Sandia Laboratories

Albuquerque, New Mexico
Livermore, California

date: March 26, 1980

to: Walter Oliu - NRC

from: W. Lee Garner - 3151

ERRATA SHEET

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The subject document supplement is a repeat of the original document with the addition of raw data from the project study. The distribution designation "RV" was incorrectly included since only specific individuals are interested in this version of the report.

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Confirmation of the Original Qualification Test for Electrical Connectors Used at Browns Ferry Nuclear Power Plant Unit 3

Lloyd L. Bonzon, William H. Buckalew, Douglas W. Dugan, Frank V. Thome

Prepared by Sandia Laboratories, Albuquerque, New Mexico 37185 and Livermore, California 94550 for the United States Department of Energy under Contract DE-AC04-76DP00789

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NOTICE

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SAND79-2311 (SUPPLEMENT)
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CONFIRMATION OF THE ORIGINAL QUALIFICATION TEST FOR ELECTRICAL CONNECTORS USED AT BROWNS FERRY NUCLEAR POWER PLANT UNIT 3

Lloyd L. Bonzon
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February 1980

Sandia Laboratories
Albuquerque, NM 87185
operated by
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for the
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FOR ELECTRICAL CONNECTORS USED
AT BROWNS FERRY NUCLEAR POWER PLANT UNIT 3

1. Background, Program Objective

Following the Union of Concerned Scientist's petition of November 4, 1977, the NRC Commissioners directed the NRC staff to:

> "Arrange for a repeat of the tests to obtain data for the verification of current methodology for environmental qualification of electrical components. These tests should be performed with a representative sample of commercially available electrical connectors qualified in accordance with IEEE-323 (1974) and in use in nuclear power reactor safety systems. When available, the test results are to be promptly provided to the Commission."

The NRC staff interpreted this action to be aimed at providing information on the methodology of qualification testing using electrical connectors which meet the provisions of IEEE-323. Since no connectors in use at that time had been actually qualified to IEEE-323-1974 (a relatively new standard), the staff responded by directing that electrical connectors previously qualified by licensees for use in operating plants be tested in accordance with the provisions of IEE-323-1971.

To the extent practicable, connector assemblies were to be sub'ected to the actual aging, radiation, and LOCA-simulation tests for which the connector assemblies had been qualified. In a letter dated May 22, 1978,

D. G. McDonald (SEP/DOR) to R. Feit (RA/RSR), DOR and IE recommended that the following plants/connectors be considered for testing:

BWR (a) Peach Bottom - Pyle National Connectors; or

(b) Browns Ferry - Bendix Connectors

PWR (a) Palisades - Viking Connectors; or

(b) Oconee - Viking Connectors

However, other plants or connectors would also be appropriate due to "... availability of the connectors to be tested, extensive procurement time, or other constraints."

From that date, Inspection and Enforcement (IE) staff evaluated some of the various utilities' connector hardware and qualification documents and directed that Sandia proceed with the first test in this series using Browns Ferry-Bendix (BF3) connectors. The principal objective was that the test was to duplicate, as closely as practicable, the actual Browns Ferry Connector tests; it is understood that these original tests were intended to conform to the requirements of IEEE-323-71, with the addition of a (Browns Ferry specified) thermal aging preconditioning requirement.

The order for the connector hardware was placed through a Bendix-authorized distributor on August 2, 1978 with delivery completed on November 1, 1978. Concurrently, Draft 1 of the Sandia-generated implementing test plan was forwarded to NRC staff, for review and approval, on August 11, 1978. Based on staff comments, Draft 2 of the plan was submitted on February 16, 1979 followed by Draft 3 on May 1 and Draft 4 on August 30.

The test plan specifically applied to the Browns Ferry Unit 3 (BF3) connector assemblies; the applicable (background) documents for this test plan are:

(a) Tennessee Valley Authority, Purchase Requisition 150639, dated April 18, 1978.

(b) "Assembling Browns Ferry Nuclear Plant Bendix Connectors," dated June 22, 1978.

(c) "Test Procedure for Browns Ferry Bendix Connectors, Revision," undated.

The primary document, which the test plan intended to duplicate is:

(d) "Qualification Test for Electrical Connectors Used at Browns Ferry Nuclear Power Plant Unit 3," Report No. 43854-2, Wyle Laboratories, March 28, 1978.

2. Test Items Descriptions and Assembly

Three each of two different types of electrical connectors were tested. Both types are manufactured by Bendix and used inside containment at Browns Ferry, Unit 3 (BF3), operated by the Tennessee Valley Authority (TVA).

Qty	Manufacturer	Identification Numbers	Operating Voltage	Maximum Operating Current (A)
3	Bendix	Plug: 10-214628-51S Receptacle: 10-214028-51P	250 Vdc	1.0
3	Bendix	Plug: 10-214636-78S Receptacle: 10-214036-78P	480 Vac	17.5

These Bendix connectors were purchased by Sandia through a Bendix-authorized distributor. Electric cable was furnished by TVA from spare

cable of the same type used at BF3. The Bendix 250-Vdc connector assemblies consisted of wire size No. 12 CPJ cable on the plug end and wire size No. 12 Vulkene cable on the receptacle end of the connectors. The Bendix 480-Vac connector assemblies consisted of wire size No. 10 CPJ cable on the plug end and wire size No. 10 Vulkene cable on the receptacle end of the connectors. CPJ and Vulkene cables consist of cross-linked polyethylene with the CPJ cable having a PVC insulating jacket.

Construction of six of each of the connector assemblies was conducted by BF3 staff using an assembly and potting procedure developed by BF3 staff (used in field assembling connectors) and approved/certified by IE staff. Initial assembly took place on January 29-30, 1979 at the BF3 site and was completed on February 26-27. All connectors were potted to appropriate specifications prior to any testing. The actual assembly was observed by IE staff; after completion of the assemblies, IE certified that they were acceptably equivalent to the in-place connectors at BF3 before any simulation tests were conducted.

The Bendix 250-Vdc connectors are equipped with 12 pins. Its wiring configuration was such that all pins were used during testing. The Bendix 480-Vac connectors are equipped with 14 pins: 12 were wired into a single-phase circuit. In each case, the 12 pins were wired to form a series/parallel circuit that gave a voltage difference between pins within the connector as well as passing current to simulate a load.

Following final assembly, six of each of the wired and potted assemblies were shipped to Sandia Laboratories (Albuquerque) for completion of the entire confirmation-of-qualification test series.

3. Description of Test Profiles

Three of each of two types of connectors were subjected to the prescribed series of tests with the remaining six connector assemblies saved as spares. This test series consisted of the following:

I - Acceptance

II - Baseline Functional

III - Baseline Mechanical/Dimensional

IV - Radiation

V - Postradiation Functional/Mechanical

VI - Temperature Aging

VII - Postaging Functional/Mechanical

VIII - Accident Test

IX - Postaccident Functional/Mechanical

X - Posttests Inspections

3.1 Radiation

The connector assemblies were exposed to Cobalt-60 radiation doses totalling 68.5 Mrads (air) at an averaged dose rate of 0.76 Mrad/h during the period April 4-9, 1979. By comparison, the specified values were 69 Mrad and 0.77 Mrad/h, respectively, to be attained within $\pm$10%.

The total 90-h irradiation interval was accomplished in four 22.5-h periods with the specimens rotated to achieve a more uniform total dose. Concurrently, selected temperatures were recorded; the maximum measured temperature was 35°C with the temperatures generally ranging between 30° to 34°C. Figure 1 shows a view of the connector boxes in place inside the irradiation facility.

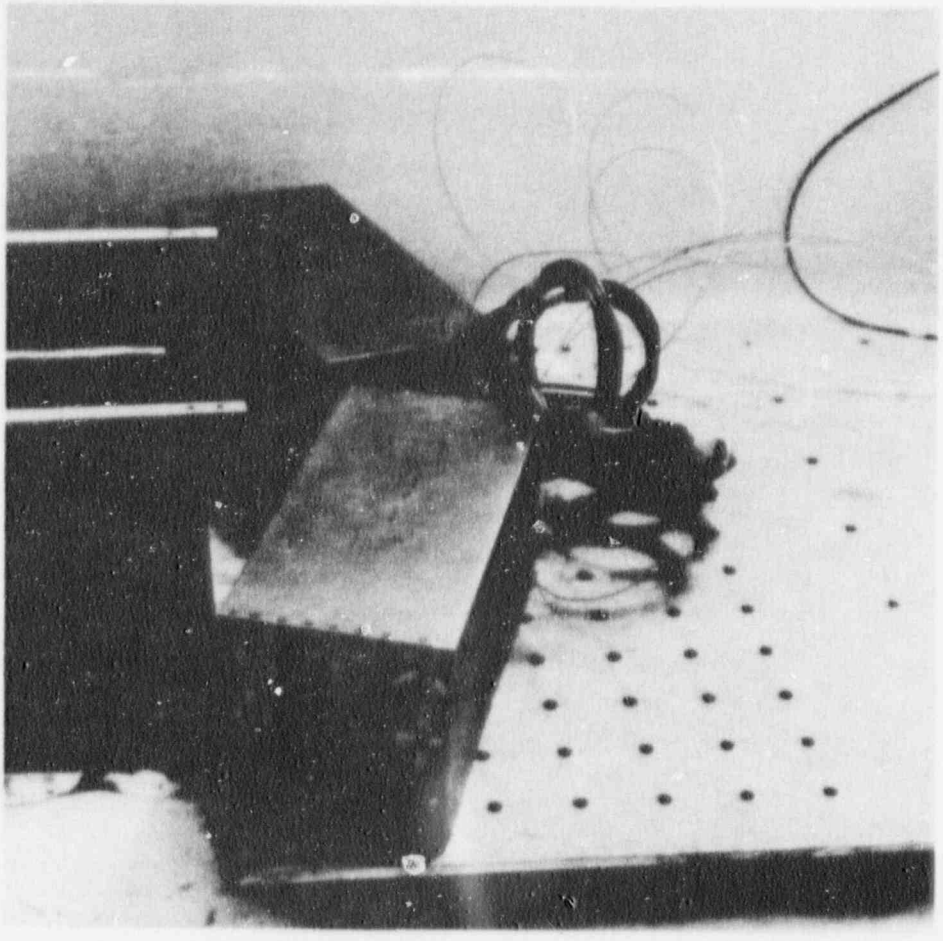


Figure 1. View of Connector Boxes in Irradiation Cell

3.2 Temperature Aging

All of the electrical connectors were subjected to a two-part simulated aging test during the period, April 10-24, 1979. The specified aging times/temperatures/tolerances are shown below; the humidity was not controlled (i.e., was ambient).

Aging Temperature	Aging Time	Aging Atmosphere
217° ±6°F	60 ±0.1 h[a]	Air
217° ±6°F	180 ±0.1 h[b]	Nitrogen

[a] 60 h in air at 217°F is intended to simulate 6 mo in air at 130°F.

[b] 180 h is intended to simulate 18 mo in 130°F nitrogen with a maximum of 4% oxygen.

Each test item was placed in the temperature chamber (i.e., oven) in a manner to avoid overheating from radiant effects from the chamber-heating elements (Figure 2). The temperature chamber was vented to the atmosphere to prevent buildup of outgasing products, particularly chlorine gas, from the test item inside the chamber. The air inside the chamber was distributed uniformly at an average velocity of about 250 ft/min; pretest flow measurements in an open chamber were made and recorded. The air-aging was conducted for 59 2/3 h at 217° ±3°F and was completed on April 13, 1979.

Following the air aging, the oven was purged with flowing nitrogen and the oven chamber brought to, and restabilized at, 217°F. The temperature was maintained (±3°F) for 179 2/3 h and was completed on April 24. During nitrogen-aging, a continuous flow of nitrogen was maintained, averaging about 1/5 ft^3/m.

During all phases of the aging tests, selected specimen and environment temperatures were recorded; the data indicated stabilized temperatures ranging between 218° and 220°F.

3.3 Accident Test

Programmatic delays in completing the test series were experienced during the period April 24 to November 1, 1979. The delays were a result of two factors. First, it was necessary for NRC staff to define the desired test profile so as to envelope both the originally specified and actual test profiles. Second, the necessary steam-generation equipment had to be assembled and a number of demonstration runs conducted to prove that the profile could be attained. During this 6-mo period, the connectors were stored in locked cabinets under ambient conditions; Sandia staff believes that the storage resulted in insignificant additional degradation and "age."

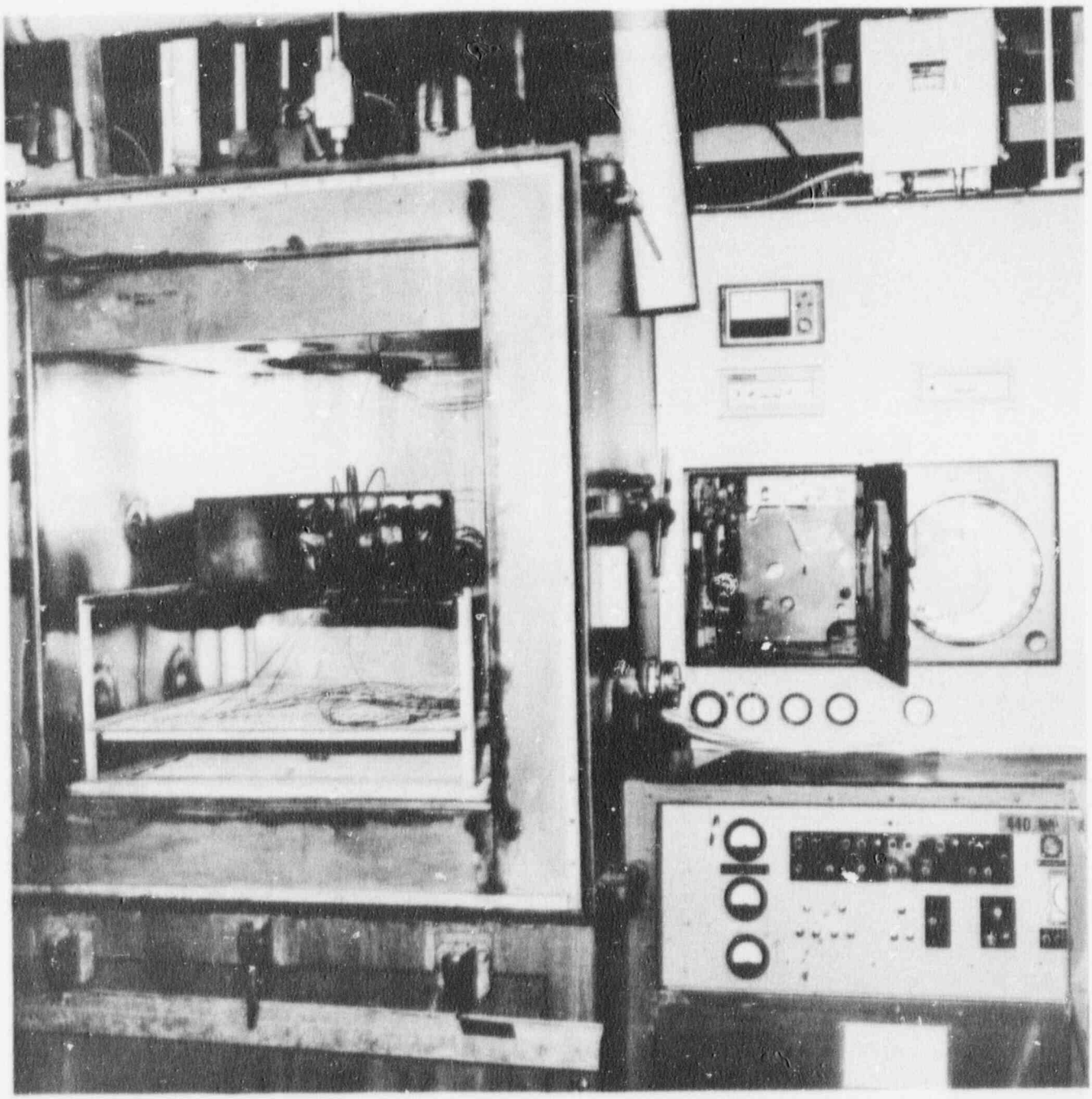


Figure 2. Oven and Associated Controller With Connector Boxes In-Place in the Oven

The connector assemblies were installed in the autoclave test chamber on October 31, 1979. Circuit continuity checks were performed and the assemblies instrumented to load and measure voltage and current. The test chamber was instrumented with numerous temperature and pressure sensors located to provide indications that the environments were correctly attained and maintained.

The electrical connector test assemblies were subjected to the accident test profile shown in Figure 3 and as detailed in established test procedures on November 1-2, 1979. The 250-Vdc connector assemblies were energized throughout the entire test. The 480-Vac connector assemblies were energized during the first 5 minutes, between minutes 15 and 18, and between minutes 57 and 60.

All aspects of the test were within the specified tolerances except for a few minutes at approximately 2 h when the temperature exceeded the desired (110°C) value by +7°C.

4. Test Results, Conclusions

All aspects of the test were considered satisfactorily completed. All connector assemblies passed the specifications of the test series; in particular, the assemblies carried their specified current/voltage loads during the accident-test phase. Posttest inspections (Figures 4 and 5) indicated little or no degradation of the connectors.

It is concluded that the test series completed on the specified BF3 connectors confirms the original qualification tests on the same type connectors as documented in Wyle Laboratories Report No. 43854-2, dated March 28, 1978.

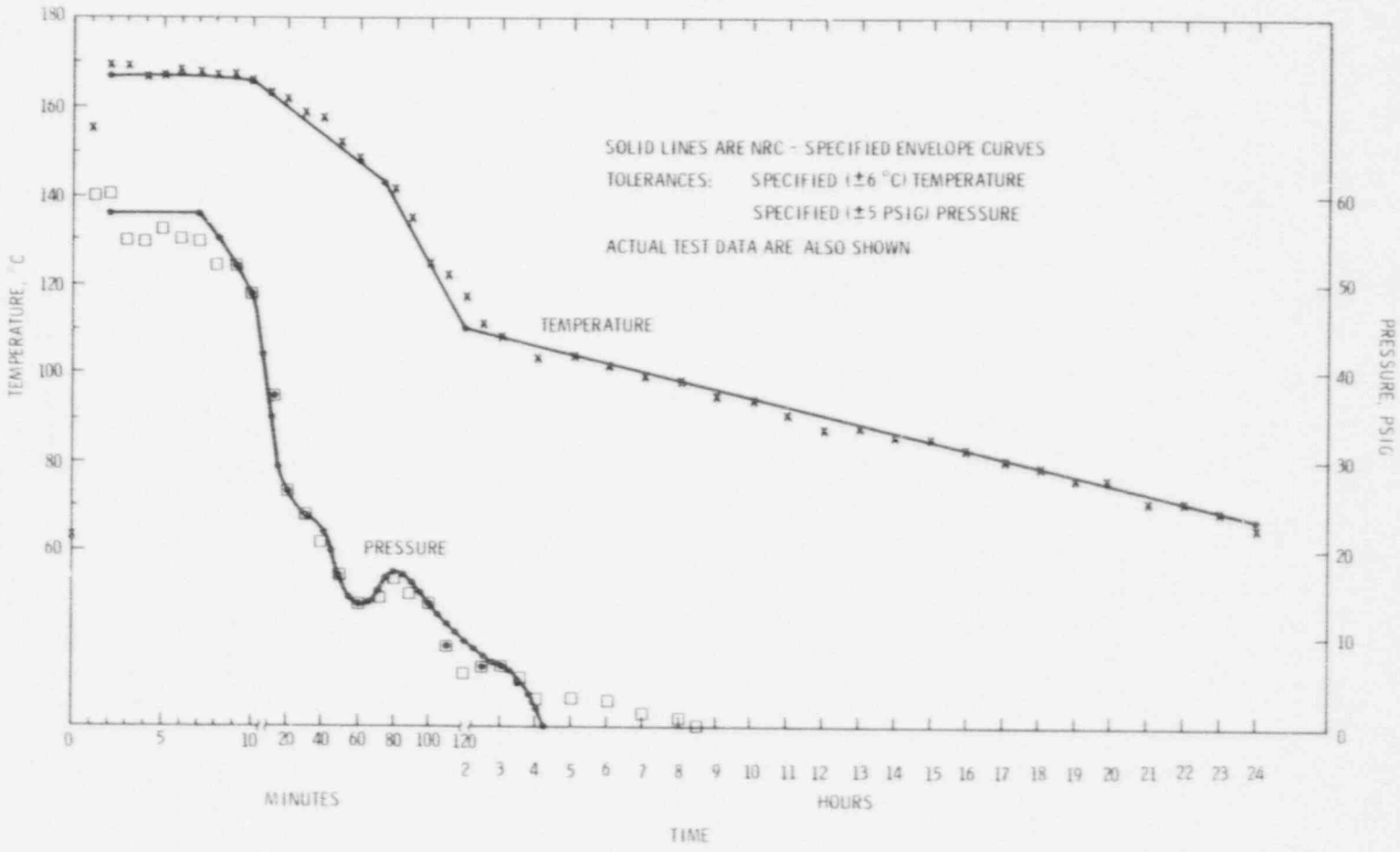


Figure 3. Specified BF3-Connector Accident Test Profile and Data From November 1 and 2, 1979 Test

