	72.0	0 **	-580	-575	-577 **	-580	-575	-577 **	-125	-121	-123 **	-.05857
3-13-79	1313	405.1	40.2	72.0	0 **	-580	-576	-578 **	-580	-576	-578 **	-125	-122	-123 **	-.05857
3-20-79	1544	412.2	47.3	72.1	0 **	-592	-589	-590 **	-592	-589	-590 **	-137	-135	-136 **	-.06476
3-28-79	824	419.9	55.0	72.0	0 **	-597	-594	-595 **	-597	-594	-595 **	-142	-140	-141 **	-.06714
4 -4-79	1543	427.2	62.3	72.2	0 **	-609	-610	-609 **	-609	-610	-609 **	-154	-156	-155 **	-.07381
4-18-79	1024	441.0	76.0	72.0	0 **	-617	-616	-616 **	-617	-616	-616 **	-162	-162	-162 **	-.07714
5 -1-79	1026	454.0	89.0	72.2	0 **	-629	-627	-628 **	-629	-627	-628 **	-174	-173	-173 **	-.08238
5-23-79	1456	476.2	111.2	72.2	0 **	-629	-638	-633 **	-629	-638	-633 **	-174	-184	-179 **	-.08524
6-14-79	848	497.9	133.0	72.5	0 **	-647	-644	-645 **	-647	-644	-645 **	-192	-190	-191 **	-.09095
* 6-14-79	1700	497.9	END OF TEST												

Table 28

FIGURES 1 THROUGH 12



ELASTIC, CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION

FIGURE 1

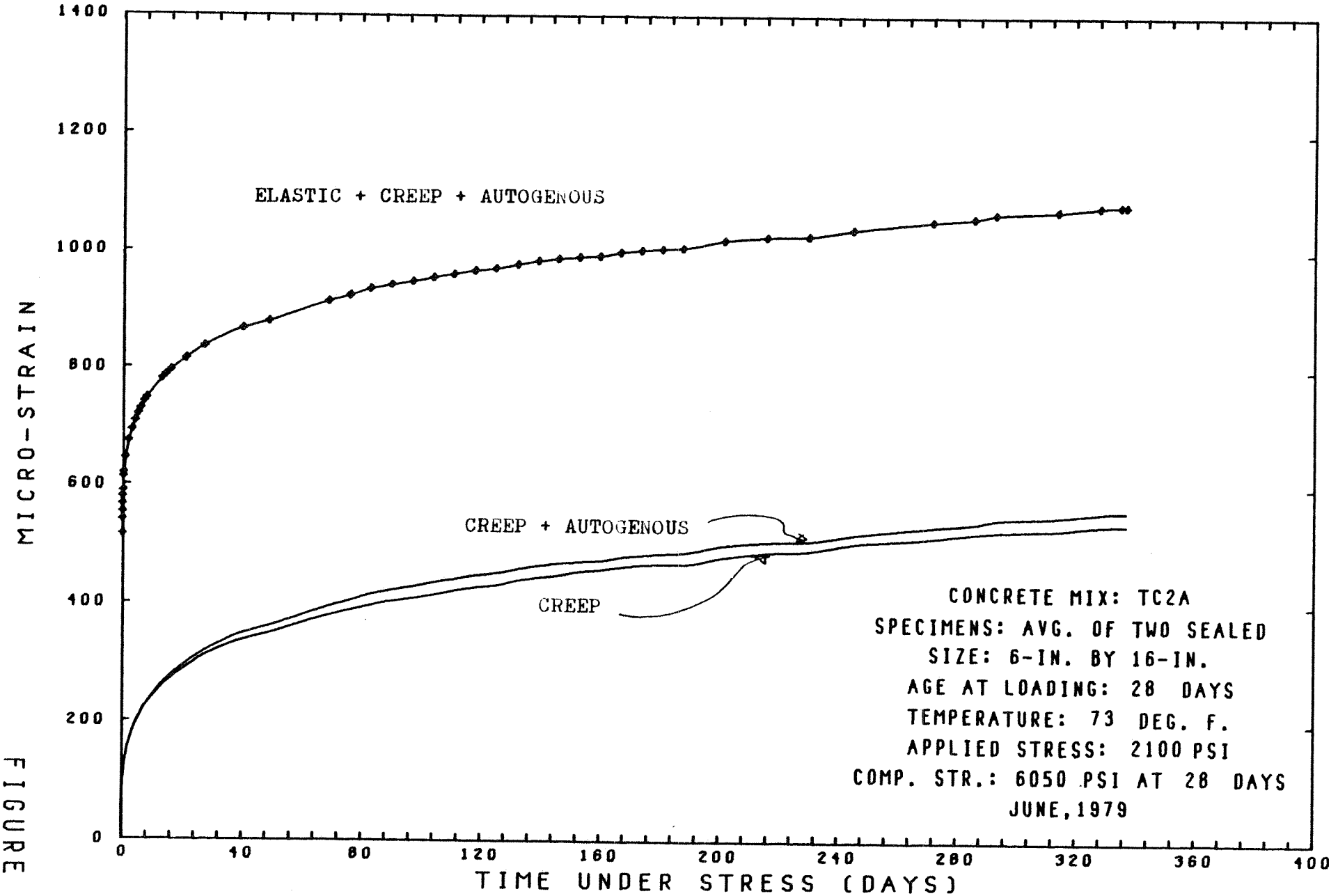