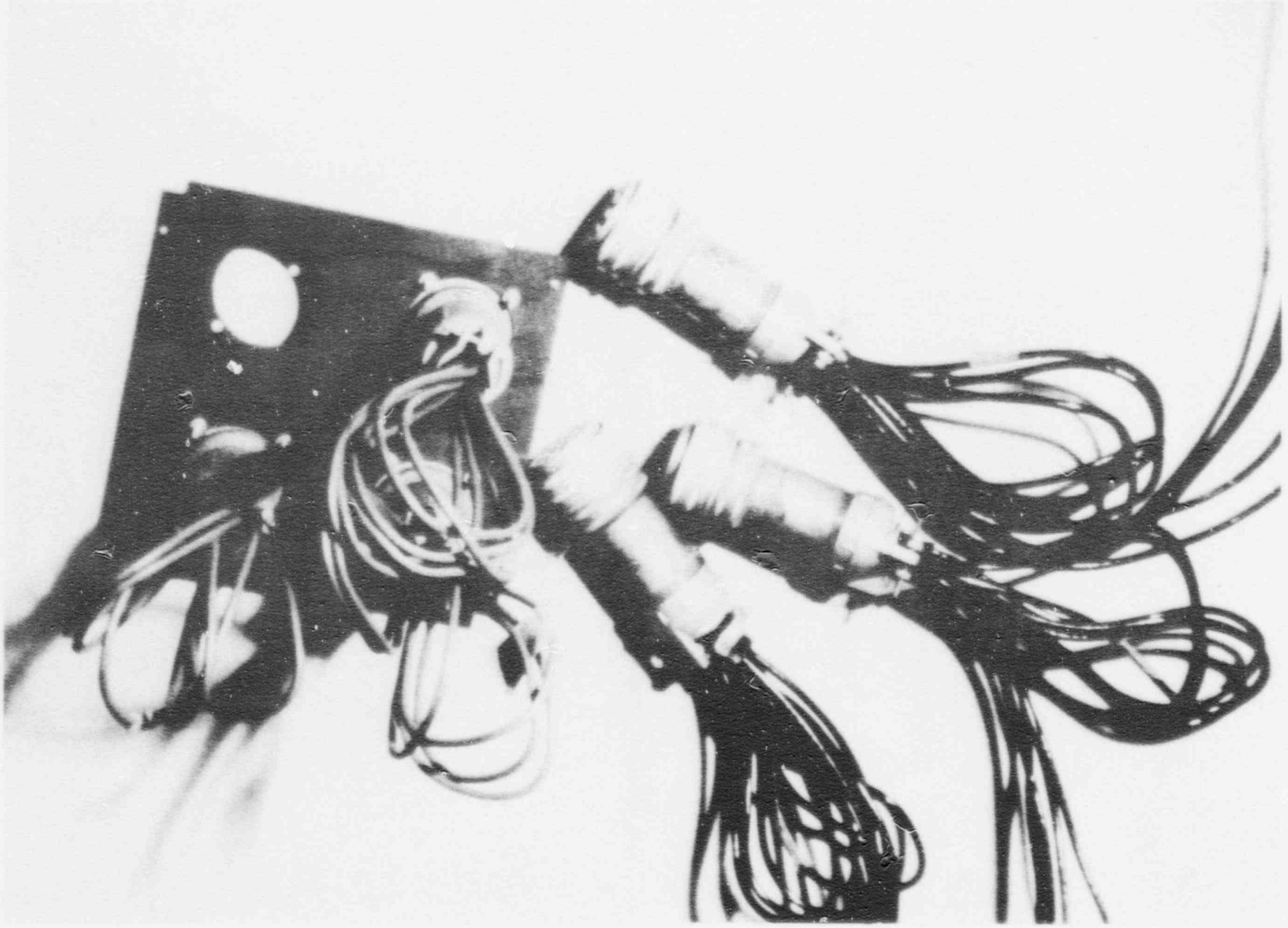


Figure 4. Posttest Disassembly of 250-Vdc Connectors

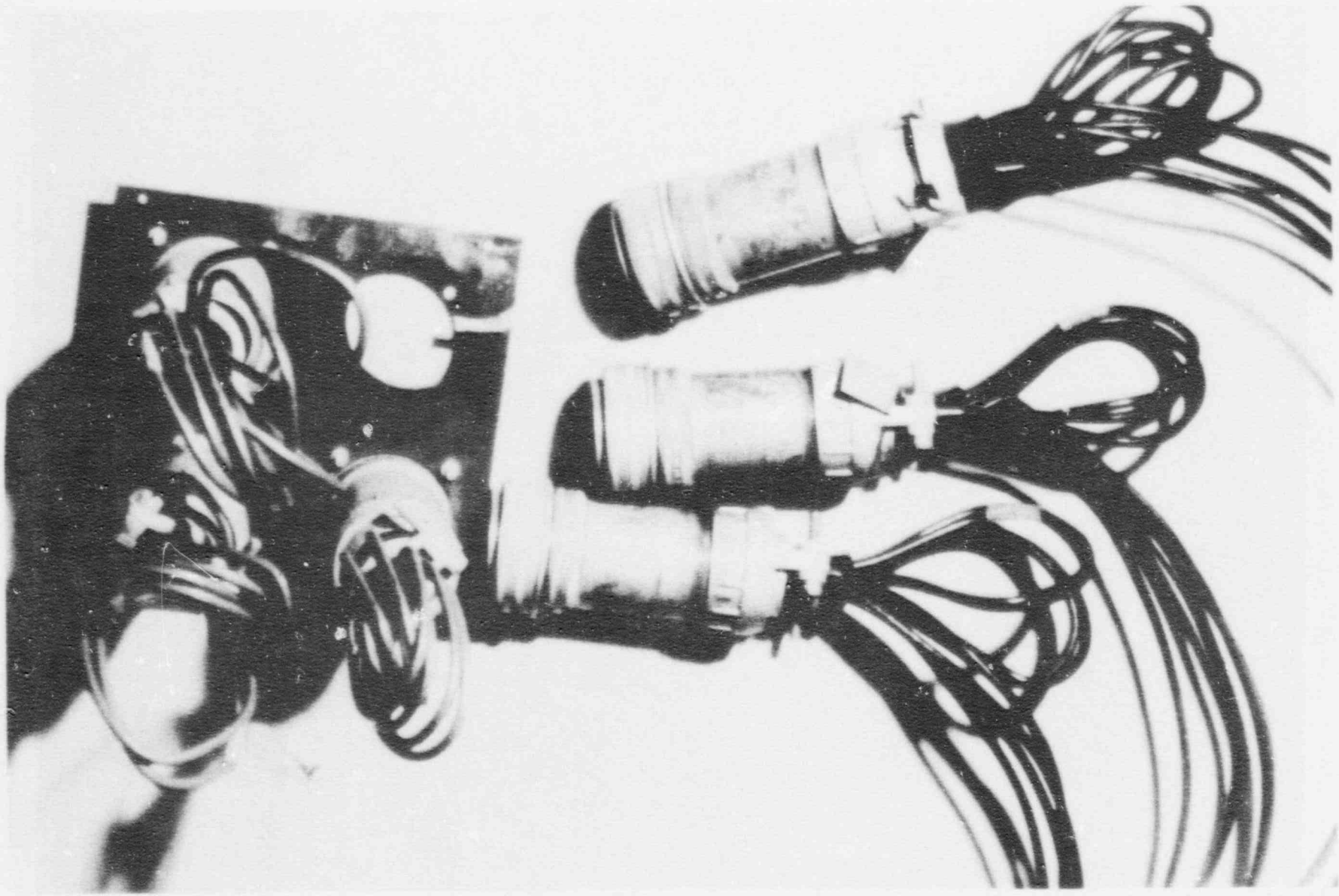


Figure 5. Posttests Disassembly of 48-Pac Connectors

5.0 Test Documentation

The preceding sections summarized the background, test items, test profiles, and general test results. In the sections which follow, the specific test plans, procedures and data sheets are provided. The arrangement of the information is provided to allow almost direct one-to-one comparison with the Wyle Laboratories Report No. 43854-2, dated March 28, 1978.

SECTION A

CONNECTOR ASSEMBLY TEST PLAN

FOR

BROWNS FERRY, UNIT 3, CONNECTORS

CONNECTOR ASSEMBLY TEST PLAN

for

BROWNS FERRY, UNIT 3, CONNECTORS

to be coordinated for the

U. S. Nuclear Regulatory Commission

Research Support Branch, RSR

by

Sandia Laboratories, Albuquerque

Submitted: 8/11/78
Second Draft: 2/16/79
Third Draft: 5/1/79
Fourth Draft: 8/30/79

8/11/78
2/16/79
5/1/79
8/30/79

Program Objective

Following the Union of Concerned Scientist's petition of November 4, 1977, the NRC Commissioners directed the NRC staff to:

> "Arrange for a repeat of the tests to obtain data for the verification of current methodology for environmental qualification of electrical components. These tests should be performed with a representative sample of commercially available electrical connectors qualified in accordance with IEEE-323 (1974) and in use in nuclear power reactor safety systems. When available, the test results are to be promptly provided to the Commission."

The staff have interpreted this action to be aimed at providing information on the methodology of qualification testing using electrical connectors which meet the provisions of IEEE-323. Since no connectors have been actually qualified to IEEE-323-1974 (a relatively new standard), the staff responded by directing that electrical connectors previously qualified by licensees for use in operating plants be tested in accordance with the provisions of IEEE-323-1971.

To the extent practicable, connector assemblies will be subjected to the actual aging, radiation, and LOCA-simulation tests for which the connector assemblies have been qualified. In a letter dated May 22, 1978, D. G. McDonald (SEP/DOR) to R. Feit (RA/RSR), DOR and IE recommended that the following plants/connectors be considered for testing:

BWR (1) Peach Bottom - Pyle National Connectors; or
(2) Browns Ferry - Bendix Connectors

PWR (1) Palisades - Viking Spec Connectors; or
(2) Oconee - Viking Spec Connectors

However, other plants or connectors would also be appropriate due to ". . . availability of the connectors to be tested, extensive procurement time, or other constraints."

Since that date, IE staff have evaluated some of the various utilities' connector hardware and qualification documents and have directed that Sandia proceed with the first test in this series using Browns Ferry-Bendix connectors. This test plan has the objective that the test is to duplicate, as closely as practicable, the actual Browns Ferry Connector tests; it is understood that the actual tests were intended to conform to the requirements of IEEE-323-71, with the addition of a (Browns Ferry specified) thermal aging pre-conditioning requirement.

Test Components

This test plan applies to the Browns Ferry Unit 3 (BF3) connector assemblies; the applicable background documents for this test plan are:

(1) Tennessee Valley Authority, Purchase Requisition 150639, dated 4/18/78.

(2) "Assembling Browns Ferry Nuclear Plant Bendix Connectors," dated 6/22/78.

(3) "Test Procedure for Browns Ferry Bendix Connectors, Revision," undated.

The primary document, which this test plan intends to duplicate is:

(4) "Qualification Test for Electrical Connectors Used at Browns Ferry Nuclear Power Plant Unit 3," Report No. 43854-2, Wyle Laboratories, March 28, 1978.

Test Items Descriptions

Three each of two different types of electrical connectors are to be tested. Both types are manufactured by Bendix and used inside containment at Browns Ferry, Unit 3.

Qty	Manufacturer	Identification Numbers	Operating Voltage	Maximum Operating Current
3	Bendix	Plug: 10-214628-51S	250VDC	1.0 Amp
3	Bendix	Receptacle: 10-214028-51P		
3	Bendix	Plug: 10-214636-78S	480VAC	17.5 Amp
3	Bendix	Receptacle: 10-214036-78P		

These Bendix connectors will be purchased by Sandia through a Bendix-authorized distributor. Electric cable will be furnished by TVA from spare cable of the same type used at BF3. The Bendix 250-VDC connector assemblies will consist of wire size No. 12 CPJ cable on the plug end and wire size No. 12 Vulkene cable on the receptacle end of the connectors. The Bendix 480-VAC connector assemblies will consist of wire size No. 10 CPJ cable on the

plug end and wire size No. 10 Vulkene cable on the receptacle end of the connectors. CPJ and Vulkene cables consist of cross-linked polyethylene with the CPJ cable having a PVC insulating jacket.

NRC/IE staff will certify that these connector components and cables are acceptably equivalent to those in place at BF3 before construction of the connector assemblies.

Assembly of Test Items

Construction of the connector assemblies will be conducted by BF3 staff using an assembly and potting procedure developed by BF3 (used in field assembling connectors) and approved/certified by IE staff. The assembly document, item 2 above, is also applicable. All connectors will be potted to appropriate specifications prior to any testing. The actual assembly will be observed by IE staff; after completion of the assemblies, IE will certify that they are acceptably equivalent to the in-place connectors at BF3 before simulation tests are conducted.

The Bendix 250-VDC connectors (plug 10-214628-51S and receptacle 10-214028-51P) are equipped with 12 pins. Its test configurations will be such that all pins will be utilized during testing. The Bendix 480-VAC connectors (plug 10-214636-78S and receptacle 10-214036-78P) are equipped with 14 pins, 12 of which will be utilized by being wired into a single-phase circuit. In each case, the 12 pins will be wired to form a series parallel circuit which will give a voltage difference between pins within the connector as well as passing current to simulate a load.

Non-Destructive Examination (NDE) Tests

Prior to performing accelerated aging on the test items, certain non-destructive examination tests will be made at Sandia Laboratories. These will include:

(1) Continuity checks to assure circuit integrity.

(2) 500-VDC insulation resistance measurements between circuit loops and between each circuit loop and the connector case.

(3) X-radiographs and neutron-radiographs of the connector bodies as deemed necessary or desirable.

Sandia staff will examine all NDE data and make recommendations to IE staff on the fitness of the connector assemblies for test. As appropriate, IE will certify that they are acceptable and can undergo the planned test series.

Housing for Connector Assemblies

To provide structural support for the assemblies, in the qualification tests (report 4 above) a metal box was used to hold three or four assemblies. This box was about 8-inches square, about 20-inches long, open only on one end (8-inch square end). The connectors mating plane was located about 8 inches from the open end.

In these tests, a similar support will be constructed to house the assemblies; however, it will be slightly foreshortened (to about 18 inches) to fit within the test chamber.

Test Procedures

To the extent practicable, the test series previously conducted on Browns Ferry, Unit 3, connector assemblies will be repeated in these tests; the previous test results are reported in Wyle Laboratories Report 43854-2. This test series will be performed in the following sequence:

1. Baseline Functional Tests
2. Nuclear Radiation
3. Post-Radiation Functional Tests
4. Temperature Aging Test
5. Post-Temperature Aging Functional Tests
6. Accident Test
7. Post-Accident Functional Tests
8. Dimensional Test
9. Post-Test Inspection

Test equipment, from sensor to final readout device, will be selected to provide the accuracies specified below:

- Aging Chamber Temperature $\pm$ 6°F (stratification $\pm$ 7°F)
- LOCA Chamber Temperature $\pm$ 5°F
- Chamber Pressure $\pm$ 5 psig
- Voltage $\pm$ 3%
- Current $\pm$ 3%

Test equipment used for these tests and date of its most recent calibration will be shown on Instrumentation Equipment Sheets attached to a final test report to be issued.

A full test report will be issued which completely describes the test series, which indicates deviations from the prescribed test program, and which includes equipment documentation and data sheets.

Baseline Functional Tests

The insulation resistance of each test item shall be determined; the value of resistance will be determined as outlined below.

Each test item will be powered with its operating voltage and loaded to produce the maximum operating current in its circuit. The resistance value of the load required to produce the maximum operating current at operating voltage will be measured and recorded for each test item. The values will determine the loading criteria for each test item for the remainder of the program. (Reference Figures 1 & 2.)

Each test item is to be subjected to an insulation resistance test. The insulation resistance is measured without power using a 500VDC megohmmeter. Value of resistance is to be determined:

- between the circuit on one side of the load and connector case,
- between the circuit on the other side of the load and connector case,
- between each side of circuit for each item.

Each test item is to be powered with its operating voltage and loaded to produce the maximum operating current in its circuit. The resistance value of the load required to produce the maximum operating current at operating voltage will be measured and recorded. These resistance values will be used throughout the remainder of the test program.

Nuclear Radiation

All connector assemblies will be exposed to a specified, uniform, radiation dose of 6.9×10^7 rads(air) at an average dose rate of about $.77 \times 10^6$ rads/hour, for approximately 90 hours, using a Cobalt-60 simulator; total dose and dose rate will be attained within 10% accuracy. The specimens may be rotated and/or repositioned periodically to achieve a more uniform total dose.

During the irradiation of the connector assemblies, the specimens temperatures will be periodically monitored and recorded.

Post-Radiation Functional Test

After the electrical connectors have been irradiated, each item will be subjected to insulation resistance, voltage, and load tests as described above. The test items will also be subjected to a dimensional test as specified in a later section of this test procedure. The insulation resistance will be measured using a 500VDC megohmmeter. Values of resistance shall be recorded. Each test item shall carry its required load at no more than a 10 percent reduction in operating voltage.

Temperature Aging Test

All of the electrical connectors will be subjected to a simulated aging test. The aging time and conditions are shown below. The humidity during aging will be uncontrolled.

Aging Temperature	Aging Time	Aging Atmosphere
217 ± 6°F	60 Hours ± 0.1 Hour[1]	Air
217 ± 6°F	180 Hours ± 0.1 Hour[2]	Nitrogen

[1]60 hours in air at 217°F is intended to simulate 6 months in air at 130°F.
[2]180 hours is intended to simulate 18 months in 130°F nitrogen with a maximum of 4 percent oxygen.

Each test item will be placed in a temperature chamber (i.e. oven) in a manner to avoid overheating from radiant effects from the chamber heating elements. The temperature chamber will be vented to the atmosphere to prevent buildup of outgasing products, particularly chlorine gas, from the test item inside the chamber. The air inside the chamber will be distributed uniformly throughout the chamber at an average velocity of about 250 feet per minute; pre-test flow measurements in an open chamber will be made and recorded. The test items will be aged in air at 217 ± 6°F for a time period of 60 hours.

Following air aging, the test specimens will be removed from the oven. The oven will be purged with flowing nitrogen; the specimens will then be repositioned in the oven. The oven temperature will be stabilized at 217 ± 6°F, with this temperature maintained for a total of 180 hours. During nitrogen aging, a continuous flow of nitrogen, about 1/4 cfm, will be introduced into the chamber at ambient pressure. This purge will prevent the outgassing products from accumulating inside the oven.

During the aging of the connector assemblies, the specimens and environment temperatures will be periodically monitored and recorded.

Post-Temperature Aging Functional Tests

After the electrical connectors have been temperature-aged, each item will be subjected to insulation resistance, voltage, and load tests. The test items will also be subjected to a dimensional test, as specified in a later section of this report. The insulation resistance will be measured using a 500 VDC megohmmeter and a volt-ohmmeter. Values of resistance shall be recorded; the megohmmeter is for supplemental information only. Each test item shall carry its required load at no more than a 10 percent reduction in operating voltage.

Accident Test

The electrical connector test assemblies will be subjected to an accident test profile enveloping that shown in Figure 3. The 250-VDC connector assemblies will be energized throughout the entire test. The 480-VAC connector assemblies will be energized only during the first 5 minutes, between minutes 15 and 18, and between minutes 57 and 60.

The connector assemblies will be installed in the test chamber. (To make electrical connection through the test chamber seals, Anaconda 3/c #12 nuclear grade cable may be butt spliced to the connector assembly and the splices covered with Raychem nuclear grade (WCSF series) heat shrink tubing.) Circuit continuity and circuit resistance tests will then be performed with the assemblies installed in the test chamber. The assemblies will be instrumented to measure voltage and current; the test chamber will be instrumented with temperature and pressure sensors. Periodic measurements of all parameters will be made.

All test items will be subject to an accident profile approximating the specified time, temperature, pressure conditions displayed in Figure 4. Also shown in Figures 4A, B, and C is the NRC specified enveloping profile for temperature and its ±6°C error band. This, along with the actual pressure profile with its ±5 psig error band, constitute the desired accident test signature. These profiles were developed from NRC staff letters:

(1) June 22, 1979, Murley to Schroeder and Eisenhut, "Commission-Requested Connector Tests"

(2) August 1, 1979, Schroeder and Eisenhut to Murley, "Commission-Requested Connector Tests"

The 250-VDC connector assemblies will be energized throughout the entire test. The 480-VAC connector assemblies will be energized only during the first five minutes, between minutes 15 and 18, and between minutes 57 and 60. (The energizing schedule is construed to imply that the connector assemblies are energized just prior to introduction of the steam environment.)

The major features of the originally specified profile are:

-- ramp to chamber conditions of 325°F (163°C), 55 psig, in approximately 2 minutes.

-- maintain stablized conditions for 5 minutes.

-- at 7 minutes, reduce pressure to 30 psig while holding temperature at 325°F (163°C).

-- between minutes 7 and 30 reduce temperature to 304°F (151°C), while holding pressure at 30 psig.

-- between minutes 30 and 75, reduce temperature to 282°F (139°C) and pressure to 20 psig.

-- at 75 minutes, reduce temperature to 230°F (110°C) while holding pressure at 20 psig.

-- reduce pressure and temperature at an average rate of 3.5°F/hour for 24 hours or until a chamber condition of 150°F (65°C) is attained.

The actual adjustments of the pressure and temperature of the test chamber are to be accomplished by manually manipulating the superheater controls and pressure regulators in a systematic way.

During the environmental exposure of the connector assemblies the specimens and environment temperatures will be periodically monitored and recorded and the connectors will be powered with their operating voltage/current loads as described above. Failure to carry the required voltage/current loads will be considered as failure of the assembly.

Generalized sketches of the sensor placements, test specimen placements, and of the voltage/current loading circuits are shown in Figures 5 and 6.

Post-Accident Functional Tests

After the connectors have been subjected to the accident test, each item will be subjected to insulation resistance,

voltage, and load tests. The test items will also be subjected to a dimensional test, as specified in a later section of this report. The insulation resistance will be measured using a 500VDC megohmmeter and a volt-ohmmeter. Values of resistance shall be recorded; the megohmmeter is for supplemental information only. Each test item shall carry its required load at no more than a 10 percent reduction in operating voltage.

These post-accident functional tests are for information only and do not constitute any acceptance criteria.

Dimensional Test

The purpose of the dimensional test is to determine if any part of the neoprene on the two types of connectors become physically distorted during testing.

There are two parts to this test. The first part is the durometer test, which measures the hardness of the neoprene. The second part is the dimensional measurement of the connectors and cables. The dimensional test will be done four times: (1) Acceptance Dimensional, (2) Post-Radiation Dimensional, (3) Post-Aging Dimensional, and (4) Post-Accident Dimensional.

Durometer Test

It is imperative that the durometer tests be performed in the same place each time. Location of test points is identified in Figures 7 and 8.

Bendix 250-VDC Connector - measure each connector receptacle face at a point between pins H, J, K, and N; between pins K, L, M, and N; and between B, C, D, and L. See Figure 7 for orientation.

Bendix 480-VAC Connector - measure each connector receptacle face at a point between pins 9, 10, 11, and 14; between pins 11, 12, 13, and 14; and between pins 4, 5, 12, and 13. See Figure 8 for orientation.

Connector and Cable Measurements

Place a straightedge across the neoprene face of the receptacle and determine if the neoprene extends beyond the edge of the connector barrel.

Measure the depth of the neoprene from the face of the receptacle to the pin. For the 250-VDC connectors, use pins A, K, M, and E; for the 480-VAC connectors, use pins 1, 14, and 6.

Measure the outside diameter of a selected wire in each connector assembly with a micrometer. Three measurements will be taken on each wire. One measurement will be taken adjacent to the wire identifier; the other two will be taken one inch

apart toward the bare end of the wire. For the 250-VDC connectors, use wire "A"; for the 480-VAC connectors, use wire "14".

Post-Test Inspection

Disassemble and inspect each test item as detailed below. Record results of any degradation that may have occurred.

1. The insulation will be inspected for surface texture, discoloration, cracks, or splitting.

2. The connector shells, threads, and cable clamps will be inspected for general conditions.

3. The connector pins on the face side will be inspected for corrosion, oxidation, pitting, or burning.

Discussion

These test procedures attempt to duplicate the actual test, previously conducted, as reported in Wyle Laboratories Report 43854-2, "Qualification Test for Electrical Connectors used at Browns Ferry Nuclear Power Plant Unit 3." There are some differences reflected in these procedures.

· All connector assemblies will be potted to appropriate specifications before the accelerated aging tests are initiated; that is, only fully assembled connectors will be subjected to this test series. In the previous test, the potting was done after the radiation was complete.

· Under Test Items Description, wire sizes (#12 and #10) were inadvertently transposed in report 3. They have been corrected in this test plan.

· The section on Housing for Connector Assemblies has been added for completeness.