FIGURE 2

ELASTIC, CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION

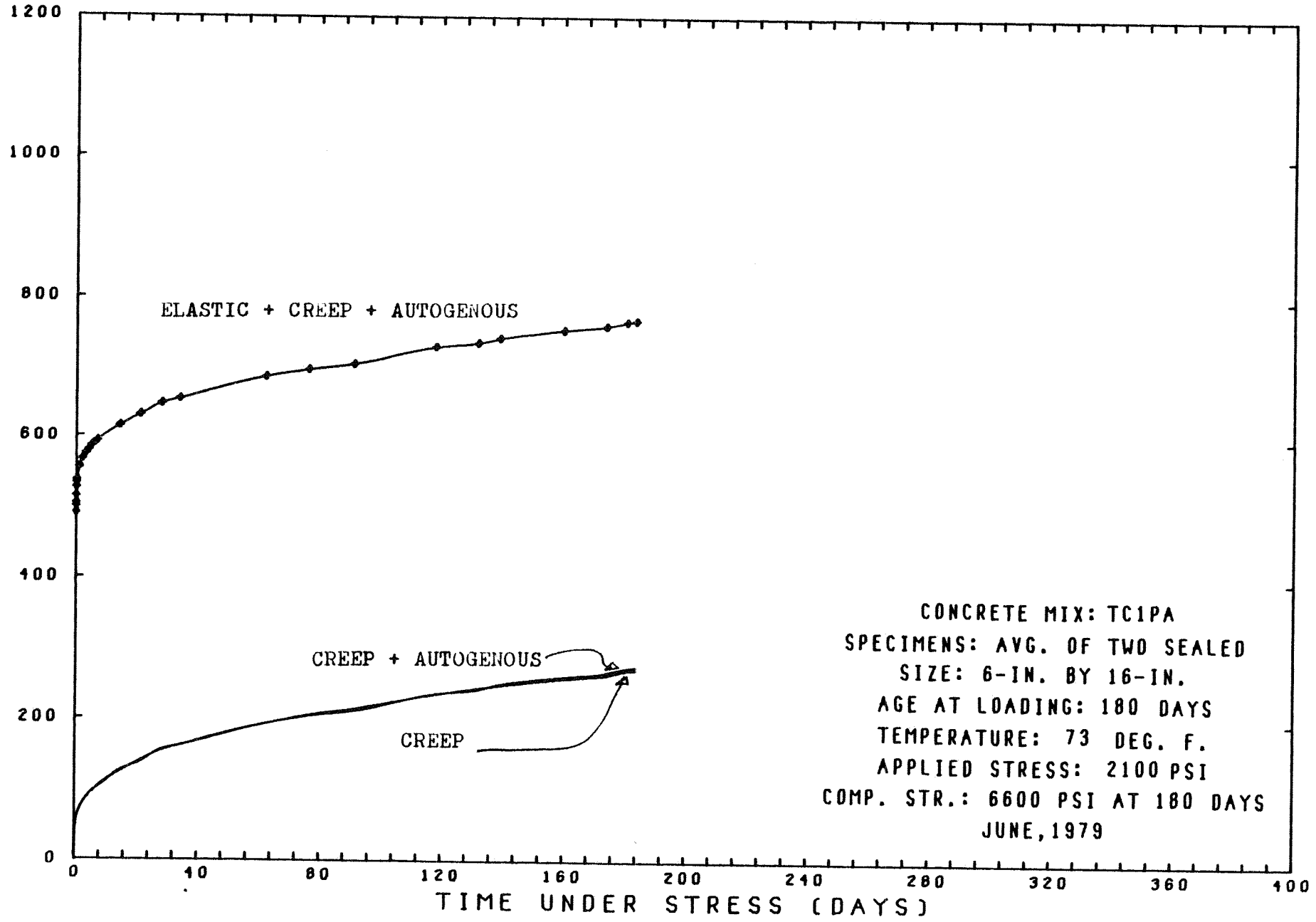
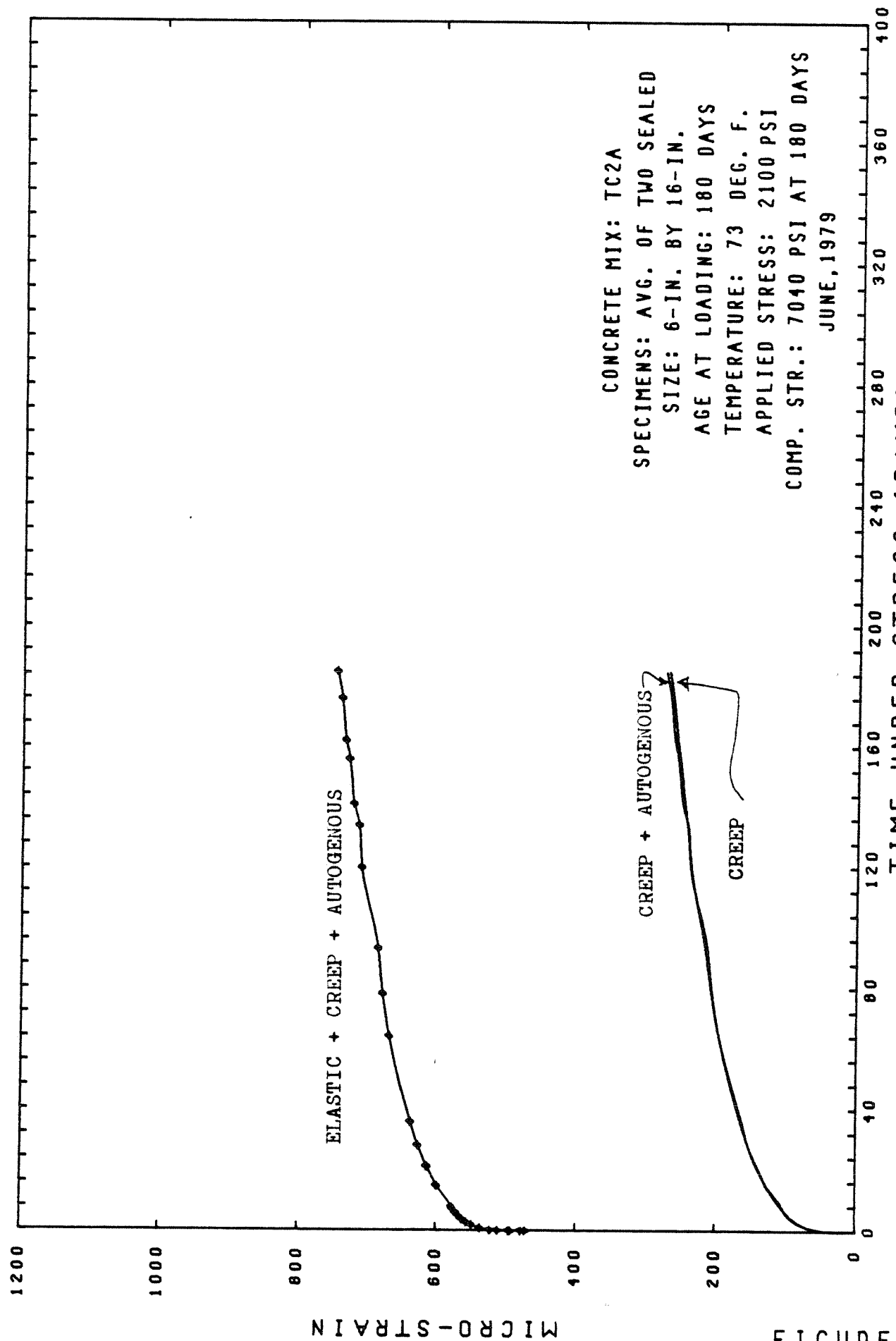


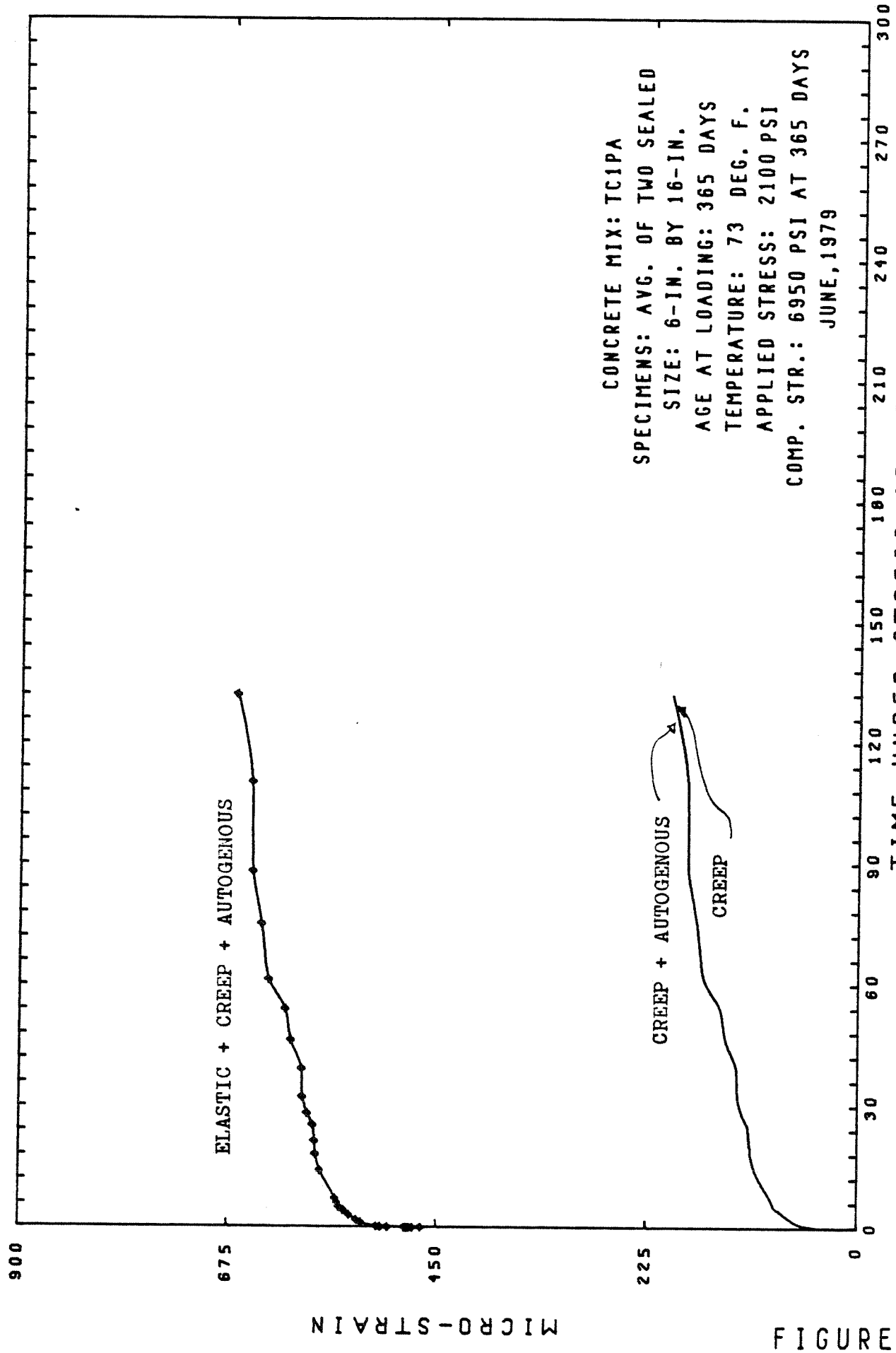
FIGURE 3

ELASTIC, CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION



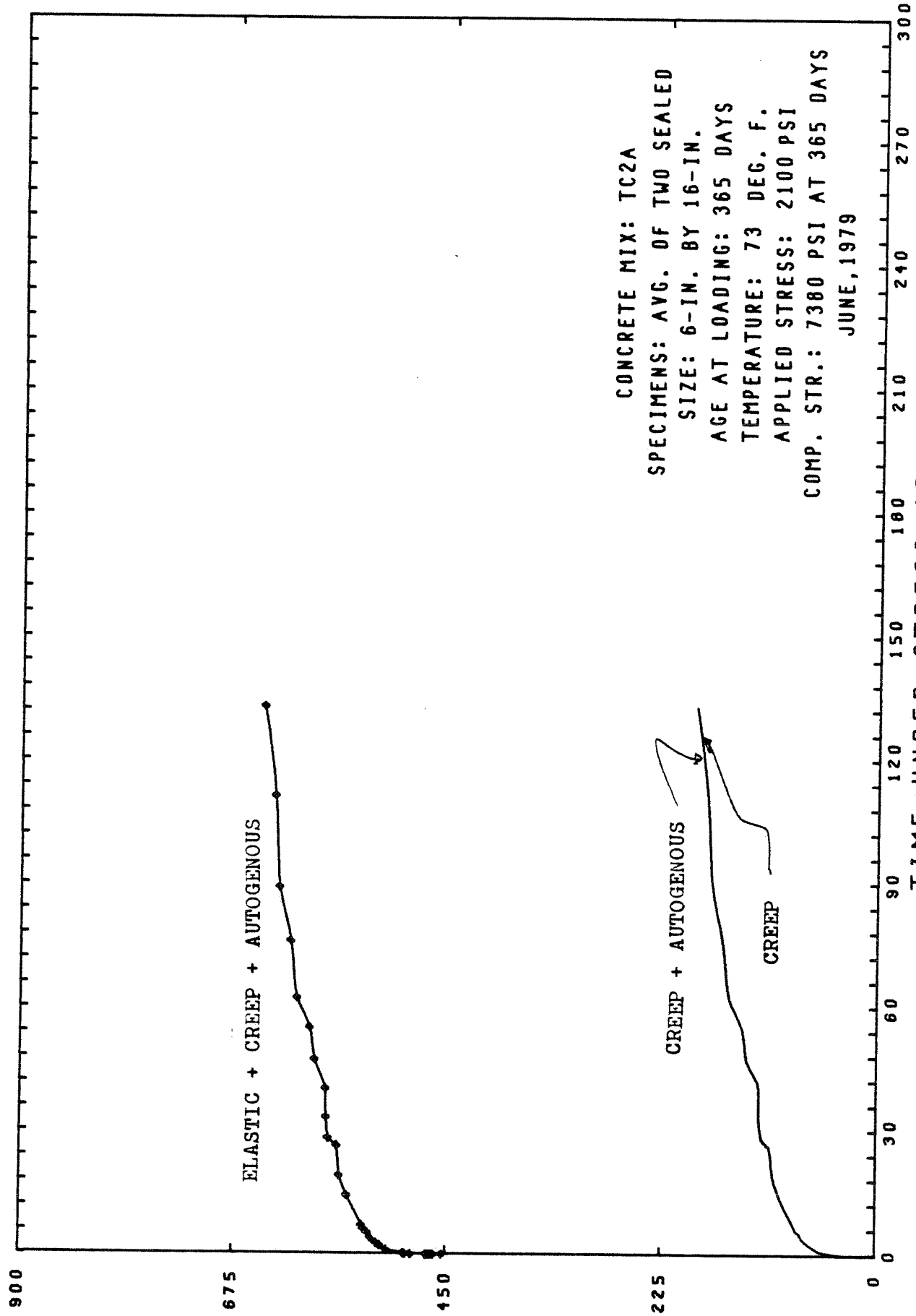
ELASTIC, CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION

FIGURE 4



ELASTIC, CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION

FIGURE 5



ELASTIC, CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION

FIGURE 6

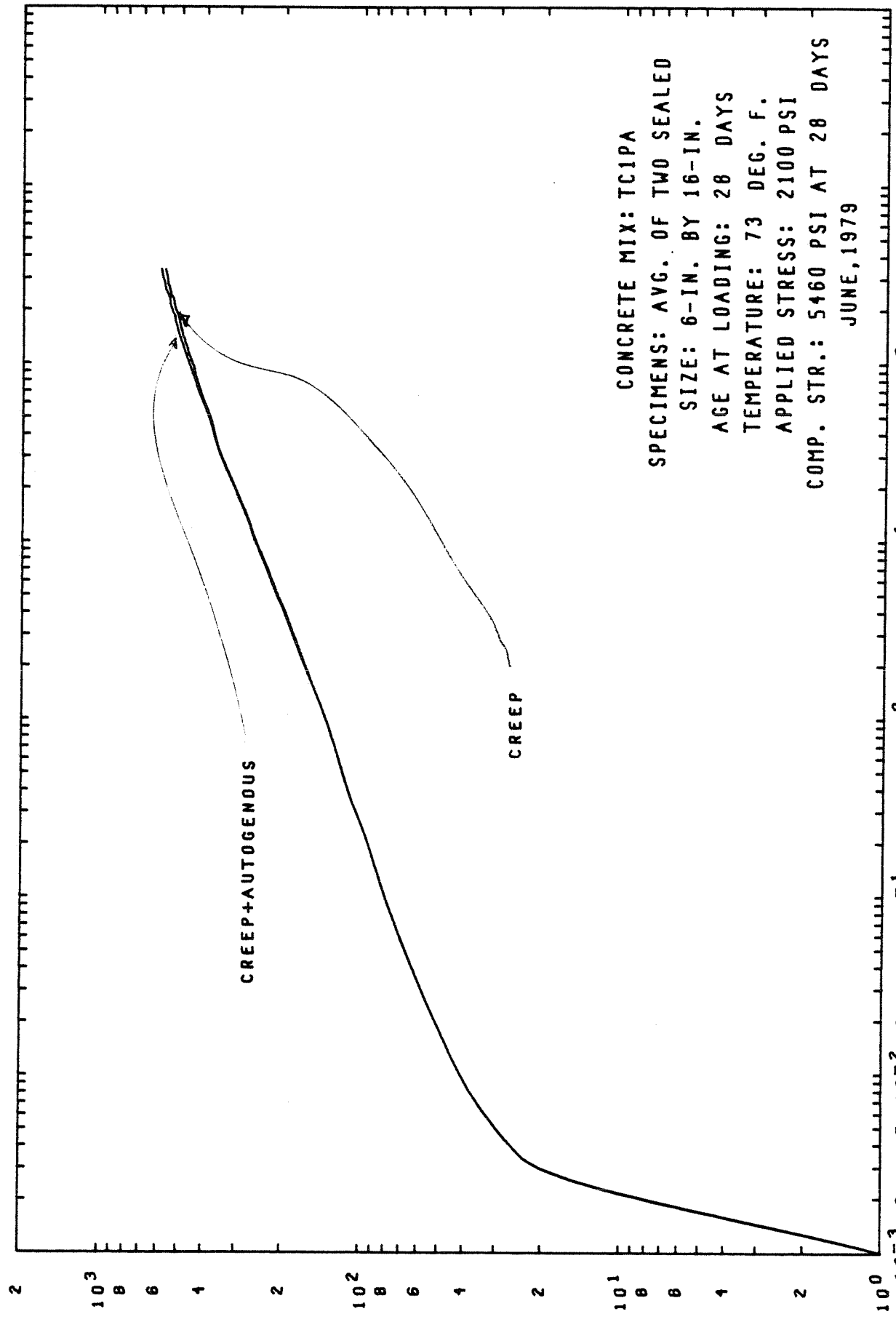

CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION
CONCRETE MIX: TC1PA
SPECIMENS: AVG. OF TWO SEALED
SIZE: 6-IN. BY 16-IN.
AGE AT LOADING: 28 DAYS
TEMPERATURE: 73 DEG. F.
APPLIED STRESS: 2100 PSI
COMP. STR.: 5460 PSI AT 28 DAYS
JUNE,1979
CREEP+AUTOGENOUS
CREEP
MICRO-STRAIN
TIME UNDER STRESS (DAYS)

FIGURE 7

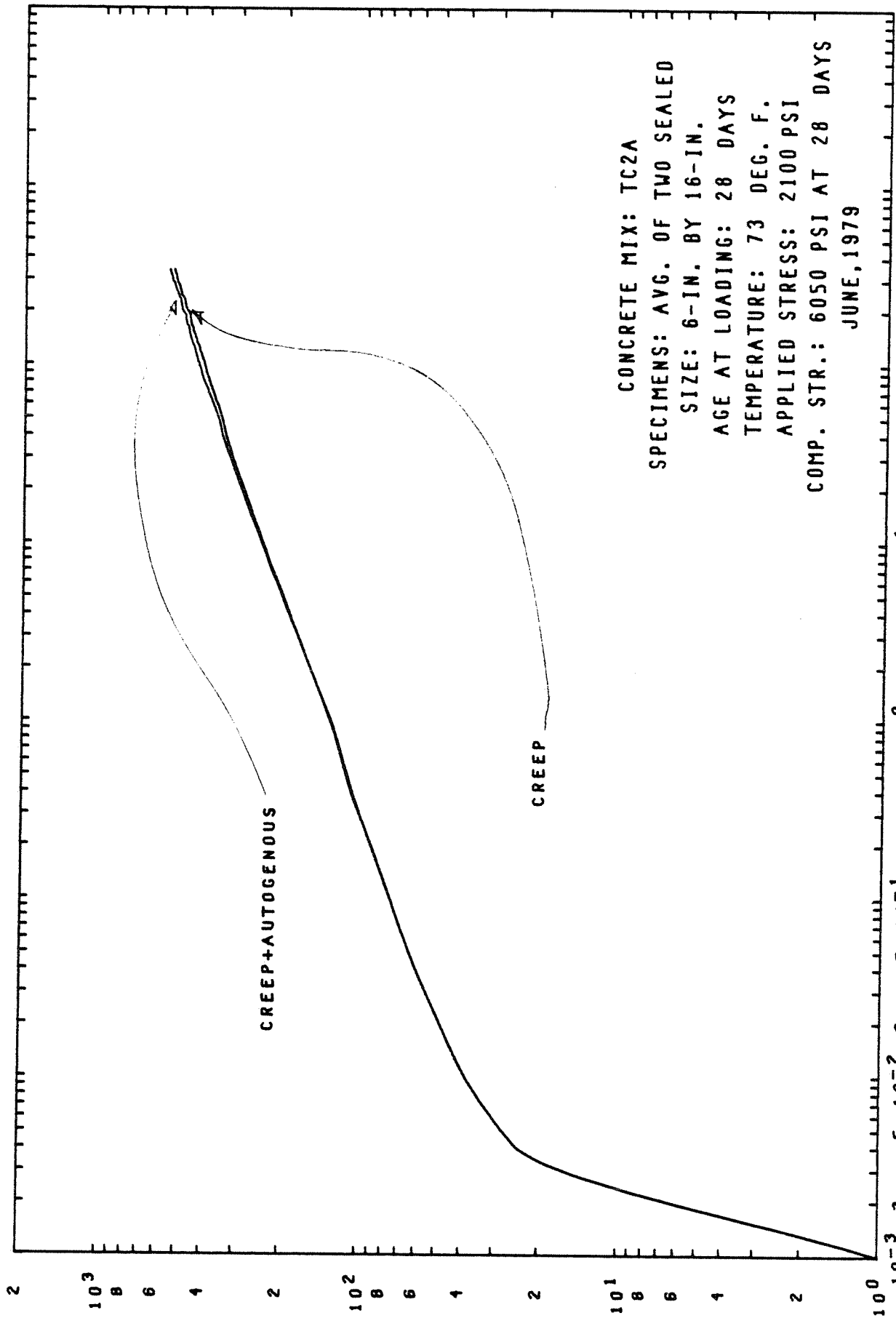

CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION
CONCRETE MIX: TC2A
SPECIMENS: AVG. OF TWO SEALED
SIZE: 6-IN. BY 16-IN.
AGE AT LOADING: 28 DAYS
TEMPERATURE: 73 DEG. F.
APPLIED STRESS: 2100 PSI
COMP. STR.: 6050 PSI AT 28 DAYS
JUNE,1979
CREEP+AUTOGENOUS
CREEP
TIME UNDER STRESS (DAYS)
MICRO-STRAIN