· In various places, the control on aging chamber temperature has been increased to reflect Sandia capability per Process Standard 9,958,000.

· Under (several) Functional Test sections, a 500 VDC megohmmeter is specified instead of a volt-ohmmeter.

· Under Nuclear Radiation, some clarification is added on "average" dose rate and sample repositioning. It is not certain how this may differ from the original test conditions.

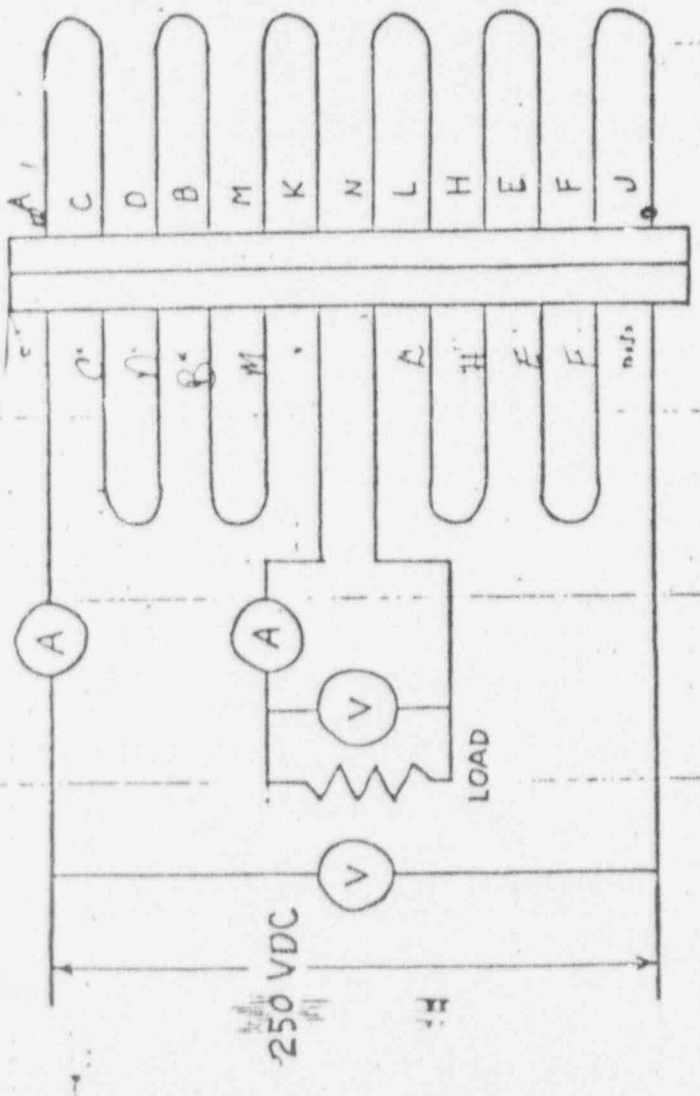
· On the Temperature Aging Table and in the text, $\pm$ 6°F has been called out. The original specification was $\pm$ 2°F for the temperature control.

· The method of nitrogen aging varies from that reported in Report 4, which describes this procedure as follows:

> "Each of the test items was placed in a sealed chamber as shown in photographs in Appendix I of this section. A vacuum pump was attached to this chamber and evacuated to 100 micron (Abs.) pressure. The chamber was then back filled with dry nitrogen to 14.7 psia and valved off to trap the nitrogen inside the chamber.
>
> "The nitrogen-filled container was then placed inside a temperature chamber which was increased to, and stabilized at, 217 ± 2°F. This temperature was maintained for a total of 180 hours. During this time period the nitrogen inside the container was purged every 24 hours to prevent out-gasing of materials from accumulating inside the container."

· Anaconda 3/c nuclear-grade cable and Raychem nuclear-grade splices may be used to exit from the LOCA test chamber if existing cable on the connector is not long enough.

· In the accident test, the temperature and pressure changes will be accomplished using manual adjustments of pressure regulators, superheaters, flow regulators, and the like; "averaged" rate is a key word.



12 PIN BENDIX

FIGURE 1
WIRING DIAGRAM

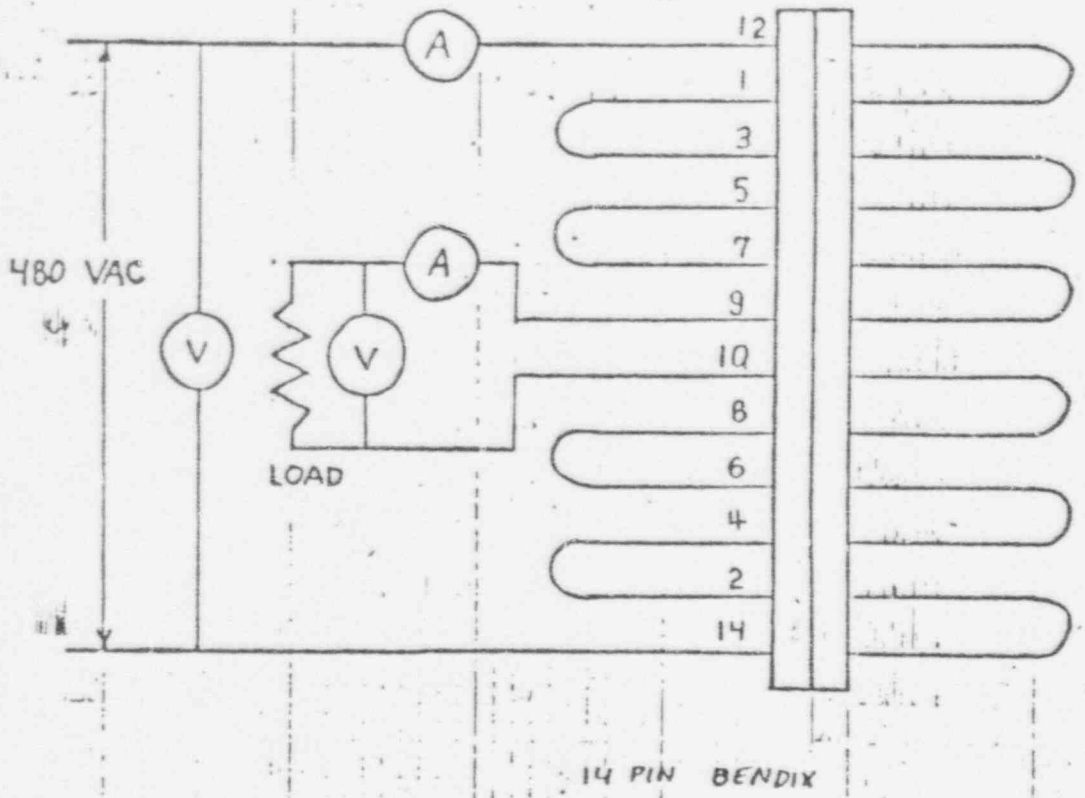


FIGURE 2
WIRING DIAGRAM

ASSOC D CURVE LEGEND

Curve Code	Explanation
△	Containment response to a postulated LOCA as defined in GE Letter No. G-ER-G-103 to G.D. Miller of TVA dated May 13, 1976, and GE Letter No. G-ER-G-130 to D.E. Patterson of TVA dated May 19, 1976
○	Containment response to a postulated 2.5 ft² steam leak as defined in Figure Q 6.2.1-6 of the Response To ACC Questions Dated March 29, 1976, contained in Volume 6 of the BFNP FSAR
○	Pen canister environmental qualification curve derived to encompass the postulated LOCA and 0.5 ft² steam line break containment response curves △ and ○ and to be used in pen canister testing after 7/1/80

NUMERICAL CODE LEGEND

Code Number	Associated Curve	Pressure (psig)	Temperature (°F)	Explanation
1	△	50	245	N/R
2	○	55	325	N/R
3	○	24	322	N/R
4	○	30	325	start 4.875 °F/min decrease for 24 minutes
5	○	30	304	start 0.5 °F/min and 0.33 psig/min decrease for 49 minutes
6	○	20	282	N/R
7	○	20	230	start 3.5 °F/hr decrease for the remainder of test
8	○	10	277	N/R
9	○	5	274	N/R
10	○	2	249	N/R
11	○	0	216	N/R

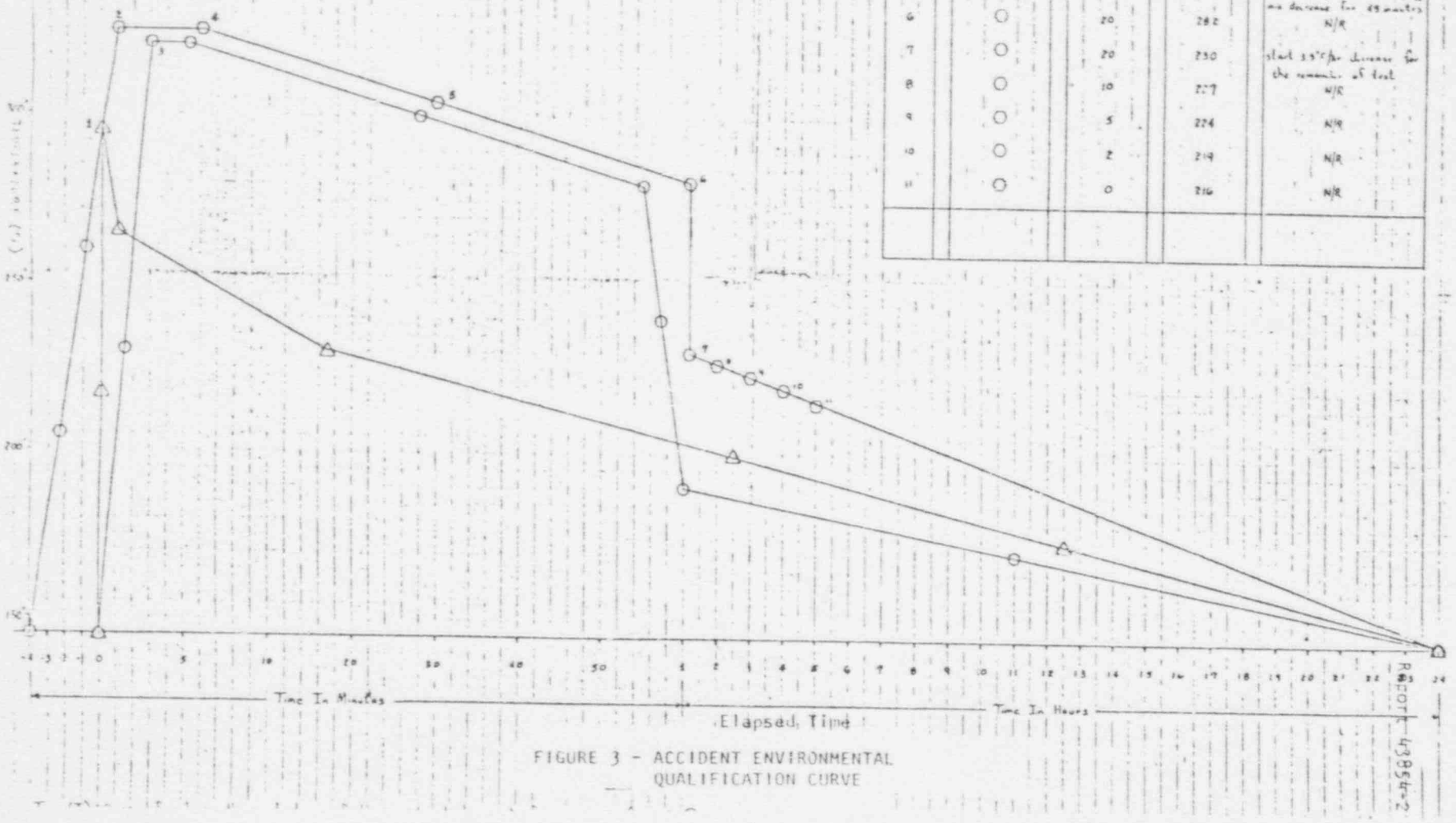


FIGURE 3 - ACCIDENT ENVIRONMENTAL QUALIFICATION CURVE

FIGURE 4A

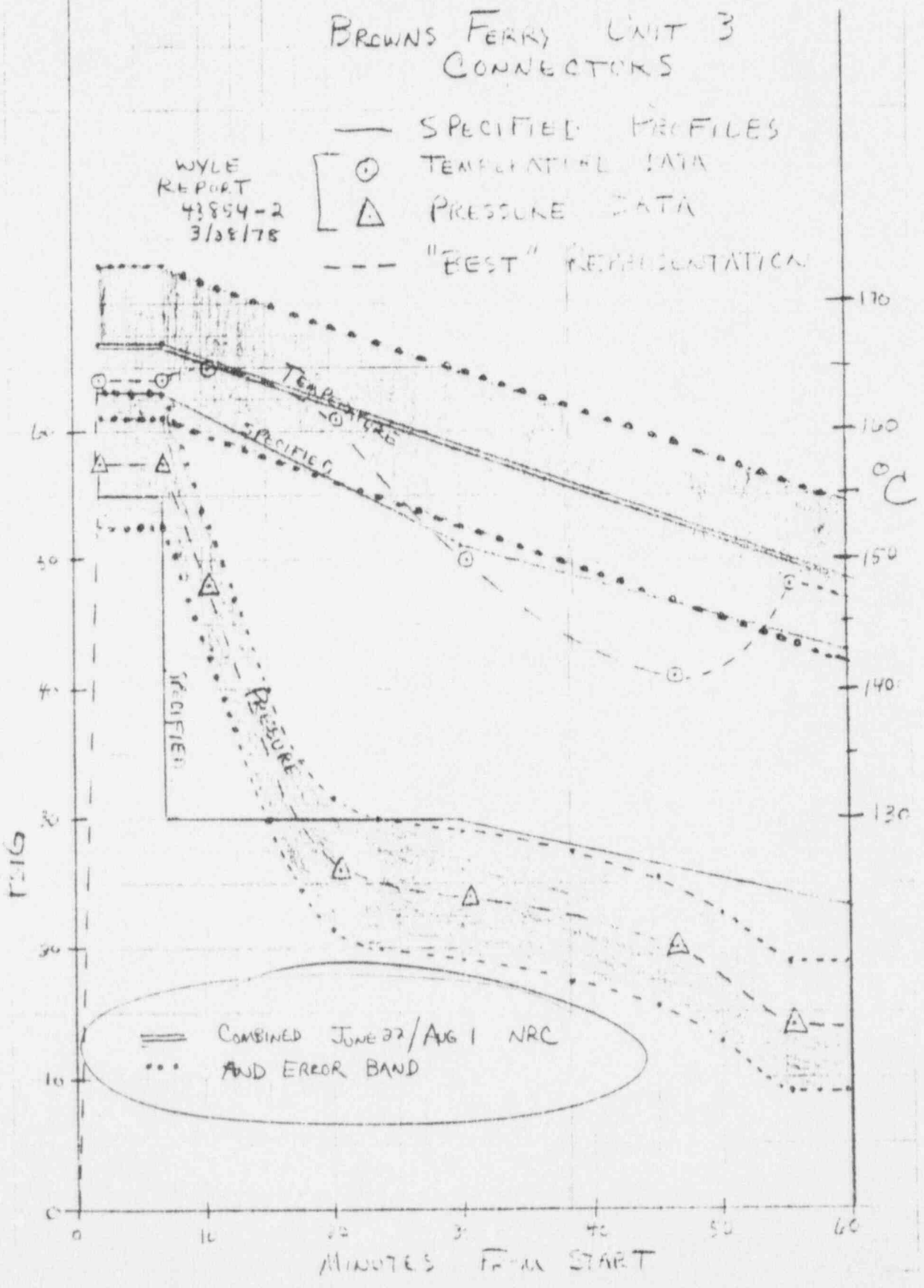

BROWNS FERRY UNIT 3
CONNECTORS
SPECIFIED PROFILES
TEMPERATURE DATA
PRESSURE DATA
"BEST" REPRESENTATION
WYLE REPORT 43854-2 3/28/78
TEMPERATURE
SPECIFIED
PRESSURE
SPECIFIED
COMBINED JUNE 27/AUG 1 NRC AND ERROR BAND
PSIG
°C
MINUTES FROM START
0
10
20
30
40
50
60
110
120
130
140
150
160

FIGURE 4B

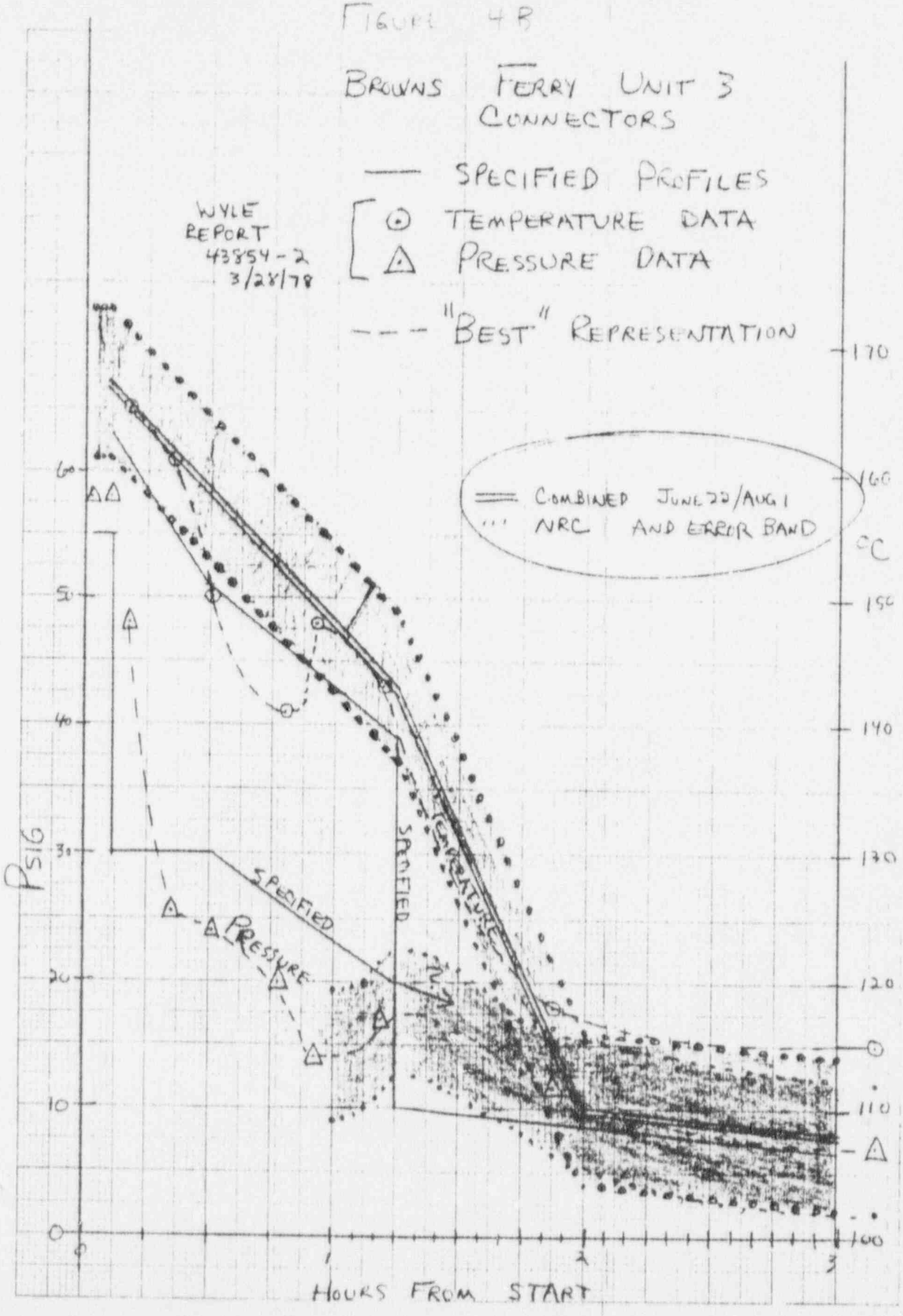

BROWNS FERRY UNIT 3
CONNECTORS
SPECIFIED PROFILES
TEMPERATURE DATA
PRESSURE DATA
"BEST" REPRESENTATION
WYLE REPORT 43854-2 3/28/78
COMBINED JUNE 20/AUG 1 AND NRC AND ERROR BAND
SPECIFIED TEMPERATURE
SPECIFIED PRESSURE
psig
°C
HOURS FROM START
0
10
20
30
40
50
60
100
110
120
130
140
150
160
170
0
1
2
3