FIGURE 8

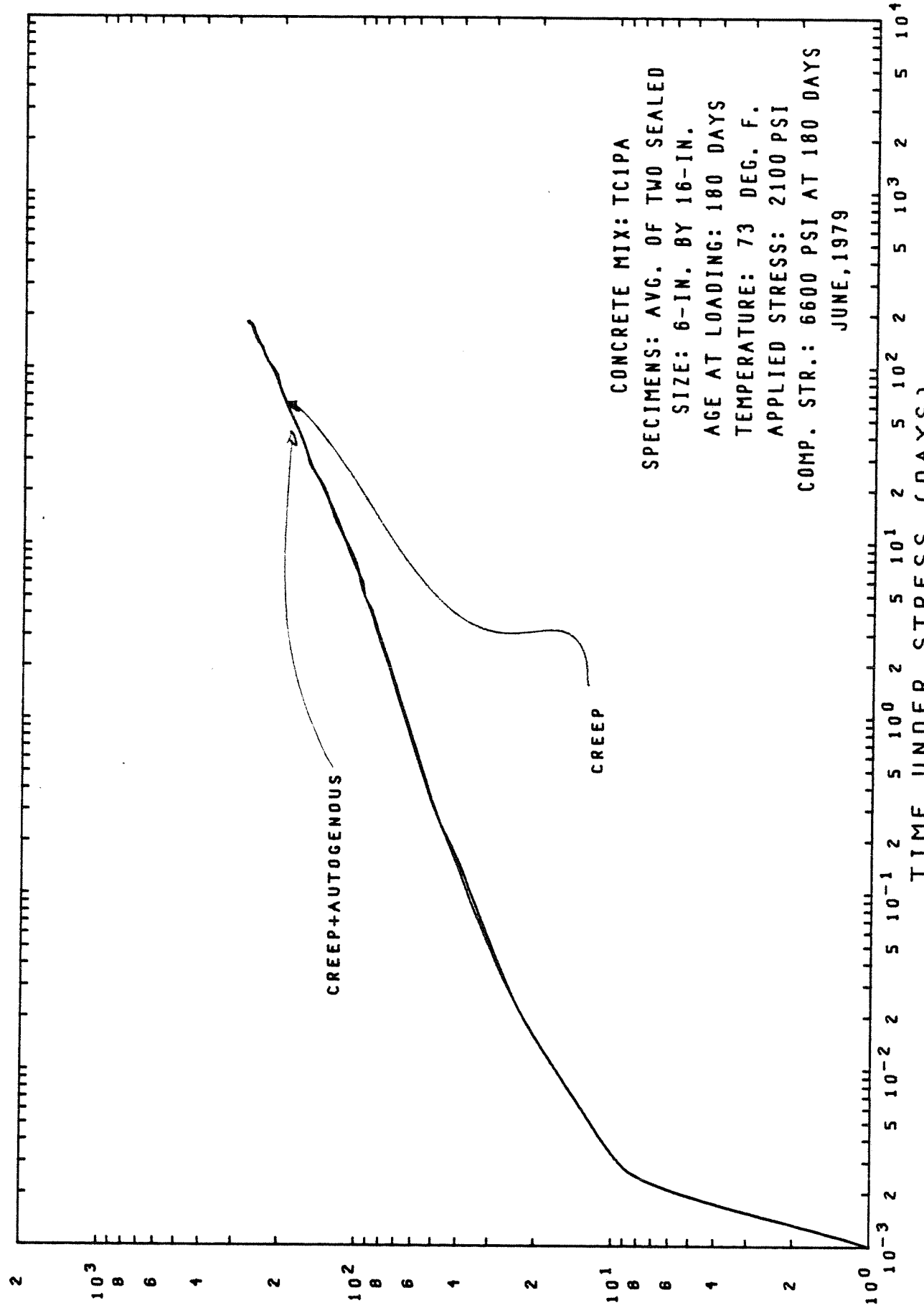

CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION
CONCRETE MIX: TC1PA
SPECIMENS: AVG. OF TWO SEALED
SIZE: 6-IN. BY 16-IN.
AGE AT LOADING: 180 DAYS
TEMPERATURE: 73 DEG. F.
APPLIED STRESS: 2100 PSI
COMP. STR.: 6600 PSI AT 180 DAYS
JUNE, 1979
CREEP+AUTOGENOUS
CREEP
TIME UNDER STRESS (DAYS)
MICRO-STRAIN