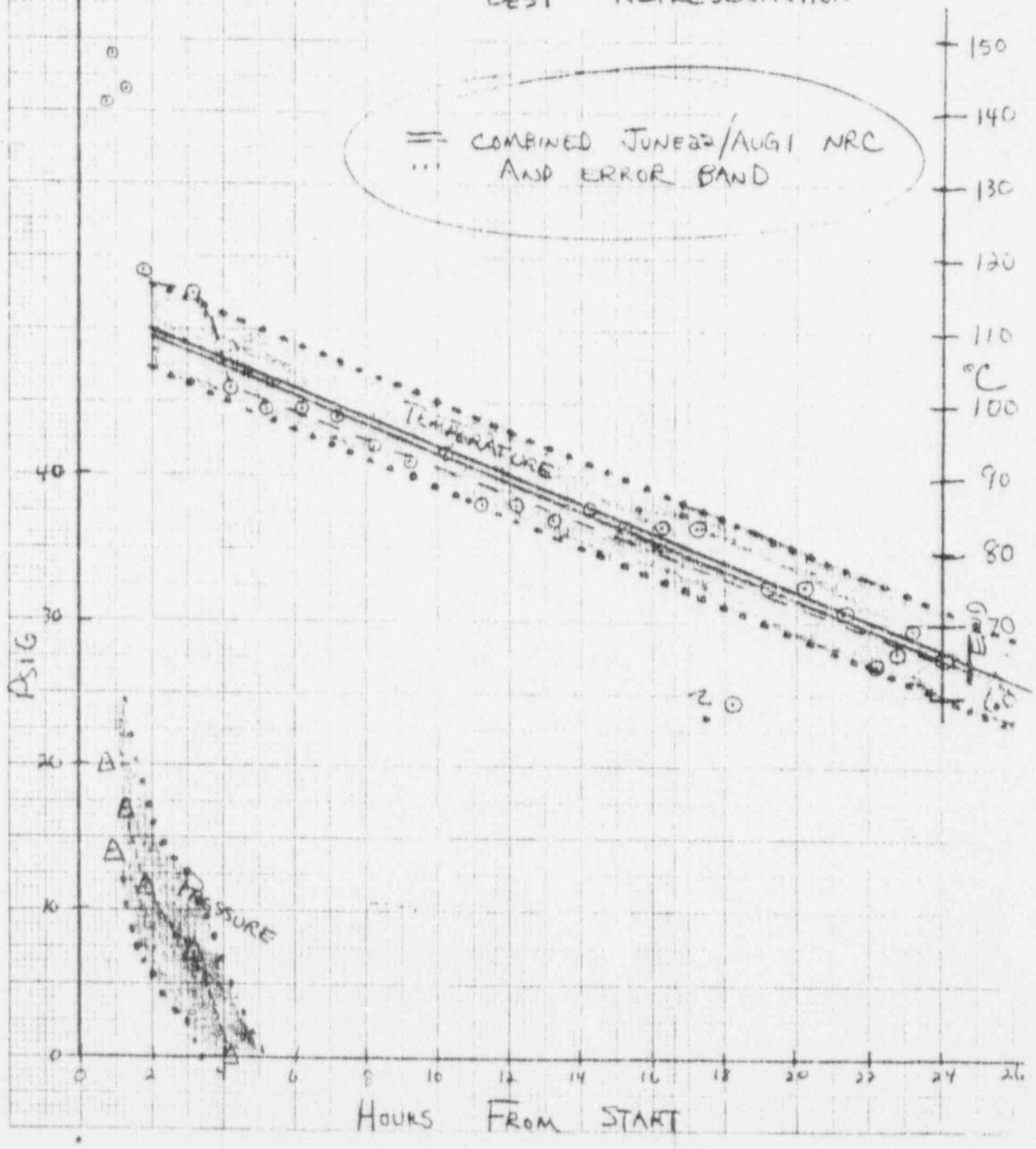
FIGURE 4C

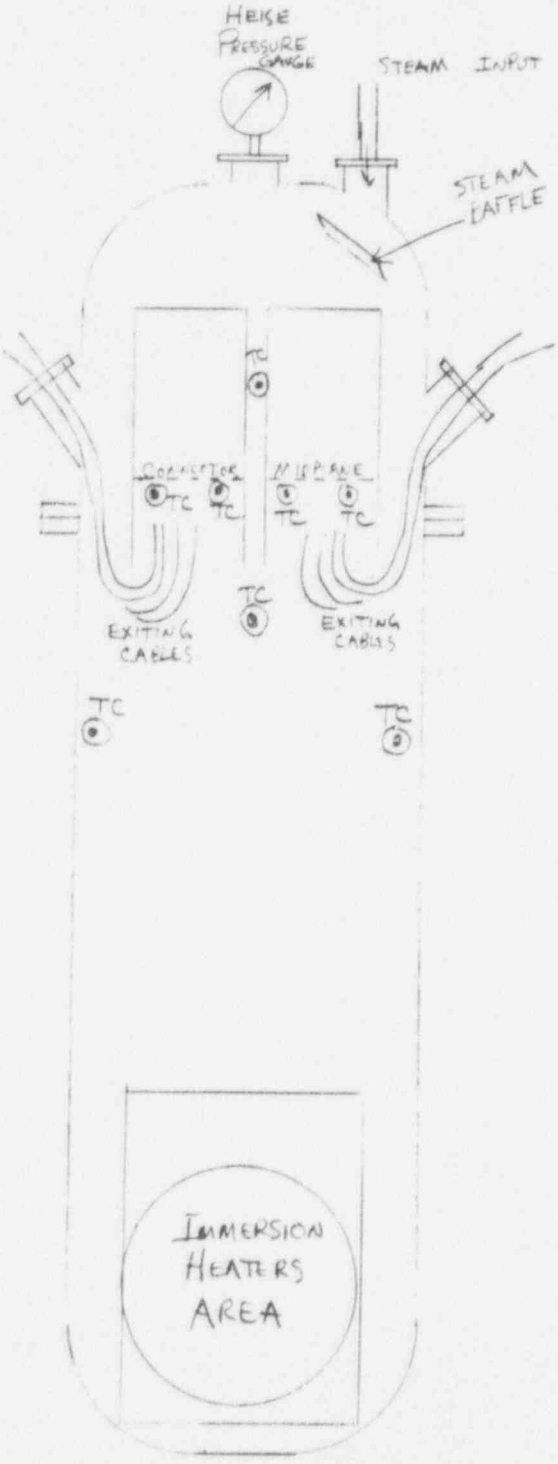
BROWNS FERRY UNIT 3
CONNECTORS

— SPECIFIED PROFILES
⊙ TEMPERATURE DATA
△ PRESSURE DATA
- - - "BEST" REPRESENTATION

WYLE REPORT 43854-2 3/29/78

= COMBINED JUNE 22/AUG 1 NRC
... AND ERROR BAND

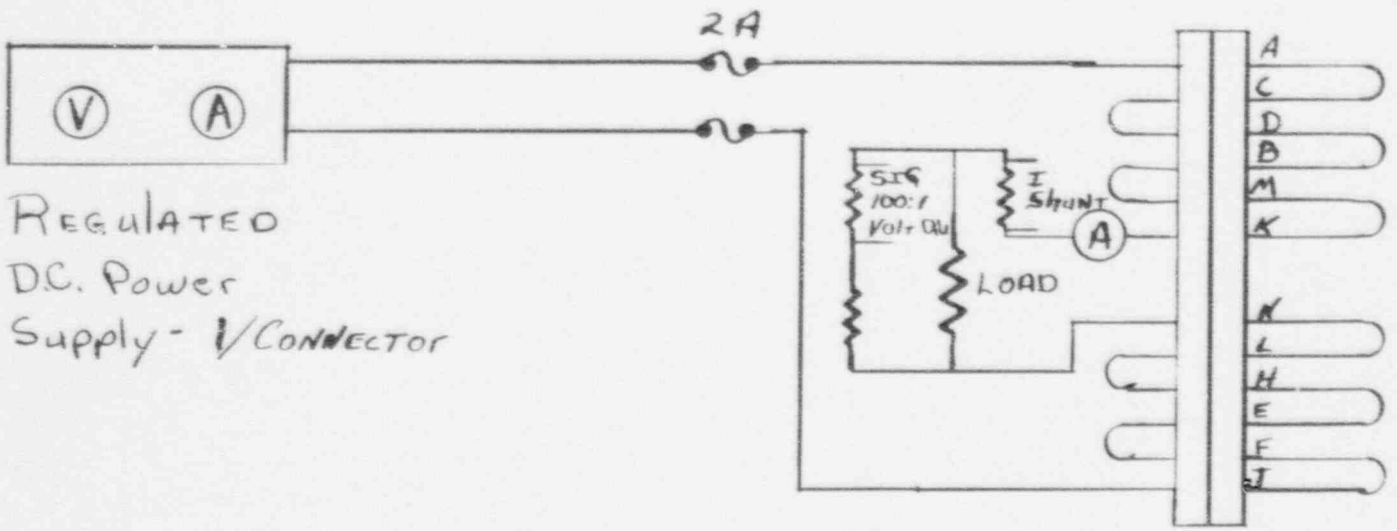




NOTES:
1. STEAM BAFFLE WILL PREVENT ANY DIRECT STEAM IMPINGEMENT, AS SHOWN.
2. HANGER FOR CONNECTOR BOXES IS NOT SHOWN.
3. THERMOCOUPLES (TC) MAY NOT BE ATTACHED TO CONNECTOR(S).
4. CONNECTOR BOXES ARE OFTEN DOWNWARD IF CABLE LENGTHS WILL ALLOW. OTHERWISE EXTRA CABLE / LOOPS MAY BE NECESSARY.

GENERALIZED/ APPROXIMATE LOCATIONS FOR TEST

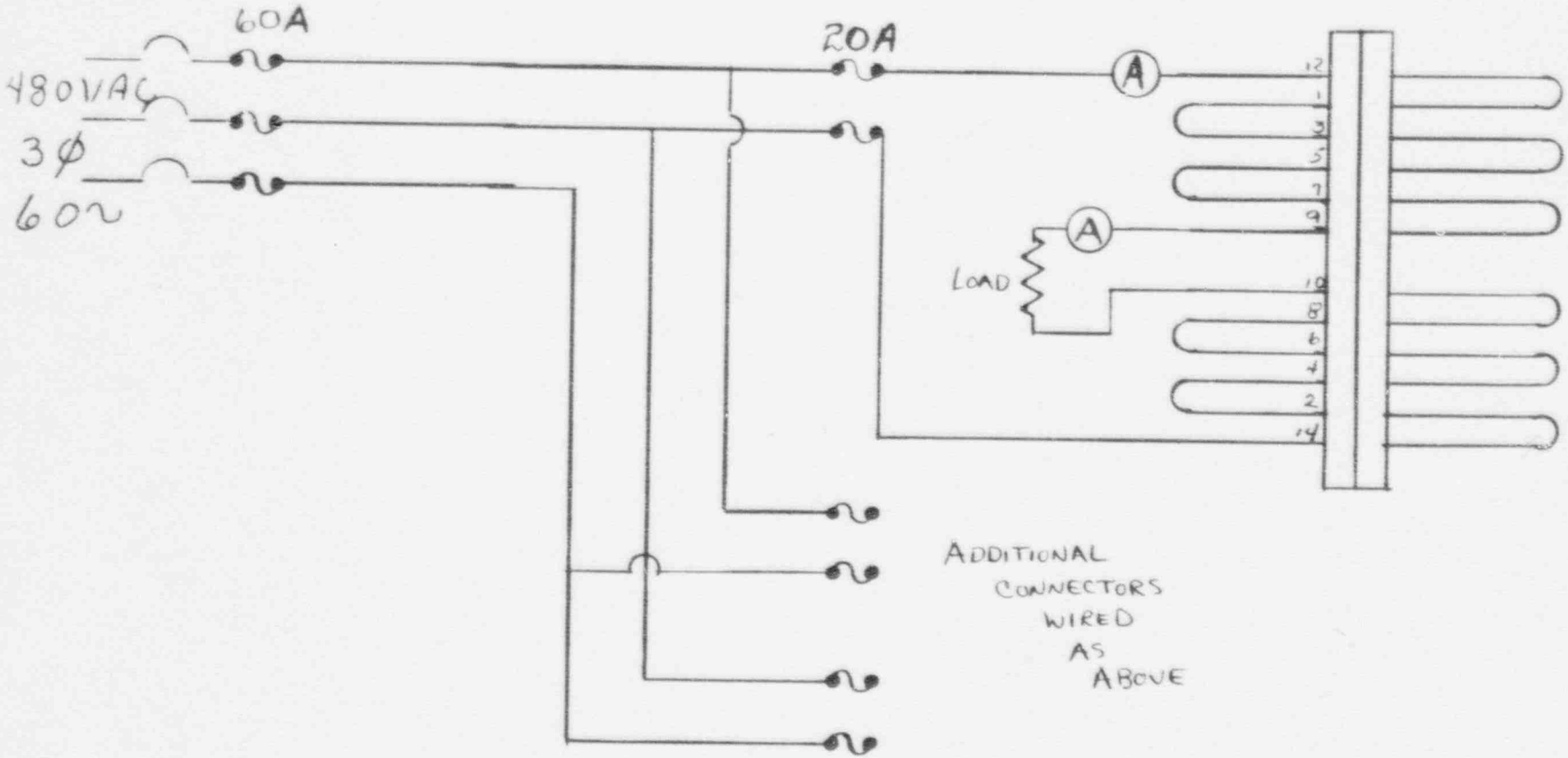
FIGURE 5



12 PIN BENDIX
250 VDC

REPEATED FOR EACH CONNECTOR

FIGURE 6A



14 PIN BENDIX
480 VAC

FIGURE 6 B

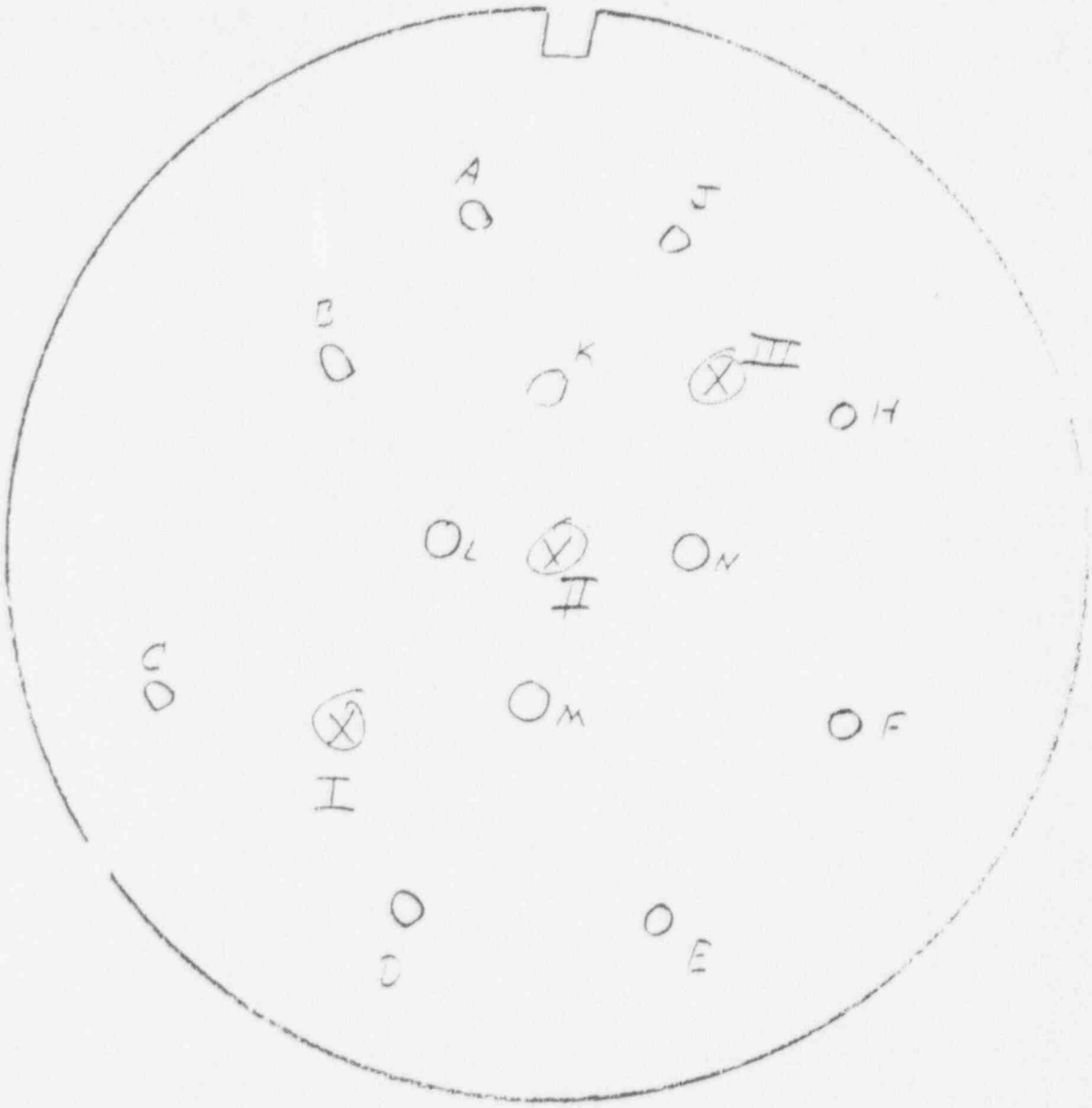


Figure 7 Bendix 250 VDC

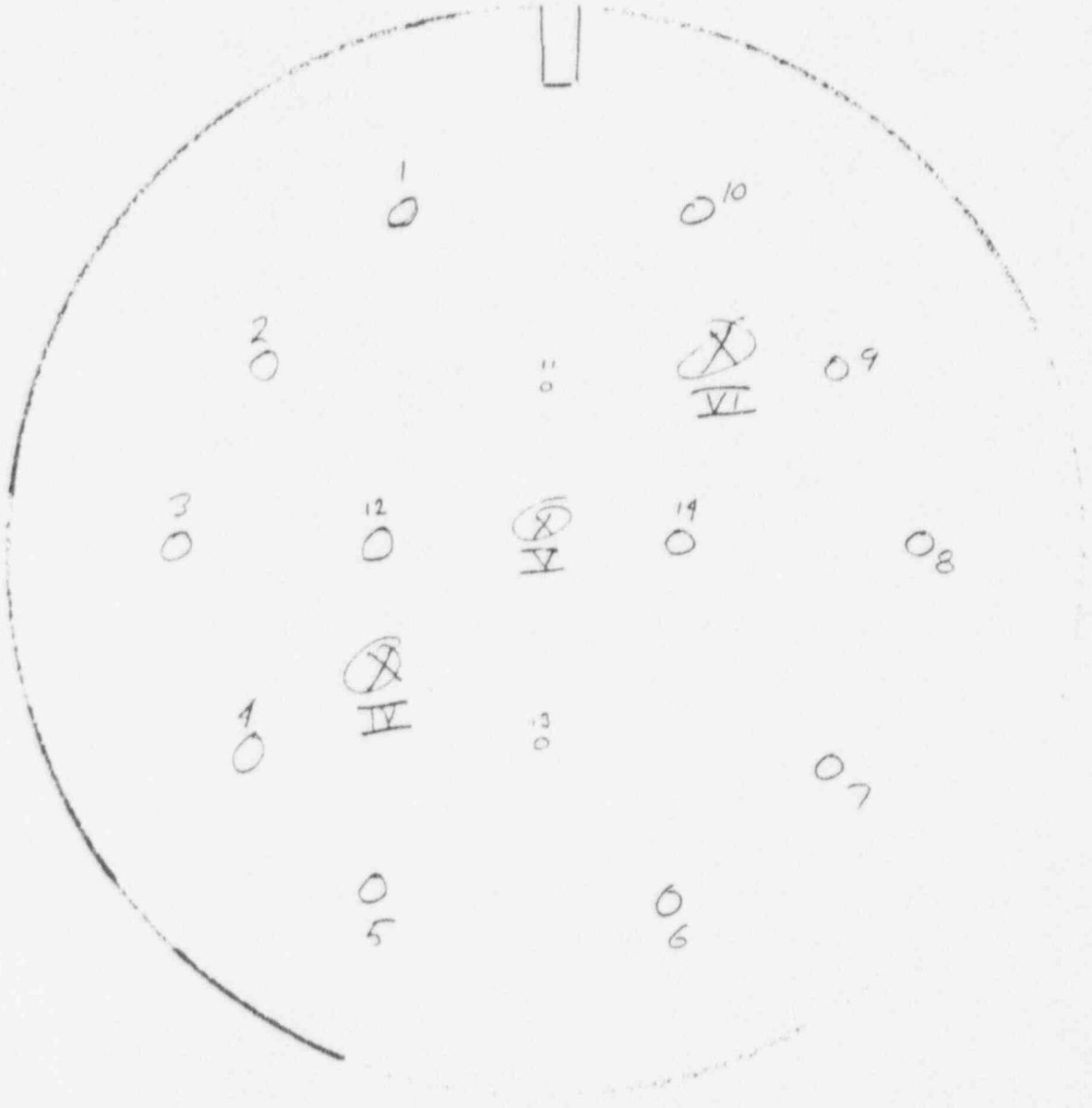


Figure 8 Bendix 480 VAC

SECTION B

TEST PROCEDURES

BROWNS FERRY, UNIT 3, CONNECTORS,

ACCIDENT SIMULATION

Test Procedures
Browns Ferry, Unit 3, Connectors
Accident Simulation

Objective:

These procedures describe the functional processes to achieve the accident-simulation tests of Browns Ferry Unit 3 Bendix connectors in accordance with the (effective revision of) "Connector Assembly Test Plan for Browns Ferry, Unit 3, Connectors."

Apparatus:

The simulation apparatus consists of a steam autoclave and pressure generation system (principally the boiler, accumulator, test chamber, and pressure regulators/throttles), steam or temperature conditioning equipment (principally the external strip heaters, and an inline superheater), and the connector-assemblies electrical loading and diagnostic equipment.

Associated with the simulation apparatus are the various diagnostic equipment such as pressure gauges, thermocouples, data acquisition system (data logger), and the like.

Personnel and Function:

To accomplish the simulation test, up to five functional operations must be manned. The initial test phases require five individuals; later during the quasi steady-state test phases fewer people are required, but never less than two individuals.

The test coordinator directs all operations based on the real-time data compared with the desired test profiles.

The environments regulator performs all adjustments of pressure regulators, superheater, throttle valves, and the like as directed by the test coordinator.

The connector assemblies loader performs all electrical loading and diagnostics of the connector assemblies as directed by the test coordinator.

The data taker records the various data derived from the environments monitors and other data as necessary.

The generalist provides backup support as required or as directed by the test coorindator.

External Strip Heaters:

These have two functions and modes of operation. First, to achieve an elevated chamber temperature prior to the accident-simulation test, and second, to control the long-term temperature rampdown of approximately -2°C/hour.

To achieve the elevated chamber temperature, the strip heaters are energized (in advance of the simulation test) for approximately 12 minutes, until the exterior skin thermocouple reaches about 70°C. The strip heaters are then deenergized and the test chamber is allowed to equilibrate for about 1 hour (or as necessary) until the interior selected thermocouple(s) reach 60-80°C.

Second, to control the temperature rampdown (after the steam phase), the strip heaters are periodically

energized (10-60 seconds) as required to follow the desired temperature profile. (Empirically, 10 seconds results in approximately a 1°C temperature rise.)

Boiler/Accumulator:

The accumulators are brought to approximately 150 psig in advance of the accident test in accordance with established safe operation procedures (SOP) and the valving is similarly lined-up preparatory to steam delivery to the test chamber according to the SOP.

Electrical Loading of the Connector Assemblies:

In accordance with the test plan, the 250-VDC connector assemblies will be energized throughout the entire accident test and the 480-VAC connector assemblies will be energized only during the first 5 minutes, between minutes 15 and 18, and between minutes 57 and 60.

For at least 5 minutes prior to the accident test initiation, all electrical loads will be applied to the connector assemblies to provide baseline data. The electrical loading during the test is according to the schedule described above.

In-Line Superheater:

The 20 kilowatt in-line superheater provides initial surge and quasi-steady-state superheat to the incoming steam.

Prior to test start, the superheater is energized

and its controller set at 400+°C (with a continuous flow of steam through it). The superheater is allowed to reach the desired temperature and to equilibrate as necessary.

During the test, the controller/superheater is manually adjusted as directed by the test coordinator to follow the desired temperature profile.

Accident Test Sequence:

The test coordinator will use the attached (appendix) test sequence sheets to achieve the test profile. These provide desired time/temperature/pressure/heaters/loading signatures. Based on these sequence sheets, he will direct the personnel to make necessary adjustments in the control apparatus. They also serve as a checklist to sequence operations prior to the start of the accident test.

Data Retrieval and Records

Chamber environment and connector-assemblies loading data will be periodically recorded on data logger printouts, strip charts, and/or data sheets as appropriate. During the early test phase, data will be recorded frequently (e.g., every 20-60 seconds). Later in the test the recording frequency will be adjusted to reflect the quasi-steady-state test aspects; the appropriate data will be recorded at least hourly.

Appendix -- Pre-Accident Test Checklist

_____ 1. Desired elevated chamber temperature has been accomplished.

Date/Time_____

_____ 2. Boiler/accumulators at working pressures and valving lineup completed.

Date/Time_____

_____ 3. In-line superheater is at desired temperature with steam flow.

Date/Time_____

_____ 4. Electrical loading of the connector assemblies is completed and baseline data taken.

Date/Time_____

_____ 5. All support staff in place to accomplish test.

Date/Time_____

_____ 6. All prepared to initialize data loggers and data time intervals.

Date/Time_____

Note: This form to be checked, initialed, and dated as specified.