FIGURE 9

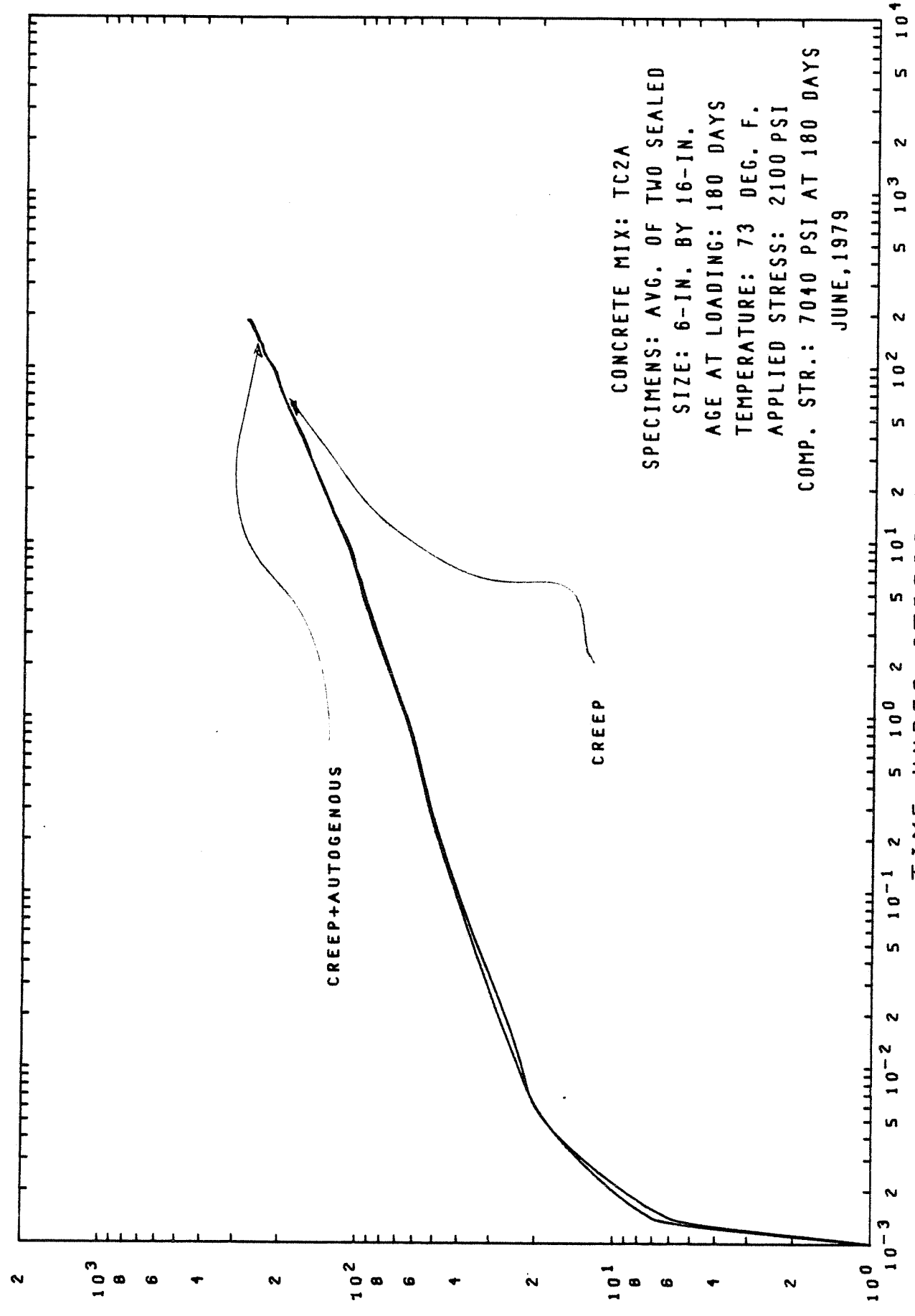

CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION
CONCRETE MIX: TC2A
SPECIMENS: AVG. OF TWO SEALED
SIZE: 6-IN. BY 16-IN.
AGE AT LOADING: 180 DAYS
TEMPERATURE: 73 DEG. F.
APPLIED STRESS: 2100 PSI
COMP. STR.: 7040 PSI AT 180 DAYS
JUNE,1979
CREEP+AUTOGENOUS
CREEP
TIME UNDER STRESS (DAYS)
MICRO-STRAIN

FIGURE 10

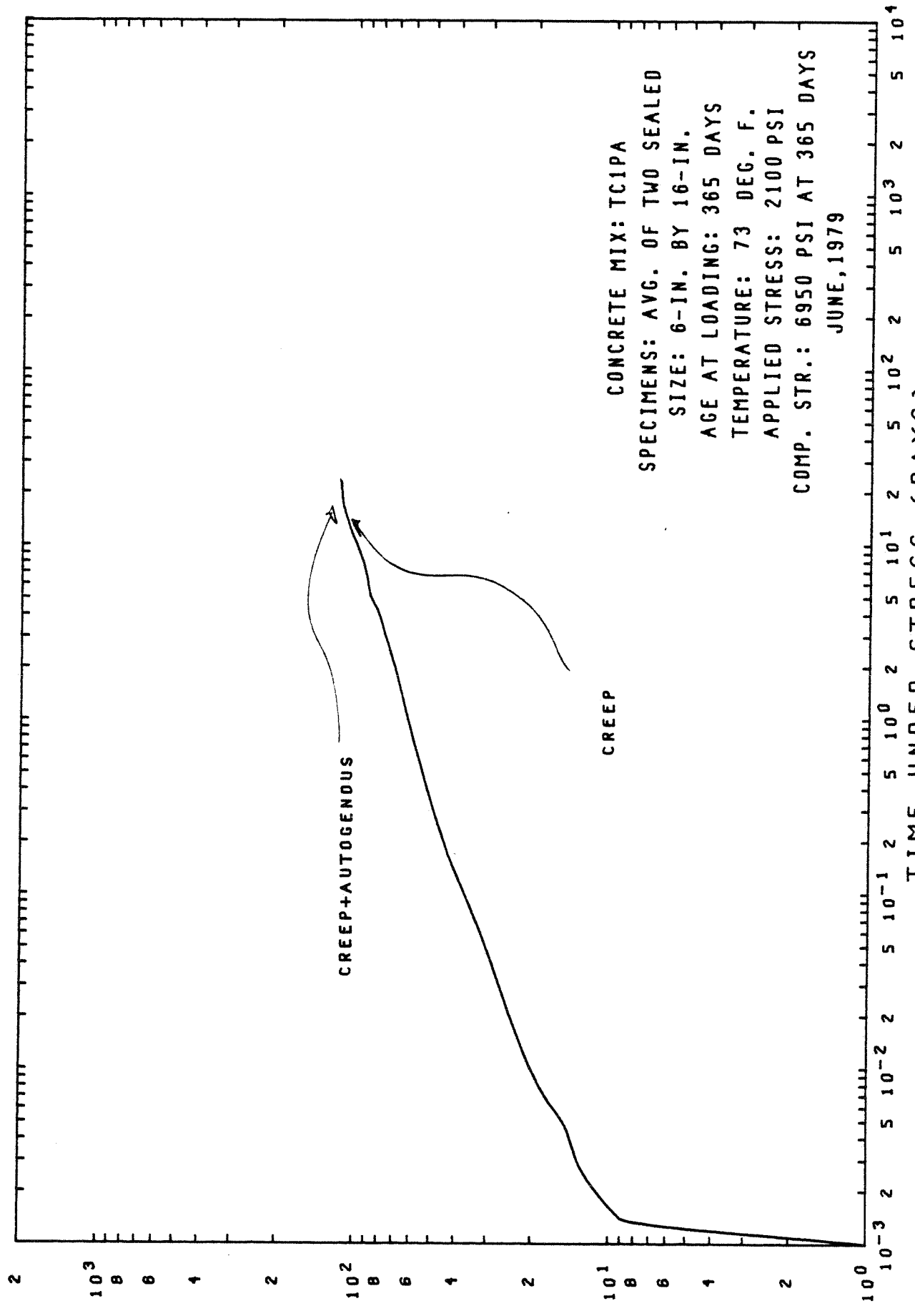

CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION
CONCRETE MIX: TC1PA
SPECIMENS: AVG. OF TWO SEALED
SIZE: 6-IN. BY 16-IN.
AGE AT LOADING: 365 DAYS
TEMPERATURE: 73 DEG. F.
APPLIED STRESS: 2100 PSI
COMP. STR.: 6950 PSI AT 365 DAYS
JUNE,1979
CREEP+AUTOGENOUS
CREEP
TIME UNDER STRESS (DAYS)
MICRO-STRAIN

FIGURE 11

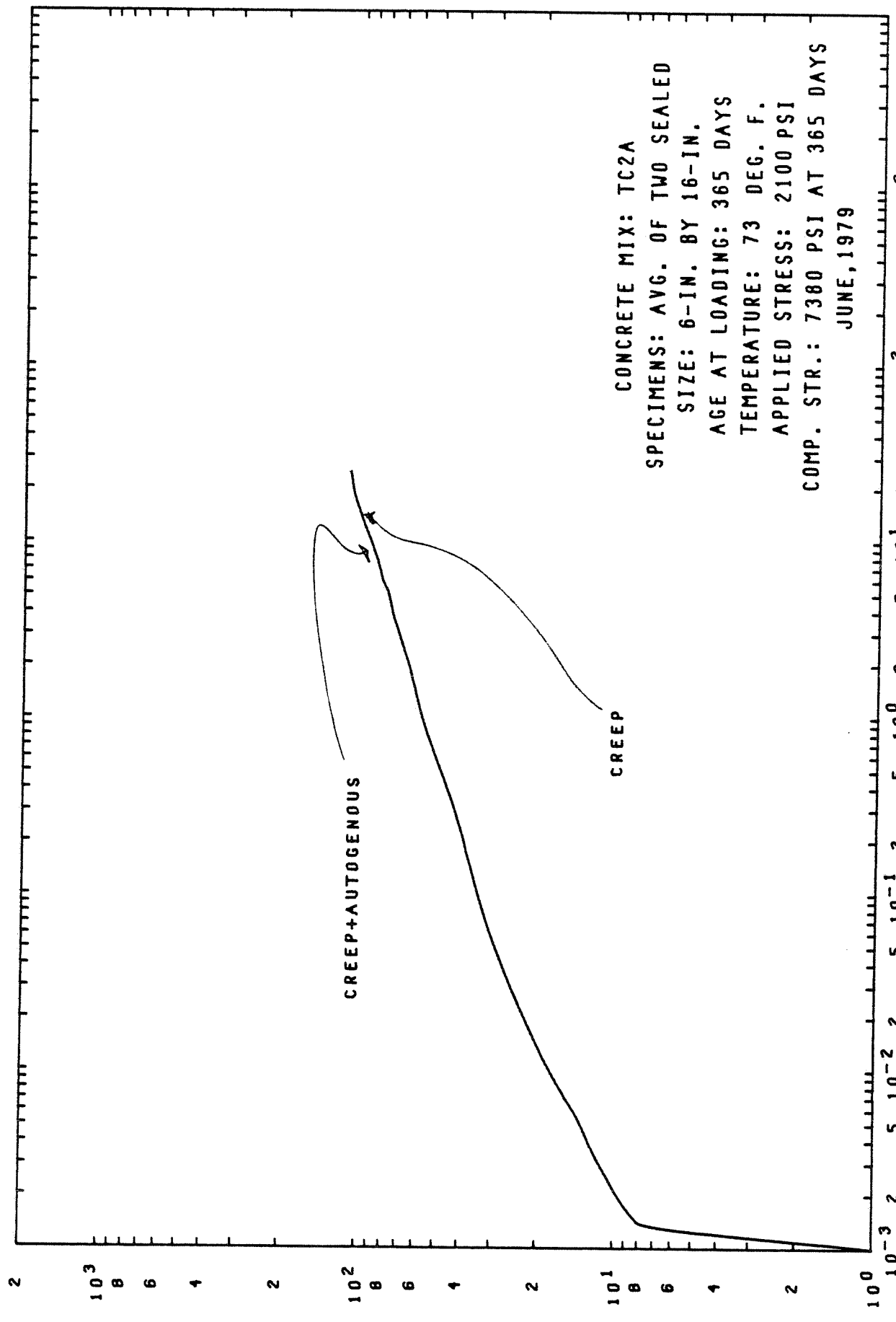

CREEP AND AUTOGENOUS STRAINS
SAN ONOFRE NUCLEAR GENERATING STATION
CONCRETE MIX: TC2A
SPECIMENS: AVG. OF TWO SEALED
SIZE: 6-IN. BY 16-IN.
AGE AT LOADING: 365 DAYS
TEMPERATURE: 73 DEG. F.
APPLIED STRESS: 2100 PSI
COMP. STR.: 7380 PSI AT 365 DAYS
JUNE,1979
CREEP+AUTOGENOUS
CREEP
TIME UNDER STRESS (DAYS)
MICRO-STRAIN

FIGURE 12