Appendix -- Time from 23 Hours, 57 Minutes to 2 Minutes

Data Logger Hours-Min-Sec	Desired Pressure (Psig)	Desired Temperature (°C)	Electrical Loads ON/OFF	Remarks
Initialize, start, data loggers to 23-57-0				
23-57-0	0	60-80	All On	
23-58	0	60-80	All On	
23-59	0	60-80	All On	
0-0-0	0	60-80	All On	Valve alignment 1. Chamber bypass open 2. Chamber inlet open 3. Superheater bypass closed 4. Exit throttle open 1/4 turn 5. Open inline 1/4 turn regulator valve (Regulator preset; 65 psig against deadhead) 6. Bring up on regulator bypass valve
0-10	Ramp to 60 psig	75	All On	
0-20		83	All On	
0-30		92	All On	
0-40	60	100	All On	
0-50	60	109	All On	
1-0	60	117	All On	
1-10	60	125	All On	
1-20	60	133	All On	
1-30	60	142	All On	
1-40	60	150	All On	
1-50	60	159	All On	
2-0	60	167	All On	

Appendix -- Time from 2 Minutes to 7 Minutes

Data Logger Min-Sec	Desired Pressure (Psig)	Desired Temperature °C	Electrical Loads On/Off
2-0	60	167	All On
3-0	60	167	All On
4-0	59	167	All On
5-0	59	167	480V Off 250V On
6-0	58	167	Minute-5
7-0	58	167	

Appendix -- Time from 7 Minutes to 1 Hour

Data Logger Min	Desired Pressure (Psig)	Desired Temperature (°C)	Electrical Loads On/Off
7	58	167	
8	55	167	
9	52	166	
10	49	166	
11	47	166	
12	43.5	165	
13	40	165	
14	37.5	164	
15	35	164	480V on
16	32.5	164	for 3 minutes
17	30	164	15-18
18	29	163	
19	28	163	
20	27	163	
21	26.5	162	
22	26	162	
23	25.5	161	
24	25	161	
25	25	161	
26	24.5	160	
28	24	159	
30	24	159	(Remarks: Change print interval
32	23.5	158	to 1 minute; change tape.)
34	23.5	157	
36	23	157	
38	22.5	156	
40	22	156	
42	21.5	155	
44	21	154	
46	20	154	
48	19	153	
50	17.5	152	
52	16	151	
54	15	151	
56	14	150	
57	14	150	480V on
58	14	149	for 3 minutes
59	14	149	57-60
60	14	148	

NOTE: 1. 250V loads ON during entire test.
2. 480V OFF after Minute 60 for accident-test duration.

Appendix -- Time from 1 Hour to 3 Hours

Data Logger Hours-Min	Desired Pressure (Psig)	Desired Temperature (°C)	Remarks
1-0	14	148	(117+ Saturated)
-5	14	147	
-10	15.5	145	
-15	17	143	
-20	17.5	139	(121+ Saturated)
-25	17	136	
-30	16	132	Change print interval
-35	15	128	to 5 minutes
-40	14	124	
-45	13	121	
-50	12	117	
-55	11	114	
2-0	10	110	(112+ Saturated)
-5	9.5	110	
-10	9.5	110	
-15	9	110	
-20	8.5	109	
-25	8	109	
-30	8	109	
-35	8	109	
-40	8	109	
-45	7.5	108	(109+ Saturated)
-50	7.5	108	
-55	7.5	108	
3-0	7	108	

Note: 1. 250V Loads ON during accident test.
2. 480V Loads OFF for accident-test duration.

Appendix -- Time from 3 Hours to 24 Hours

Data Logger Hours-Min	Desired Pressure (Psig)	Desired Temperature (°C)	Remarks
3-0	7	108	
-15	6.5	108	
-30	5	107	Start wall temperature
-45	3.5	107	to 108°C
4-0	1.5	106	Open top center port
-15	0	106	to allow heat flow
-30	0	105	
-45	0	105	
5-0	0	104	
6	0	102	
7	0	100	
8	0	98	
9	0	96	
10	0	94	
11	0	92	
12	0	90	
13	0	88	
14	0	86	
15	0	84	
16	0	82	
17	0	80	
18	0	78	
19	0	76	
20	0	74	
21	0	72	
22	0	70	
23	0	68	
24	0	66	
	ALL LOADS OFF		

Note: 1. 250V loads ON to end of test.
2. 480V loads OFF

SECTION I

ACCEPTANCE TESTS

Acceptance/NDE Tests Procedure

Each test item will be inspected and tested as described below, to assess the physical/electrical integrity of the connectors assemblies. All results and observations will be recorded on data sheets and supplemented with other pertinent documentation:

-- check pin-to-pin wiring against the wiring diagrams, Figures 1 and 2, using a Simpson meter, or equivalent.

-- check circuit continuity against wiring diagrams using a Simpson meter, or equivalent.

-- perform X-radiographs and/or neutron-radiographs of the connector bodies as deemed necessary or desirable.

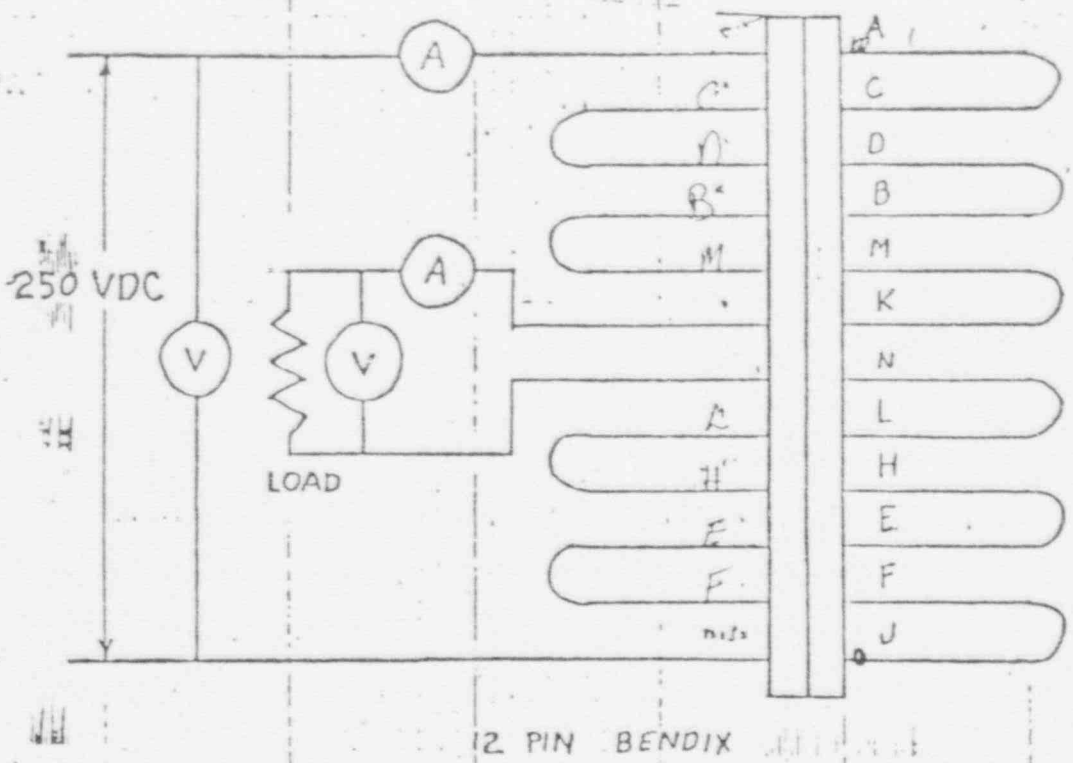


FIGURE 1
WIRING DIAGRAM

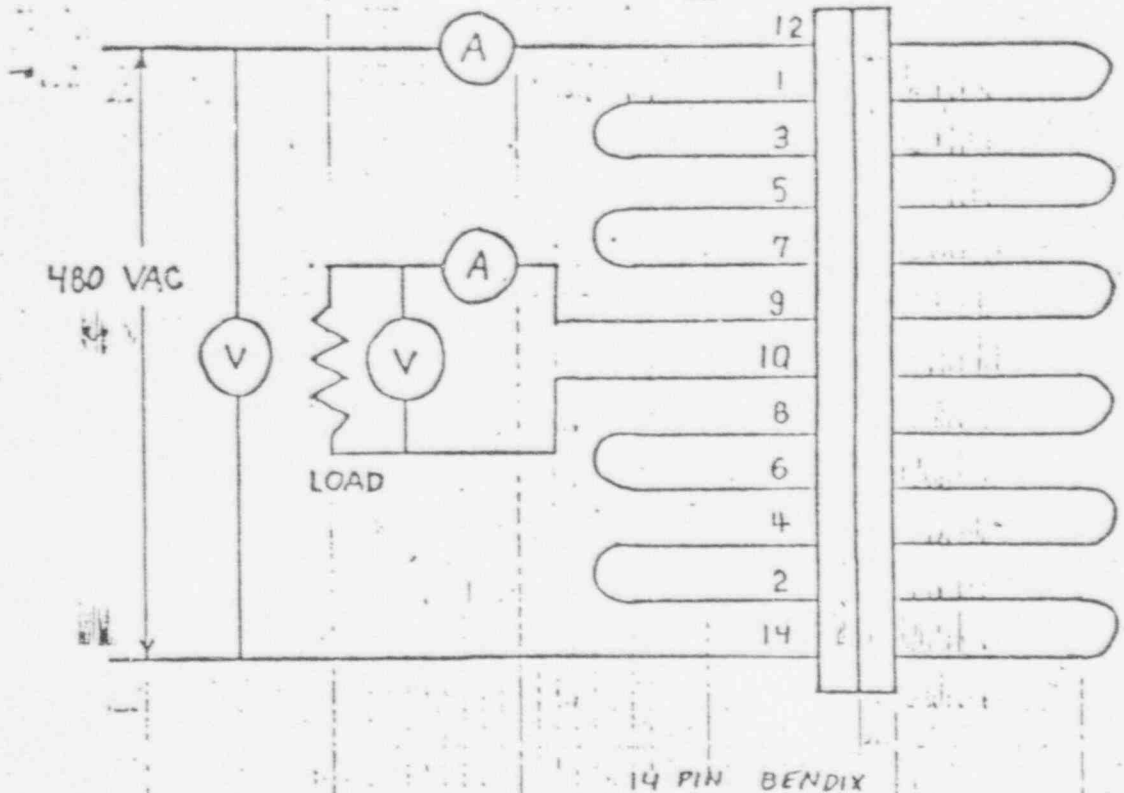


FIGURE 2
WIRING DIAGRAM

DATA SHEET

Project DIT3 CONNECTORS

Specimen — ALL

Part No

Ident. Start Date 4/3/79

TEST ITEM DESCRIPTION

ITEMS	TYPE	BENDIX ID NUMBERS
1, 2, 3	250 VDC	{10-214635-51S {10-214635-51P
7, 8, 9	450 VAC	{10-214636-75S {10-214636-75P

Remarks

Tested by Date

Witness Date

Sheet No. 1 of 1

Approved Lloyd Burgess 4/3/79

DATA SHEET

Project BT 3 CONNECTORS

Specimen ALL

Part No

Ident.

Start Date 4/3/74

ACCEPTANCE TESTS – CONTINUITY

ITEM #	PIN-to-PIN FIGURES 1/2	CIRCUIT CONTINUITY	
1	✓	A-K ✓	N-J ✓
2	✓	A-K ✓	N-J ✓
3	✓	A-K ✓	N-J ✓
7	✓	12-9 ✓	10-14 ✓
8	✓	12-9 ✓	10-14 ✓
9	✓	12-9 ✓	10-14 ✓

Remarks ALL ITEMS AS DEPICTED IN FIGURES 1/2. ALL OK.

Tested by [signature] Date 4/3/74

Witness Lloyd Denyes Date 4/3/74

Sheet No. 1 of 1

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date APRIL 3, 1979 Test Area BLDG. 5708

Technician D. DEGAN Project BF3 CANTEENS Type Test ACCEPTANCE - CONTINUITY

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	DIGITAL MULTIMETER	FLUKE	51CA	3315	21343	0-10MΩ	±0.1%+2DIGITS	3/2/79	9/2/79

CERTIFICATION SHEET ATTACHED

Instrument Test Engineer _____ Checked & Received by _____

Standards Laboratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87115

DIGITAL MULTIMETER
JOHN FLUKE
MODEL NO. 8100A
SERIAL NO. 3515
PROPERTY NO. 13043

SUBMITTED BY 4442

CERTIFIED 2 MAR 1979
EXPIRES 2 SEP 1979

THIS MULTIMETER WAS TESTED AT SELECTED CHECKPOINTS ON ALL RANGES AND ALL FUNCTIONS AND WAS FOUND TO BE WITHIN THE FOLLOWING MANUFACTURERS ACCURACY CLAIMS.

DC +/-(0.05% OF READING + 1 DIGIT) 0.1 VOLT TO 1000 VOLTS

RESISTANCE +/-(0.1% OF READING + 2 DIGITS) 10 OHMS TO 10 MEGOHMS

AC +/-(0.2% OF READING + 5 DIGITS) 50 HZ TO 10 KHZ
+/-(0.5% OF READING + 10 DIGITS) FOR 20 KHZ

METROLOGIST, M. T. SALAZAR -2553

CERTIFIED BY G. F. MCFALL - 2553

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident.

Start Date 4/2/74

NEUTRON RADIOGRAPHS - ACCEPTANCE

NEUTRON RADIOGRAPHS WERE MADE OF ITEMS 1, 2, 3 AND 1, 8, 9 USING A CALIFORNIUM NEUTRON SOURCE LOCATED IN TA-V OF SANDIA LABORATORIES. FILM WAS AA READIPACKS.

ALL APPEARED TO BE WITHOUT SIGNIFICANT VOIDS OR CRACKS IN THE FITTING.

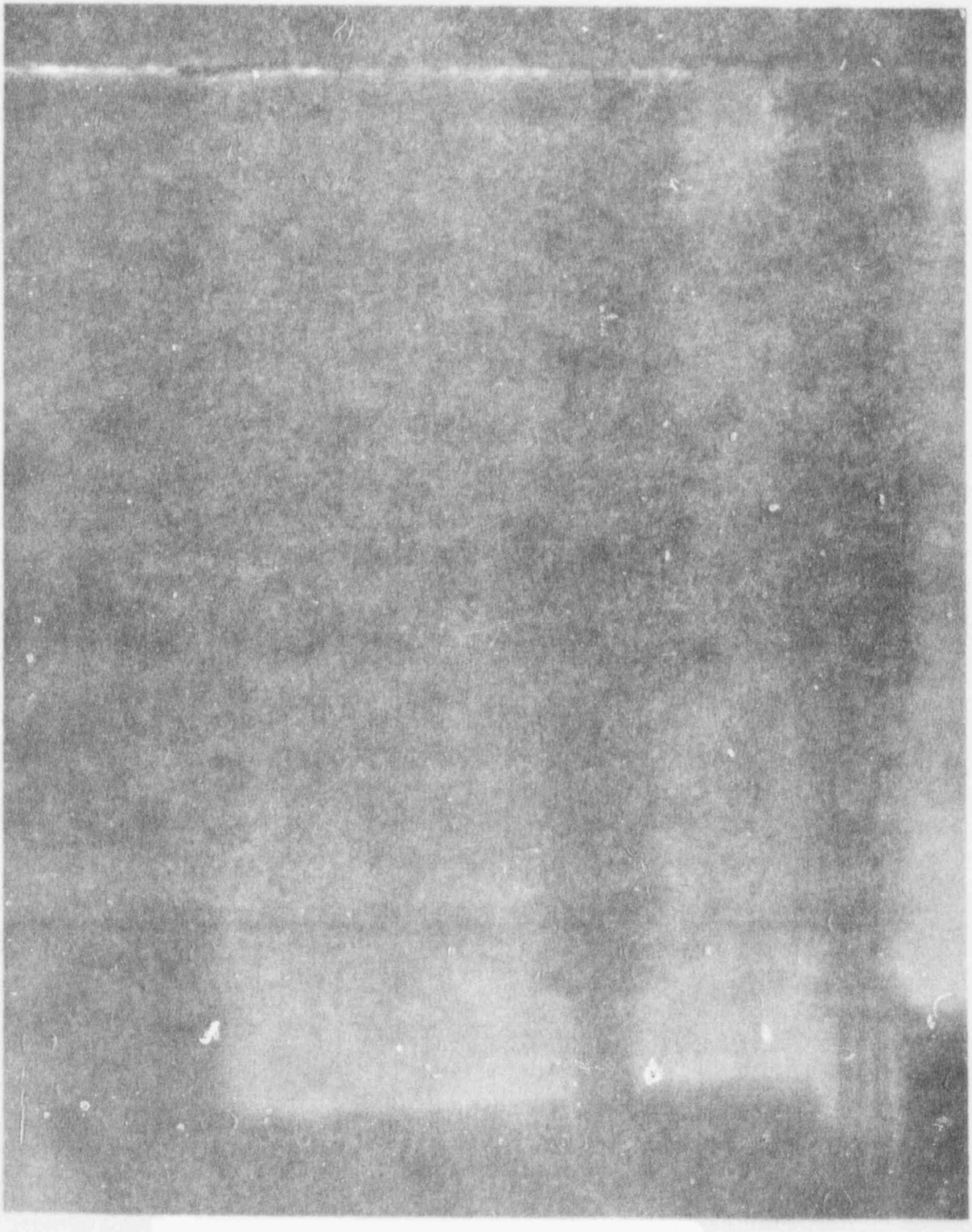
Remarks

Tested by [signature] Date 4-2-74

Witness [signature] Date 4/2/74

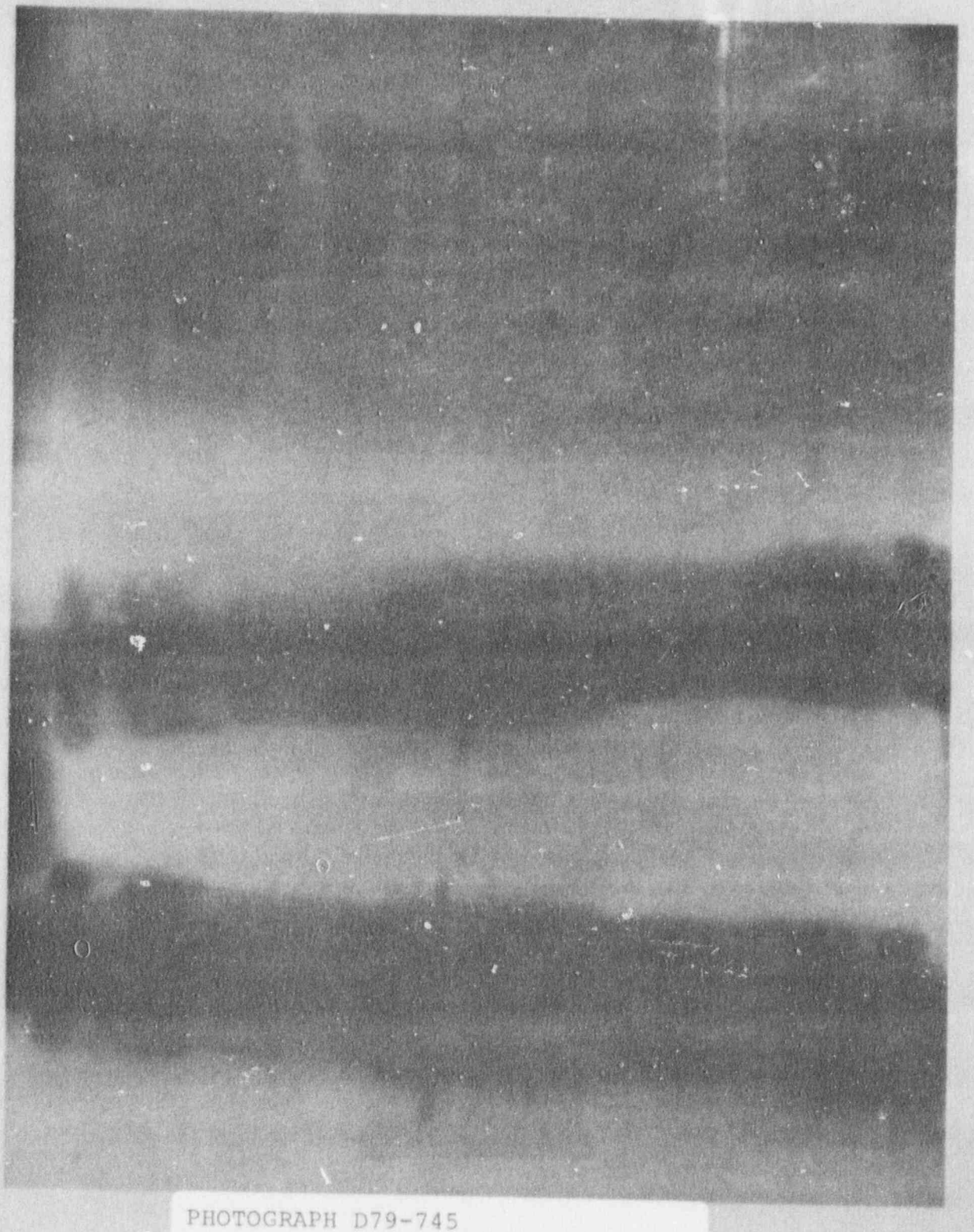
Sheet No. 1 of 1

Approved



PHOTOGRAPH D79-744

NEUTRON RADIOGRAPHS OF TEST ITEMS 1, 2, 3; 250-VDC CONNECTOR ASSEMBLIES



PHOTOGRAPH D79-745

NEUTRON RADIOGRAPHS OF TEST ITEMS 7, 8, 9; 480-VAC CONNECTOR ASSEMBLIES

SECTION II

BASELINE FUNCTIONAL TESTS

Baseline Functional Tests Procedure

The insulation resistance of each test item shall be determined; the value of resistance will be determined as outlined below.

Each test item will be powered with its operating voltage and loaded to produce the maximum operating current in its circuit. The resistance value of the load required to produce the maximum operating current at operating voltage will be measured and recorded for each test item. The values will determine the loading criteria for each test item for the remainder of the program. (Reference Figures 1 and 2).

Each test item is to be subjected to an insulation resistance test. The insulation resistance will be measured without power using a 500VDC megohmmeter. Value of resistance is to be determined

-- between the circuit on one side of the load and connector case,

-- between the circuit on the other side of the load and connector case,

-- between each side of circuit for each item.

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident. BASELINE FUNCTIONAL - IR, INSULATION RESISTANCE Start Date 4/3/79

PINS (250 VDC CONNECTORS)

ITEM	K to CASE	A TO CASE	K TO A
1	2.5×10^{9} Ω	2.5×10^{9} Ω	2.5×10^{9} Ω
2	$> 2.5 \times 10^{9}$ Ω	$> 2.5 \times 10^{9}$ Ω	2.5×10^{9} Ω
3	2.5×10^{9} Ω	$> 2.5 \times 10^{9}$ Ω	2.5×10^{9} Ω

PINS (45 VAC CONNECTORS)

ITEM	Y TO CASE	C TO CASE	Y TO C
7	1.5×10^{9} Ω	2.5×10^{9} Ω	2.5×10^{9} Ω
8	2.5×10^{9} Ω	2.5×10^{9} Ω	2.5×10^{9} Ω
9	2.5×10^{9} Ω	2.5×10^{9} Ω	2.5×10^{9} Ω

Remarks

Tested by [signature] Date 4-3-79

Witness [signature] Date 4/3/79

Sheet No. 1 of 3

Approved

DATA SHEET

Project PT's CONNECTORS

Specimen 25 VDC

Part No 1, 2, 3

Ident. PARAMETRIC FUNCTIONAL - LOAD/VOLTAGE Start Date 4/1/79

ITEM	INPUT VOLTAGE	LOAD RESISTANCE	LOAD VOLTAGE	INPUT CURRENT
1	25 VDC	244 Ω	25 VDC	1.000 Amps
2	25 VDC	246 Ω	25 VDC	1.000 Amps
3	25 VDC	244 Ω	25 VDC	0.995 Amps

Remarks

Tested by [signature] Date 4-3-79

Witness [signature] Date 4-1-79

Sheet No. 2 of 3

Approved

DATA SHEET

Project DT3 (CONNECTORS)

Specimen 455 VAC

Part No 7, 8, 9

Ident. BASELINE FUNCTIONAL - LEAD/CONTACT Start Date 4/4/79

ITEM	INPUT VOLTAGE	LEAD (DC) RESISTANCE	LEAD VOLTAGE	INPUT CURRENT
7	455 VAC	~ 31 Ω	484 VAC	17.5 AMPS
8	470 VAC	~ 27 Ω	455 VAC	17.37 AMPS
9	470 VAC	~ 27 Ω	455 VAC	17.4 AMPS

Remarks

Tested by [signature] Date 4-4-79

Witness [signature] Date 4/4/79

Sheet No. 3 of 3

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date April 3, 1977 Test Area [illegible]

Technician P. DeLAN Project IFT's Connected Type Test Baseline - Environmental

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	Megohmmeter	American Hi Test Systems	PM 25C	5-17-112	RIC 12	250 - 2500 MΩ	± 4% F.S.	3/4/77	9/15/77
2	Digital Multimeter	Fluke	8600A	3318	21243	C - Range C - Accuracy	± 0.1% + digits ± 0.5% + count	3/1/77	9/1/77
3	Power Analyzer	Yokogawa	4610	5061	23155	C - 5A C - [illegible]	± 0.5% + count	3/1/77	9/1/77
4	Power Supply	Hewlett Packard	6454A		23769	C - 32 V DC C - 2.5A	Not Monitored		

Certification Sheet Attached

Instrument Test Engineer _____ Checked & Received by _____

Standards Laboratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87185

MEGOHMETER
American HV Test Systems
Model No. PM2500
Serial No. S-77-112
Property No. R10220

Submitted by: Organization 4442

Certified: March 19, 1979
Expires: September 19, 1979

The meters on this instrument were tested and found to be within ± 2.0% of full scale on all ranges. Thus, the overall results when used as a megohm meter can be expected to be within ± 4.0% of F.S. ranges.

Metrologist: G. F. McFall, 2553

Certified by: G. F. McFall, 2553

GFM:2553:bh

Standards Laboratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87115

ANALYZER POWER
Magtrol
Model No. 4610
Serial No. 8C67
Property No. 250985

Submitted by: Organization 4442

Certified: March 1, 1979
Expires: September 1, 1979

This instrument was tested and adjusted to meet the following accuracy specification:

± 0.5% + 1 digit on all ranges and functions

Metrologist: W. W. Rowe, 2553

Certified by: G. F. McFall, 2553

WWR:2553:bh

SECTION III

BASELINE MECHANICAL/DIMENSIONAL TESTS

Baseline Mechanical/Dimensional Tests Procedures

Each test item will be subjected to durometer and connector and cable measurements tests to assess any physical distortion. The baseline tests provide initial data for comparison.

The durometer tests will be performed in the same place each time. Location of test points is identified in Figures 3 and 4.

Bendix 250-VDC Connector -- measure each connector receptacle face at a point between pins H, J, K, and N; between pins K, L, M, and N; and between B, C, D, and L. See Figures 3 for orientation.

Bendix 480-VAC Connector -- measure each connector receptacle face at a point between pins 9, 10, 11, and 14; between pins 11, 12, 13, and 14; and between pins 4, 5, 12, and 13. See Figure 4 for orientation.

Place a straightedge across the neoprene face of each receptacle and determine if the neoprene extends beyond the edge of the connector barrel. Measure the depth of the neoprene from the face of each receptacle to the pin. For the 250-VDC connectors, use pins A, K, M, and E; for the 480-VAC connectors, use pins 1, 14, and 6.

Measure the outside diameter of a selected wire in each connector assembly with a micrometer. Three measurements will be taken on each wire. One measurement will be taken adjacent to the wire identifier; the other two will be taken one inch apart toward the bare end of the wire. For the 250-VDC connectors, use wire "A"; for the 480-VAC connectors, use wire "14".

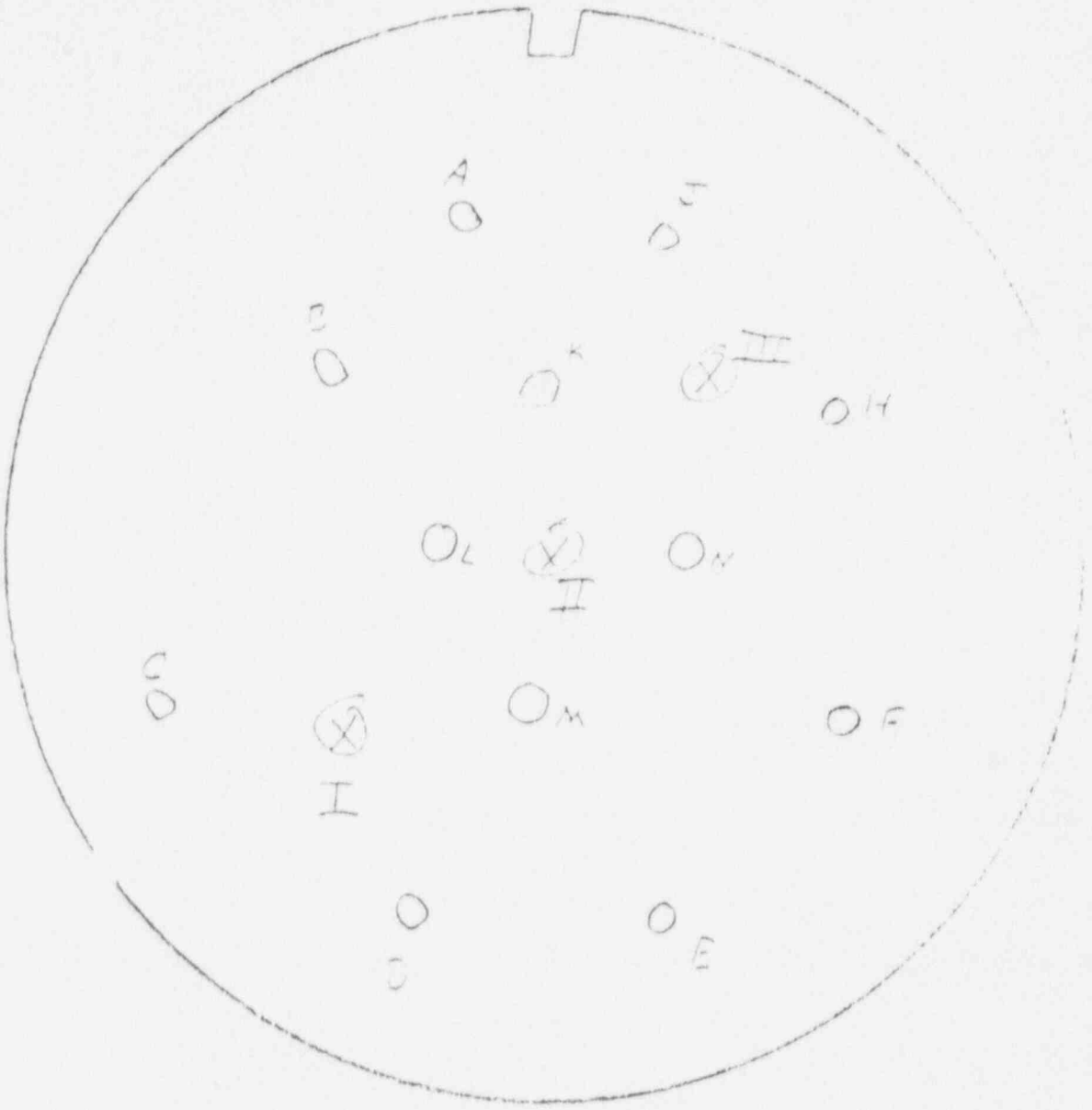


Figure 3 Bendix 250 VDC

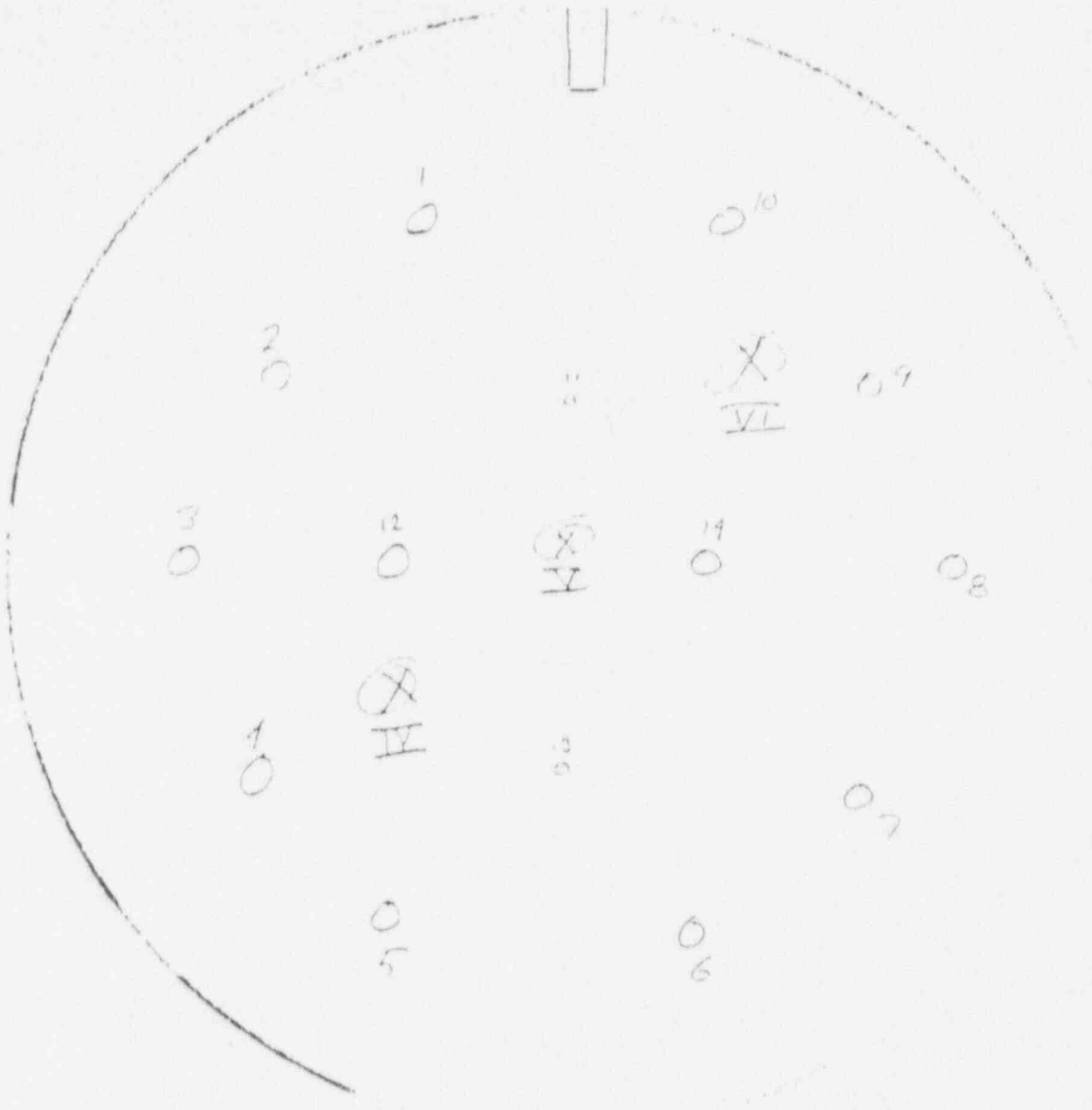


Figure 4 Bendix 480 VAC

DATA SHEET

Project BT3 CONNECTORS

Specimen 25C CDC

Part No 1

Ident. ACCEPTANCE DIMENSIONAL Start Date 4/3/79

ALIGNMENT INDICATOR		DIAMETER		WIRE A	
PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
A	C.104"	I	77	1	C.153"
K	C.095"	II	80	2	C.154"
M	C.091"	III	71	3	C.153"
E	C.119"				

ALIGNMENT INDICATOR WAS ABOVE THE END OF THE DIAMETER PLUG BARREL.

BARREL DIAMETER : 1.512"

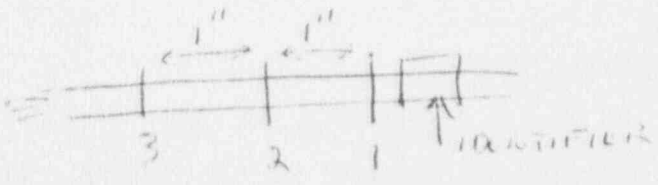
Remarks

Tested by [signature] Date

Witness Lloyd Burgess Date 4/3/79

Sheet No. 1 of 1

Approved



DATA SHEET

Project BT1 CONNECTORS

Specimen 1SC 10C

Part No 1

Ident. ACCEPTANCE DIMENSIONAL Start Date 4/3/74

ACCEPTANCE INSPECTION DIAMETER LOOK A

I.D.	DEPTH	LOCATION	DATE	LOCATION	I.D.
A	C.114"	I	76	1	C.153"
B	C.108"	II	75	2	C.133"
M	C.111"	III	77	3	C.163"
E	C.104"				

ALL OF THE INSPECTION WAS ABOVE THE END OF THE CONNECTOR TEE. BARREL.

BARREL DIAMETER: 1.507 - 1.513"

Remarks

Tested By [signature] Date 4/3/74

Witness [signature] Date 4/3/74

Sheet No. 2 of 6

Approved

DATA SHEET

Project DF3 CONNECTORS

Specimen 250 VDC

Part No 3

Ident. ACCEPTANCE DIMENSIONAL Start Date 4/3/71

ALIGNMENT INSULATOR		DIAMETER		WIRE A	
Pin	DEPTH	LOCATION	VALUE	LOCATION	I.D.
A	C.C75"	I	77	1	C.156"
B	C.102"	II	75	2	C.154"
C	C.099"	III	74	3	C.155"
E	C.121"				

ALIGNMENT INSULATOR WAS ABOVE THE END OF THE CONNECTOR REC. BARREL

BARREL DIAMETER : 1.507 - 1.512"

Remarks

Tested by [signature] Date 4/3/71

Witness Lloyd Dungan Date 4/3/71

Sheet No. 3 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 45° VAC

Part No 7

Ident. ACCEPTANCE DIMENSION-AC Start Date 4/3/74

REFERENCE INDICATOR		DIAMETER		WIRE 14	
PIN	DEPTH	LOCATION	GAGE	LOCATION	O.D.
1	0.113"	IN	74	1	0.116"
14	0.114"	IN	77	2	0.116"
6	0.112"	IN	74	3	0.116"

REFERENCE INDICATOR WAS ABOVE THE END OF THE CONNECTOR REAR BARREL.

BARREL DIAMETER: 1.165"

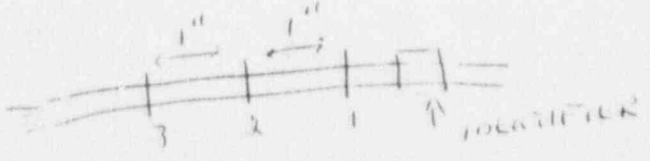
Remarks

Tested by [signature] Date

Witness Lloyd Conyers Date 4/3/74

Sheet No. 4 of 6

Approved



DATA SHEET

Project BF3 CONNECTORS

Specimen 4X VAC

Part No 8

Ident. ACCEPTANCE DIMENSIONAL Start Date 4/3/79

ACCEPTANCE INSULATOR DIAMETER				NOTE 14	
TIP	DEPTH	LOCATION	VALUE	LOCATION	I.D.
1	C.111"	15	81	1	C.201"
14	C.165"	5	77	2	C.206"
6	C.126"	11	78	3	C.207"

ACCEPTANCE INSULATOR WAS ABOVE THE END OF THE CONNECTOR PLUG BARREL

BARREL DIAMETER: 1.965"

Remarks

Tested by [signature] Date

Witness Lloyd Burgess Date 4/3/79

Sheet No. 5 of 6

Approved

DATA SHEET

Project D1 7 CONNECTOR

Specimen 4 SOCKET

Part No 9

Ident. ACCEPTANCE DIMENSIONAL Start Date 4/3/17

ACCEPTANCE INSPECTION DIMENSIONS WIRE 14

Dia	DEPTH	LOCATION	VALUE	LOCATION	O.D.
1	C.167"	II	71	1	C.203"
14	C.167"	I	74	2	C.211"
6	C.132"	II	52	3	C.212"

ACCEPTANCE INSPECTION WAS ABOVE THE END OF THE CONNECTOR PLUG BARREL.

PANEL DIMENSION: 1.467"

Remarks

Tested by [signature] Date 4/3/17

Witness [signature] Date 4/3/17

Sheet No. 6 of 6

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 4/3/74 Test Area Bldg. 524

Technician D. Regan Project DF3 Connectors Type Test Assembly Dimensional

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	Shore Type A2	Shore Instrument & Mfg. Co.	Type A²	—	Item 3	0-100	As Is	Not Applicable	
2	Calipers	Brown & Sharpe	574	—	—	0-6"/.001"	.001"	Not Applicable	

Instrument Test Engineer _____ Checked & Received by _____

SECTION IV

RADIATION TEST

Nuclear Radiation Test Procedure

Perform a pre-test mapping in the irradiation cell in the volume where the connector assemblies are expected to be located. Record the general radiation profile and from these select specific locations for placement of the assemblies. All radiation measurements will be done using calibrated passive dosimetry; record all pertinent information.

From this data select the positions where the dose rate is most uniform at the specified rate of 0.77 Megarads/hours. Perform a second pre-test mapping using the metal housing box to confirm the selection of position. (This step may be repeated as necessary.) Record all pertinent information.

With the connector assemblies installed in the metal housing box, position these with respect to the Cobalt-60 source at the final selected positions. The total irradiation period of 90 hours (69 Megarads total dose) will be conducted in four 22.5 hour periods. After each irradiation period the box will be rotated 90° keeping its centerline at the selected position (i.e., each of the four sides of the box will face the Cobalt-60 source during one irradiation period). The rotation is to assure a more uniform averaged dose rate and dose to the connector assemblies. Dosimetry may be used as desired during the actual irradiation process. Record all pertinent information.

Select specimen temperatures are to be monitored and recorded. Record results, thermocouples (TC) locations, and observations on data sheets and/or other pertinent documentation.

DATA SHEET

Project BF3 Connectors

Specimen —

Part No

Ident.

Start Date 3/5/79

Pre-Test Radiation Maps - 1

Based on TLD-400 maps of the North GE Cell of the plate, the data is plotted in the figures for rows A, B, C, D and plate positions 3 - 11.

From these the ℄ position to achieve ~ 0.17 MR/hr was obtained as shown in the attachment. Because of source geometry, this dose rate occurs on two lines (intersecting) from about B3 through D9 and D6 through ~ D11.

The dose rates in the can are also shown.

Remarks

Tested by Lloyd Benson Date 3/20/79

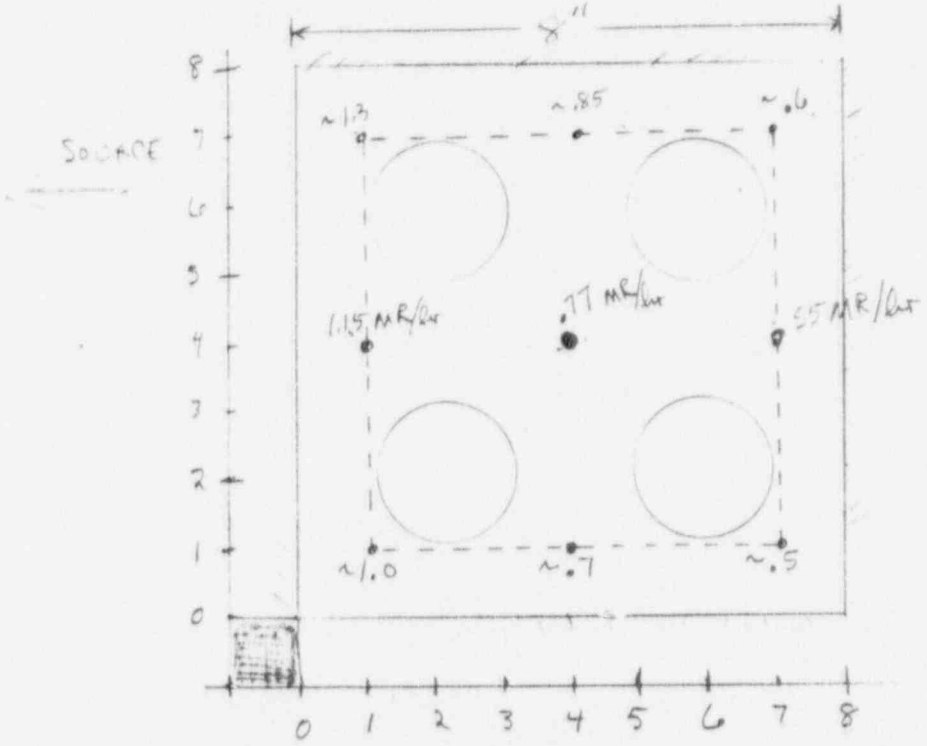
Witness Date

Sheet No. 1 of 1

Approved


11
10
9
8
7
6
5
4
3
W
0.92
(1.65")
3.88
0.81
0.7
0.54
0.61
0.46
0.51
0.57
0.60
0.67
0.54
0.95
0.46
0
3
6
9
12
INCHES

Dose rate estimates with can on chosen (.77 MR/hr) ℄.



1.3
1.0
.6
.5

4 | 3.4 | 0.85 MR/hr

3/5/79

Langer

1.15
.7
.55
.85

4 | 3.25 | 0.81 MR/hr

DATA SHEET

Project FFTF CONNECTORS

Specimen —

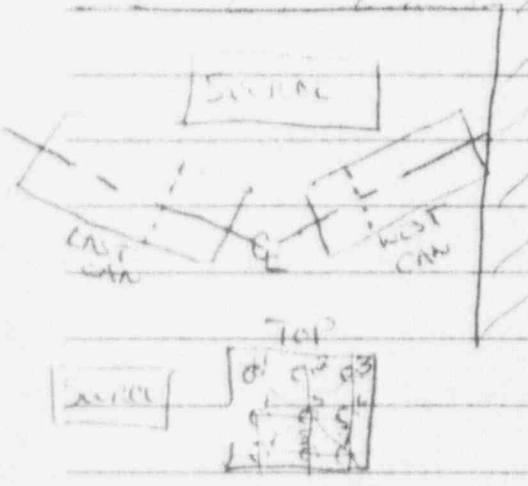
Part No

Ident.

Start Date 3/26/79

RE: TEST APPARATUS MAPS - 2.

BASED ON PREVIOUS MAP, THE STAINLESS STEEL CANS WERE PLACED ON THE ℄ DETERMINED. TLD-400 DOSIMETERS WERE PLACED ON THE CANS (BOTTOM AND AT CONNECTOR MID PLANE).



CONNECTOR - MID

POSITION	"SPECULATED"	EAST CAN	WEST CAN
1	1.3	0.71	0.71
2	.55	0.64	0.61
3	.6	0.45	0.42
4	1.15	1.11	1.02
5	.77	0.61	0.61
6	.55	0.48	0.46
7	1.0	1.14	0.97
8	.7	0.65	0.64
9	.5	0.44	0.45

Remarks

Tested by Floyd Rogers Date 3/28/79

Witness Date

Sheet No. 1 of 1

Approved

Measurements of the radiation field intensity are made using calcium floride thermoluminescent dosimeters (Harshaw TLD-400's). The dosimeters (luminescence) are read with a Harshaw 2000 reader. Calibration curves of TLD response (see attached), for each batch of TLD's, are made using a Cobalt-60 source which has an NBS-traceable certification. Doses are recorded as rads (material), i.e., rads (TLD-400); these can be related to any other material as desired.

DATA SHEET

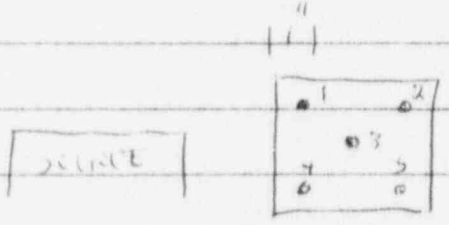
Project BF 3 CONNECTORS

Specimen

Part No

Ident. PRE-TEST RADIATION MAPS - 3 Start Date 4/4/79

BASED ON MAP 2, THE STAINLESS STEEL CANS WERE PLACED ON A NEW $\mathcal{C}_L$, 1-INCH (PERPENDICULAR FROM THE 4 FOR MAP 2) TOWARDS THE SOURCE, TLD 400'S WERE PLACED IN 5 LOCATIONS ON THE CONNECTOR RACK.



CONNECTOR MID

POSITION	"SPECIFIED"	EAST CAN	WEST CAN
1	1.3	1.05 MR/HR	.91
2	0.6	.585	.55
3	0.77	.75	.82
4	1.0	1.16	1.14
5	0.5	.54	.50

Remarks BASED ON MAPS AND ATTACHED FIGURES, RADIATION WILL BE DONE AT MAP 3 LOCATION

Tested by Date

Witness Lloyd Bowyer Date 4/5/79

Sheet No. 1 of 1

Approved

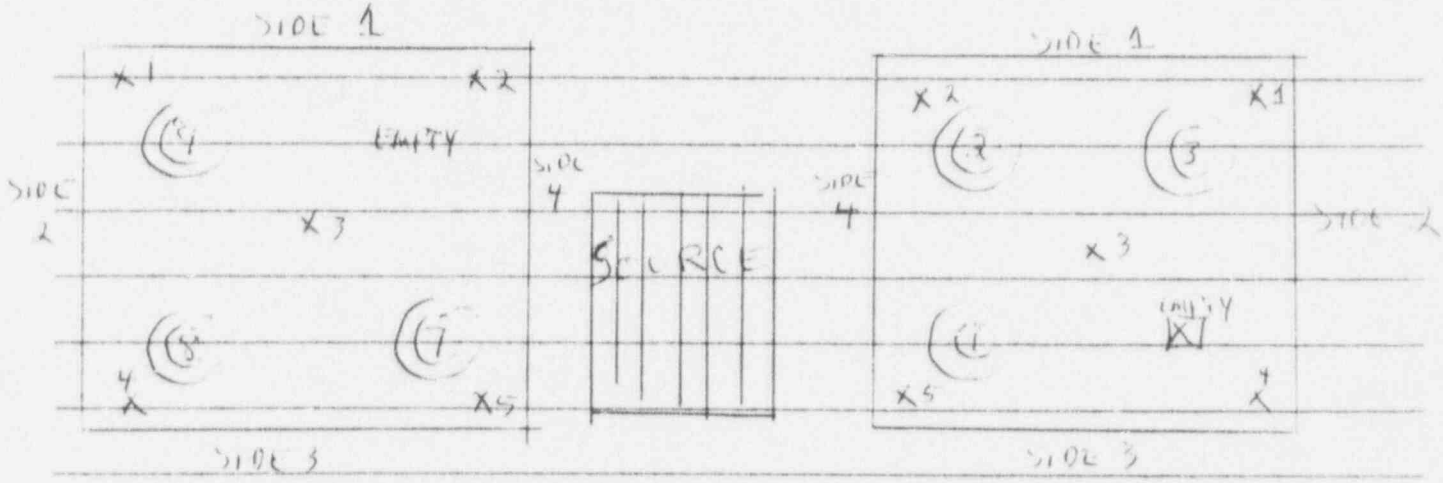
DATA SHEET

Project BF3 Connectors

Specimen ACC

Part No

Ident. Connectors Relative To Source Start Date 4/5/17



EAST CAN

4500AC CONNECTORS

WEST CAN

2500OC CONNECTORS

↑ UP

X IS DOSIMETER EMPLACEMENT

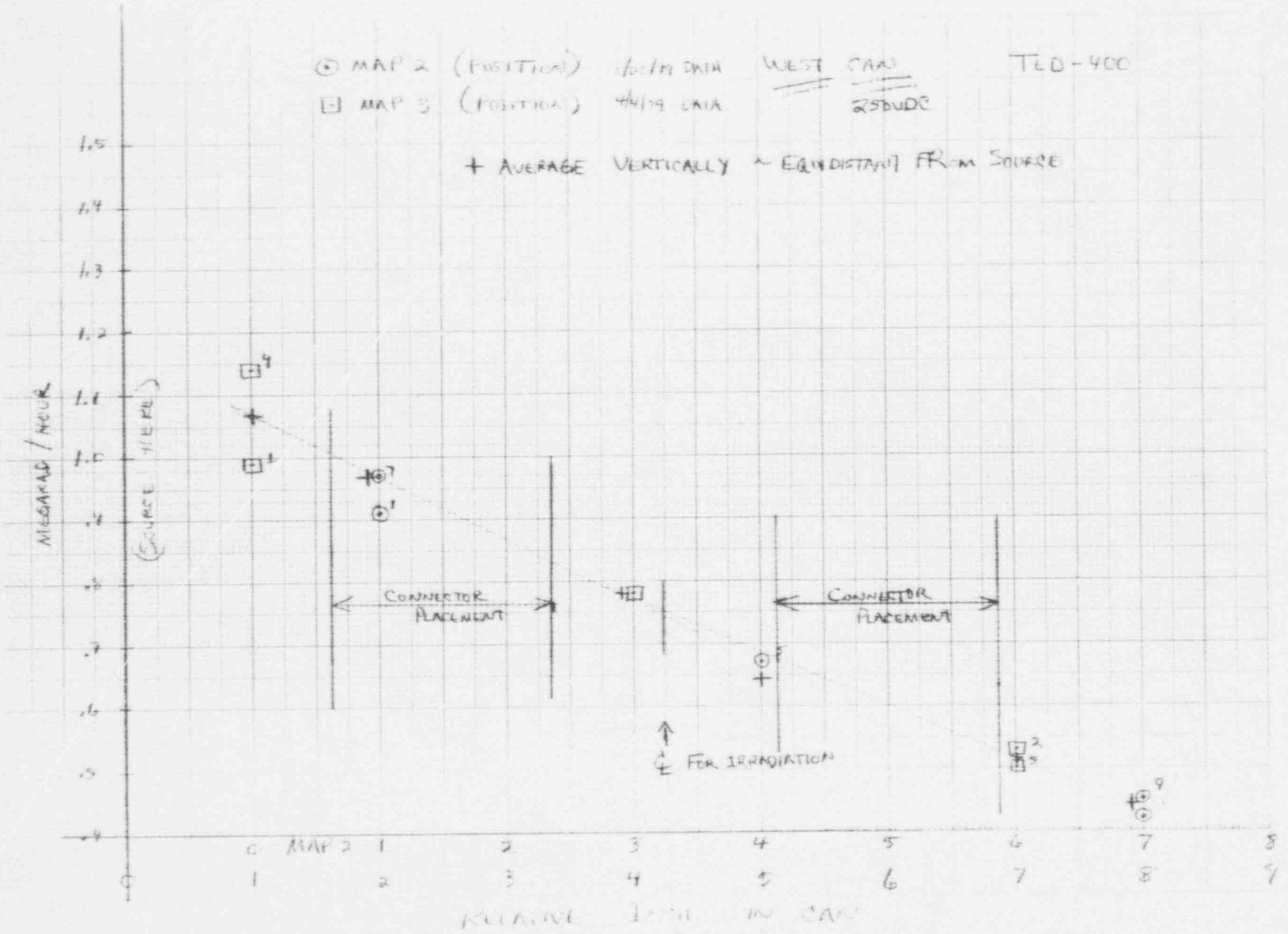
Remarks

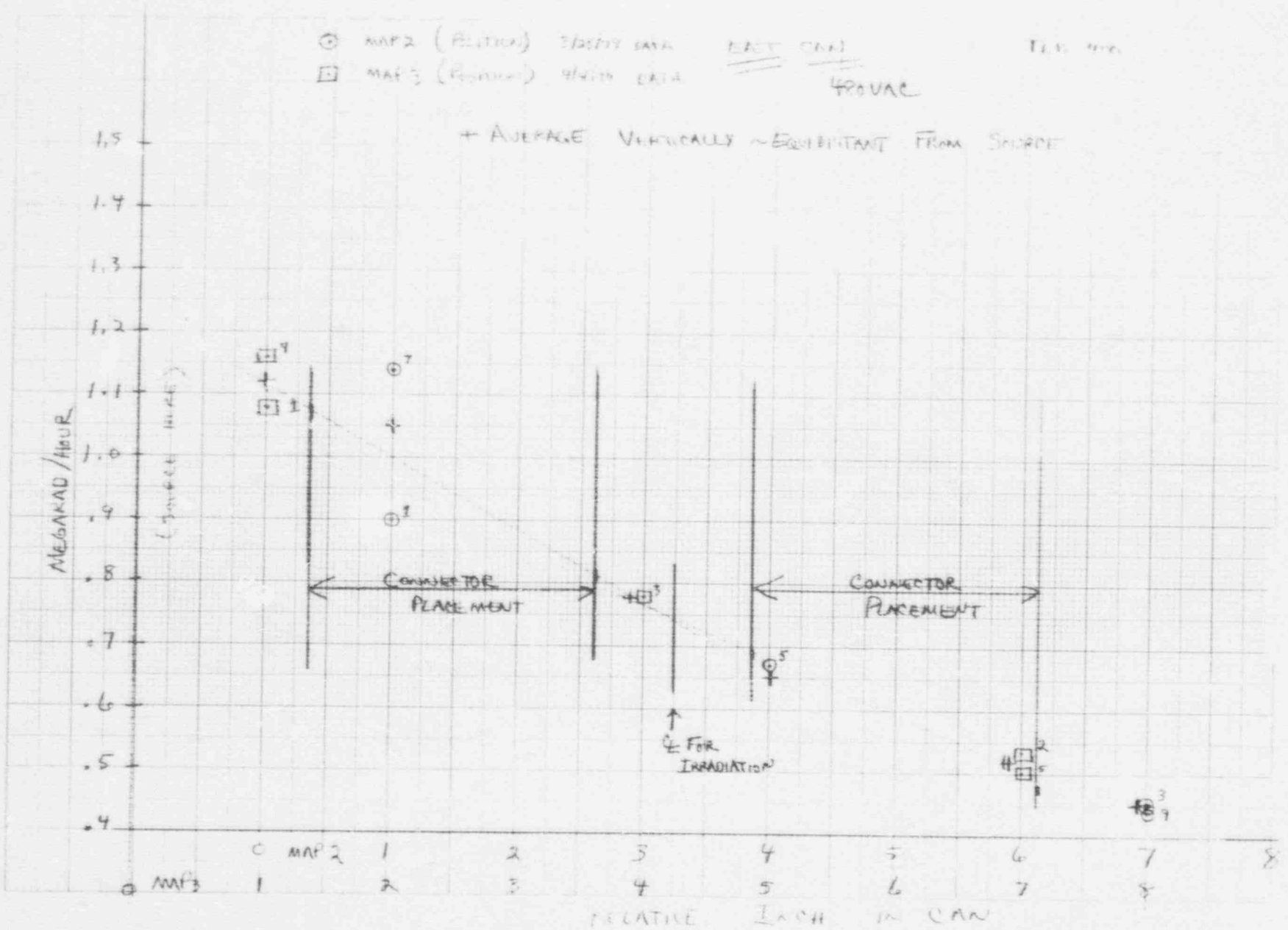
Tested by Date

Witness Lloyd [illegible] Date 4/5/17

Sheet No. 1 of 1

Approved


MAP 2 (POSITION) 4/6/79 DATA
MAP 3 (POSITION) 4/4/79 DATA
WEST CAN
25DUDC
TLD-400
+ AVERAGE VERTICALLY ~ EQUIDISTANT FROM SOURCE
MILLIRAD / HOUR
(SOURCE HERE)
1.5
1.4
1.3
1.2
1.1
1.0
.9
.8
.7
.6
.5
.4
CONNECTOR PLACEMENT
CONNECTOR PLACEMENT
FOR IRRADIATION
MAP 2
0 1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8 9
RELATIVE DEPTH IN CAN


MAP 2 (RELATIVE) DENSITY DATA
MAP 3 (RELATIVE) DENSITY DATA
EAST CAN
PROVAC
+ AVERAGE VERTICALLY ~EQUIDISTANT FROM SOURCE
MEGARAD/HOUR
1.5
1.4
1.3
1.2
1.1
1.0
.9
.8
.7
.6
.5
.4
CONNECTOR PLACEMENT
CONNECTOR PLACEMENT
℄ FOR IRRADIATION
MAP 2
MAP 3
RELATIVE INCH IN CAN

DATA SHEET

Project SF3 (CONNECTORS)

Specimen 1, 2, 3, 7, 8, 9

Part No

Ident. VARIATION, FIRST 22.5 Hz PERIOD Start Date 4/5/79

TC #	POSITIONED ON CONNECTOR #	SIDE 1 UP NYLON (1.14) DOWNWAY			
		#	WEST CAN	EAST CAN	
CH1	1				
CH2	2	1	(2.5%) 12.6	(2.4%) 11.5	
CH3	3	2	(7.5%) 25.1	(7.5%) 25.1	
CH4	AMBIENT - WEST CAN	3	(12.5%) 20.1	(12.5%) 20.1	
CH5	7	4	(6%) 16.9	(2.4%) 11.5	
CH6	8	5	(5%) 27.9	(5%) 27.9	
CH7	9				
CH8	AMBIENT - EAST CAN				

START: 4/5/79 15:27

END: 4/6/79 13:57

Remarks

Tested by [signature] Date 4-6-79

Witness [signature] Date 4/6/79

Sheet No. 1 of 9

Approved

DATA SHEET

Project DT's Connectors

Specimen 1, 2, 3, 7S, 4

Part No

Ident. RADIATION, TEST 225 HR PERIOD, SEE 1 LF Start Date 4/5/79

TEMPERATURES: TYPE K TC / DATALOGGER, °C

4/5/79 4/6/79

TC #	Connector #	TEST	16:00	24:00	08:00	16:00	23:00
1	1	25°C	28°C	31°C	29°C	32°C	33°C
2	2	25	29	31	30	32	34
3	3	25	28	30	27	31	32
4	Ambient not con	25	28	28	27	29	30
5	7	25	29	31	30	32	34
6	5	25	27	28	28	30	31
7	1	25	27	28	28	30	31
8	Ambient last con	25	27	27	27	28	30

RADIATION START: 4/5/79 @ 15:27 ; END: 4/6/79 13:51

Remarks

Tested by [signature] Date 4/4/79

Witness [signature] Date 4/9/79

Sheet No. 2 of 2

Approved

DATA SHEET

Project [illegible]

Specimen 1, 2, 3, 4, 5, 6

Part No

Ident. [illegible] Start Date 4/6/79

TEST 4/6/79 14:21 SIDE 2 UP

END 4/7/79 12:51 AXIAL (1,4) DIAMETRY

#	WEST CHK	EAST CHK
1	(3.5%) .649mK	(3.2%) .657mK
2	(5%) 27.1	(5.05%) 27.4
3	(5.5%) 26.1	(11%) 22.5
4	(15%) 15.6	(2%) 12.3
5	(11%) 14.9	(15.5%) 13.2

Remarks

Tested by [illegible] Date 4/7/79

Witness [illegible] Date [illegible]

Sheet No. 3 of 9

Approved

DATA SHEET

Project HFS CONNECTORS

Specimen 1, 2, 3, 7, 8, 9

Part No

Ident. RADIATION, SOUND 22.5 MR /HR, SIDE 2 UP Start Date 4/6/79

TEMPERATURES: TYPE K TC/DATALOGGER, °C

TC #	ALTERNATE #	INLET	1324	2324	3424	4324	1224
			4/6/79		4/7/79		
1	1	33°C	31°C	30°C	27°C	27°C	31°C
2	2	33	32	31	30	30	33
3	3	32	32	31	30	30	32
4	AMBIENT LAST CHN	28	29	28	27	28	29
5	7	33	30	28	27	28	30
6	5	31	31	28	28	25	30
7	1	27	32	31	30	30	33
8	AMBIENT LAST CHN	32	25	25	24	26	25
	RADIATION START:		4/6/79 14:21		4/7/79	13:51	

Remarks

Tested by Lloyd Jones Date 4/7/79

Witness [signature] Date 4/9/79

Sheet No. 4 of 9

Approved

DATA SHEET

Project MT's CONNECTORS

Specimen 1, 2, 3, 4, 5, 6

Part No

Ident. RADIATION, TUBED 22.5 HR. PERIOD, SIDE 5 UP Start Date 4/1/79

START: 4/1/79 13:14

END: 4/6/79 11:44

SIDE 5 UP

NYLON (1.12) DOSIMETRY

#	WEST CAN	EAST CAN
1	(9.25%) 25.5 Mr	(8.75%) 26.4 Mr
2	(23.75%) 11.9 Mr	(21.25%) 13.4 Mr
3	(12.5%) 20.9 Mr	(13%) 20.3 Mr
4	(10.75%) 23.2 Mr	(9.5%) 25.1 Mr
5	(17%) 16.4 Mr	(30%) 9.05 Mr

Remarks

Tested by [signature] Date 4-8-79

Witness Willie A. Vick Date 4/8/79

Sheet No. 5 of 9

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 1, 2, 3, 7, 8, 9

Part No

Ident. RADIATION, THIRD 22.5 HR PERIOD, SIDE 3 of Start Date 4/7/79

TEMPERATURES: TYPE K TC/DATALOGGER, °C

		4/7/79		4/8/79		
TC #	CONNECTOR #	1324	2324	0524	0724	1124
1	1	29°C	27°C	28°C	28°C	31°C
2	2	30	29	28	30	31
3	3	30	30	27	28	31
4	AMBIENT NEST CAN	25	27	26	26	29
5	7	29	28	27	26	30
6	8	29	30	29	28	31
7	9	30	30	29	28	31
8	AMBIENT CAN CAN	27	24	23	23	27

RADIATION START: 4/7/79 13:14 END: 4/8/79 11:49

Remarks

Tested by [signature] Date 4/7/79

Witness [signature] Date 4/9/79

Sheet No. 6 of 9

Approved

DATA SHEET

Project 10 CONNECTORS

Specimen 1, 2, 3, 7S'1

Part No

Ident. ANNEALED, TESTED 22.5 HR PERIOD Start Date 4/5/77

START: 4/5/77 12:10'Y SIDE 4 C1

END: 4/7/77 10:35Y NYLON (1,12) DIMETRY

#	WESTCAN	EAST CAN
1	(4.25%) 14MK	(22%) 12.5MK
2	(21%) 13.5	(2.25%) 14
3	(12.25%) 21.3	(15%) 15.2
4	(10.25%) 23.7	(10.25%) 23.7
5	(7.5%) 25.1	(3.75%) 26.4

Remarks

Tested by Lloyd Burgess Date 4/8/77

Witness [illegible] Date 4/8/77

Sheet No. 7 of 9

Approved

DATA SHEET

Project BT3 CONNECTORS

Specimen 1, 2, 3, 7, 8, 9

Part No

Ident. RADIATION, FOURTH 22 SMK PERIOD, SIDE 4 of Start Date 4/8/79

TEMPERATURES: TYPE K TC / DATALOGGER, °C

TC #	Connector #	4/8/79 Pre-Test	1400	2330	4/9/79 0330	0900	1000
1	1	27°C	33°C	~~31°C~~	31°C	30°C	30°C
2	2	29	32	30	30	29	29
3	3	27	32	30	29	29	29
4	AMBIENT NEAR CAN	25	30	28	25	27	27
5	7	29	34	32	31	30	31
6	5	29	34	32	31	30	31
7	9	28	31	29	28	28	28
8	AMBIENT EAST CAN	26	28	25	24	24	25

RADIATION START: 4/8/79 1210 END: 4/9/79 1035

Remarks

Tested by [signature] Date 4/4/79

Witness [signature] Date 4/9/79

Sheet No. 8 of 9

Approved

DATA SHEET

Project BT3 CONNECTORS

Specimen 1, 2, 3, 7&4

Part No

Ident. RADIATION SUMMARY Start Date 4/5/79

- RADIATION WAS CONDUCTED IN FOUR 22.5HR PERIODS, WITH ROTATION OF THE CONNECTORS (CANS) AS PREVIOUSLY DESCRIBED
- PERIODS 1 & 2 WERE CONDUCTED AT MAP'S LOCATION, PERIODS 3 & 4 AT ½" FURTHER FROM THE SOURCE. CORRESPONDING CONNECTOR LOCATIONS ARE SHOWN IN THE FIGURES.
- MAXIMUM MEASURED CONNECTOR TEMPERATURE WAS 35°C. TEMPERATURES GENERALLY RANGED BETWEEN 30 - 34°C.
- BASED ON THE PRETEST TLD-100 MAPS AND THE CONNECTOR LOCATIONS, THE AVERAGED DOSE RATE WAS 0.76 MRAD/HOUR, THE TOTAL DOSE WAS 68.5MRAD. THESE VALUES ARE CONSIDERED TO BE ACCURATE TO ± 10%

Remarks

Tested by Meyl Dinger Date 4/7/79

Witness Date

Sheet No. 9 of 9

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 4/5 - 4/7/79 Test Area TA-I, NORTH GIF

Technician D. DUGAN Project BF3 CAMERAS Type Test RADIATION

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	DATALOGGER	ACUREX	A501	1654	C11467	-1XX-1XX C	± 1°C	3/6/79	5/6/79

CERTIFICATION SHEET ATTACHED

Instrument Test Engineer _____ Checked & Received by _____

Standards Laboratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87115

DATALOGGER
Acurex
Model No. A901
Serial No. 1694
Property No. 011409

Submitted by: Organization 4442

Certified: March 9, 1979
Expires: September 9, 1979

This instrument was adjusted according to manufacturer's calibration procedure and was found to be within these specifications:

Voltage Measurements:	$\pm$ 0.005% of full scale $\pm$ 0.005% of reading after one hour warmup
Thermocouple Measurements: (Type K Thermocouple)	-170°C to + 1280°C $\pm$ 1°C

Metrologist: H. H. Pike, 2553

Certified by: G. F. McFall, 2552

RHP:2553:bh

Conditions of Certification. Neither Sandia Laboratories nor the Government assumes any responsibility with respect to the use of this document, the information contained therein, or the physical device or instrument certified, by any person other than the contractor to whom originally issued. Any such use will be at the sole risk and responsibility of such other user.

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In no case will Sandia Laboratories or the Government assume responsibility for consequential damages. SA 5710-DA(9-72)

Sandia Laboratories

April 5, 1979

L. L. Bonzon, 4442

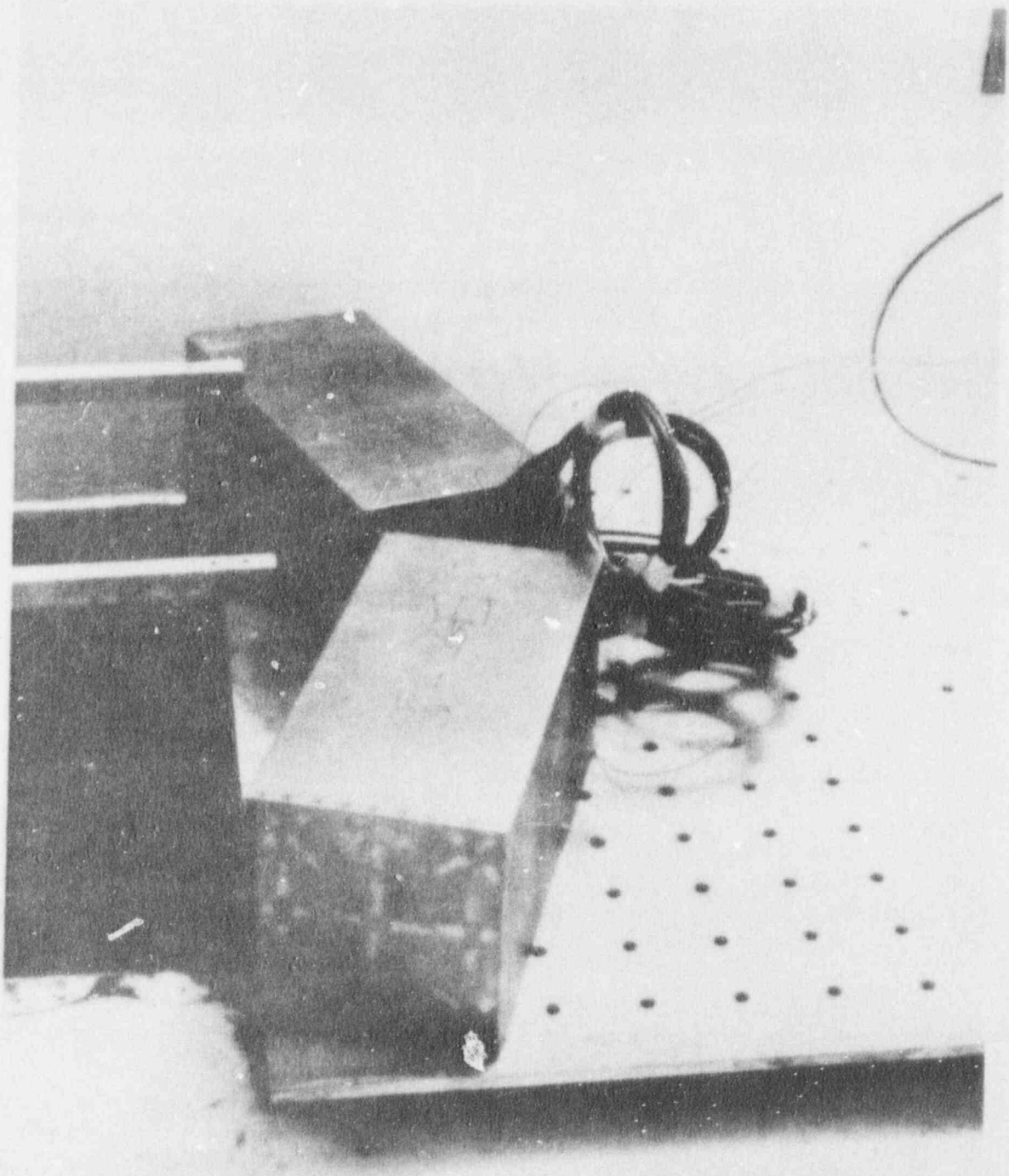
L. D. Posey, 4452

Calibration of the CaF_2 TLD's used by the Area V Diagnostics Lab

The present batch of Harshaw TLD 400 dosimeters was calibrated in the following manner. The low-dose range, up to 100 rads, was calibrated using the vertical range in Area I. The dose received by the dosimeters during this part of the calibration is determined from the exposure dose measured by Victoreen R-chambers which are calibrated by NBS at regular intervals. Prior to the summer of 1978, the south Co^{60}-source of the Sandia GIF was an NBS secondary standard and the high-dose (> 100 rads) calibration data was obtained using this source. At that time, the source configuration was modified and the new configuration has not as yet been calibrated. As a result, TLD dosimeters from the batch presently in use were calibrated at high-dose by Far West Technology Inc. using the EG&G NBS certified Co^{60}-source in Santa Barbara, California. Although the entire calibration procedure is not currently carried out in-house, the calibration can be traced to two separate NBS certifications.

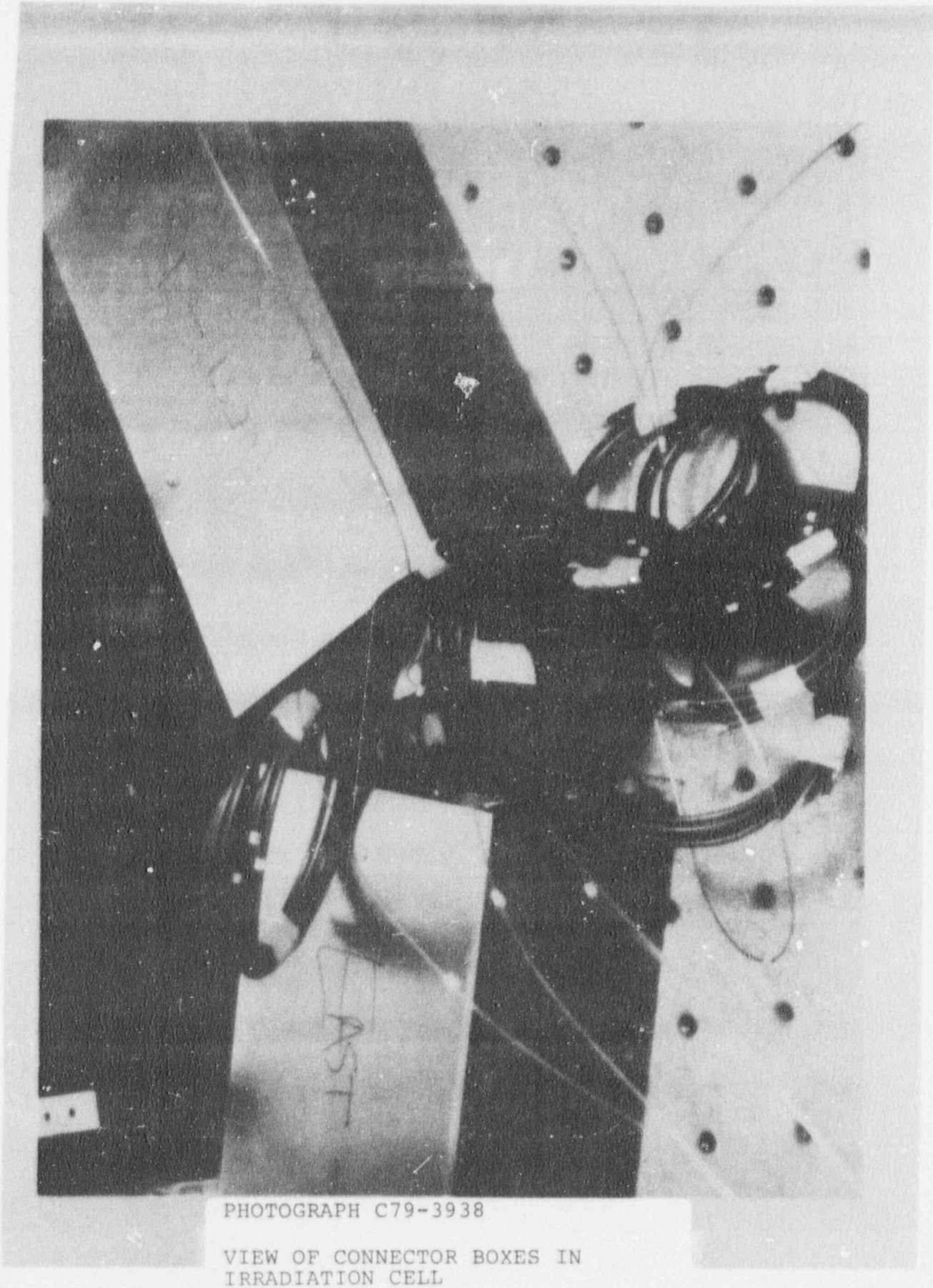
LDP:4452:dj

Copy to:
4452 M. Hauer



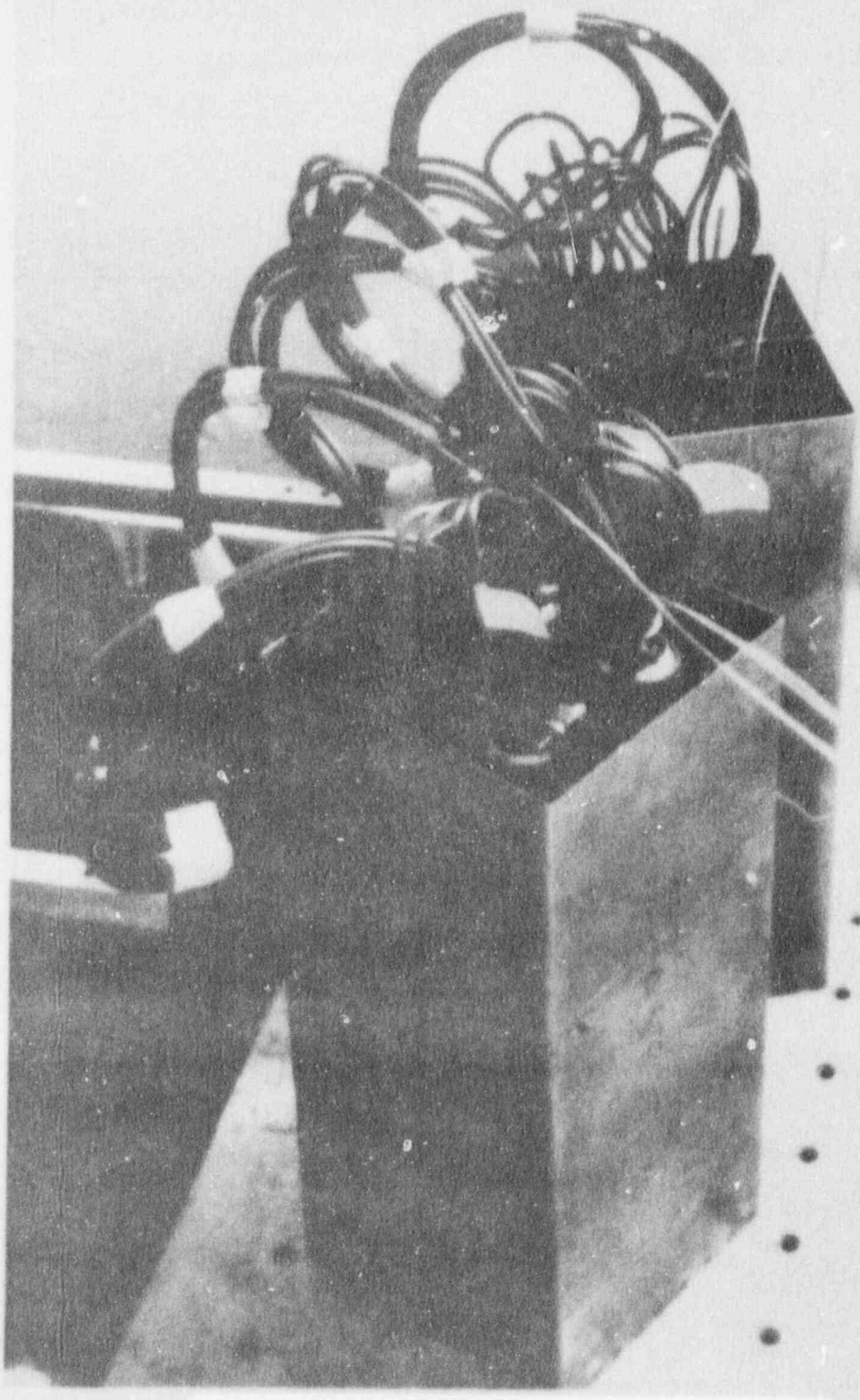
PHOTOGRAPH C79-3936

VIEW OF CONNECTOR BOXES IN
IRRADIATION CELL



PHOTOGRAPH C79-3938

VIEW OF CONNECTOR BOXES IN
IRRADIATION CELL



PHOTOGRAPH C79-3944

VIEW OF CONNECTOR BOXES IN
IRRADIATION CELL

SECTION V

POST-RADIATION FUNCTIONAL/MECHANICAL TESTS

Post-Radiation Functional/Mechanical Tests Procedures

After the electrical connectors have been irradiated, each item will be subjected to insulation resistance, voltage, load, and dimensional tests. The test procedures outlined in the previous two applicable (Baseline) sections will be followed here as well, except that the electrical loads are held constant and the operating current/voltage is recorded.

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident. POST-RADIATION FUNCTIONAL IR Start Date 4/10/79

PINS (25 VDC CONNECTORS)

ITEM	K TO CASE	N TO CASE	K TO N
1	$>2.5 \times 10^{9}\ \Omega$	$>2.5 \times 10^{9}\ \Omega$	$>2.5 \times 10^{9}\ \Omega$
2	$>2.5 \times 10^{9}\ \Omega$	$>2.5 \times 10^{9}\ \Omega$	$>2.5 \times 10^{9}\ \Omega$
3	$2.5 \times 10^{9}\ \Omega$	$2.5 \times 10^{9}\ \Omega$	$2.5 \times 10^{9}\ \Omega$

PINS (45 VAC CONNECTORS)

ITEM	4 TO CASE	10 TO CASE	4 TO 10
7	$7.5 \times 10^{8}\ \Omega$	$1.3 \times 10^{9}\ \Omega$	$6.25 \times 10^{8}\ \Omega$
8	$2.5 \times 10^{9}\ \Omega$	$2.5 \times 10^{9}\ \Omega$	$1.5 \times 10^{9}\ \Omega$
9	$2.0 \times 10^{9}\ \Omega$	$2.5 \times 10^{9}\ \Omega$	$1.25 \times 10^{9}\ \Omega$

Remarks

Tested by [signature] Date 4-10-79

Witness [signature] Date 4/10/79

Sheet No. 1 of 3

Approved

DATA SHEET

Project SF3 CONNECTORS

Specimen ASC-DC

Part No 1, 2, 3

Ident. TEST - RADIATION FUNCTIONAL LOAD/VOLTAGE Start Date 4/10/79

Test	Inrt Voltage	Load Resistance	Load Voltage	Inrt Current
1	250 VDC	24Ω (coil)	251VDC	1.010 A
2	250 VDC	24Ω (coil)	251VDC	0.955 A
3	250 VDC	241Ω (coil)	251VDC	1.003 A

Remarks

Tested by [signature] Date 4/10/79

Witness Floyd Dougan Date 4/10/79

Sheet No. 2 of 3

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 480 VAC

Part No 7, 8, 9

Ident. POST-RADIATION FUNCTIONAL LEAD/VOLTAGE Start Date 4/10/79

ITEM	INIT VOLTAGE	LEAD (DC) RESISTANCE	LOAD VOLTAGE	INIT CURRENT
7	480 VAC	25.3 Ω (cold)	480 VAC	17.43 A
8	480 VAC	25.6 Ω (cold)	482 VAC	17.34 A
9	480 VAC	25.6 Ω (cold)	476 VAC	17.36 A

Remarks

Tested by [signature] Date 4/10/79

Witness [signature] Date 4/10/79

Sheet No. 3 of 3

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 4/10/79 Test Area Bldg 51CB

Technician D. DUGAN Project BT3 CONNECTORS Type Test POST-RADIATION FUNCTIONAL

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	MEGOHMMETER	AMERICAN HI TEST SYSTEMS	5M250C	S-77-112	RX22C	.01S–250 MΩ	±4% F.S.	3/14/79	9/14/79
2	DIGITAL MULTIMETER	FLUKE	8100A	3318	21343	C-10MΩ ±0.1% +2DIGITS C.1-1000VDC ±0.05%+1DIGIT		3/2/79	9/2/79
3	POWER ANALYZER	NEWTRONIC	461C	5067	25C183	0-5A 0-600V	±0.5%A1DIGIT	3/1/79	9/1/79
4	POWER SUPPLY	HEWLETT PACKARD	6454	—	23764	0-32VDC 0-1.5A	NOT AVAILABLE	—	—

Instrument Test Engineer _____ Checked & Received by _____

DATA SHEET

Project BT's CONNECTORS

Specimen 250-DC

Part No 1

Ident. POST-RADIATION DIMENSIONAL Start Date 4/10/79

ACETONE INSULATOR		DIAMETER		WIRE A	
PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
A	C.100"	I	87	1	C.155"
K	C.094"	II	92	2	C.156"
M	C.091"	III	87	3	C.157"
E	C.118"				

ACETONE INSULATOR WAS ABOVE THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER : 1.504 - 1.512"

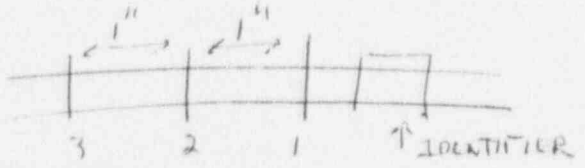
Remarks

Tested by [signature] Date 4-10-79

Witness [signature] Date 4/10/79

Sheet No. 1 of 6

Approved



DATA SHEET

Project BNC CONNECTORS

Specimen 25C VDC

Part No 2

Ident. BNC - RADIATION DIMENSIONAL Start Date 4/10/79

REFERENCE INDICATOR DEROMETER WIRE A

LOC	DEPTH	LOCATION	VALUE	LOCATION	OD
A	C.110"	I	92	1	C.153"
B	C.110"	II	93	2	C.151"
C	C.105"	III	91	3	C.153"
E	C.100"				

REFERENCE INDICATOR WAS ABOVE THE END OF THE CONNECTOR BIG BARREL

BARREL DIAMETER: 1.505 - 1.512"

Remarks

Tested by [signature] Date 4-10-79

Witness [signature] Date 4/10/79

Sheet No. 2 of 6

Approved

DATA SHEET

Project BT3 CONNECTORS

Specimen 25C-DC

Part No 3

Ident. PCT - RADIATION DIMENSIONAL Start Date 4/10/71

NEOPRENE INSULATOR		DIAMETER		WIRE A	
PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
A	C.CIS"	I	C/3	1	C.156"
K	C.CIS"	II	C/1	2	C.157"
M	C.CCC"	III	C/C	3	C.155"
E	C.CIC"				

NEOPRENE INSULATOR WAS ABOVE THE END OF THE CONNECTOR RUB BARREL.

BARREL DIAMETER: 1.565 - 1.512"

Remarks

Tested by [signature] Date 4/10/71

Witness [signature] Date 4/10/71

Sheet No. 3 of 6

Approved

DATA SHEET

Project MTS CONNECTORS

Specimen 45 VAC

Part No 7

Ident. TEST - RADIATION DIMENSIONAL Start Date 4/16/79

RECEIVE INDICATOR DIAMETER WIRE 14

DIA	DEPTH	LOCATION	VALUE	LOCATION	OD
1	C.102"	II	91	1	C.101"
14	C.101"	I	85	2	C.101"
6	C.103"	III	88	3	C.101"

ADDITIONAL INDICATOR WAS ABOVE THE END OF THE CONNECTOR PLUG BARREL

BARREL DIAMETER: 1.165"

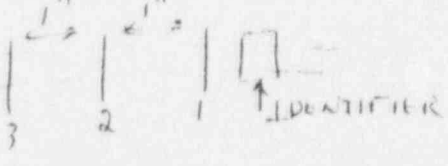
Remarks

Tested by [signature] Date 4-10-79

Witness [signature] Date 4/10/79

Sheet No. 4 of 6

Approved



DATA SHEET

Project BT3 CONNECTORS

Specimen 458 1AC

Part No 5

Ident. POST-IRRADIATION DIMENSIONAL Start Date 4/6/77

REFERENCE INSULATOR DIAMETER WIRE 14

PIN	DEPTH	LOCATION	VALUE	LOCATION	ID
1	C.165"	II	54	1	C.304"
14	C.118"	I	56	2	C.311"
6	C.123"	II	55	3	C.301"

REFERENCE INSULATOR WAS ABOVE THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER: 1.767"

Remarks

Tested by [signature] Date 4-10-78

Witness [signature] Date 4/10/78

Sheet No. 5 of 6

Approved

DATA SHEET

Project BT3 CONNECTORS

Specimen 4/0 VAC

Part No 1

Ident. POST INFLATION DIMENSIONAL Start Date 4/10/79

ACCIDENT INFLATION DIAMETER WIRE 14

Pin	DEPTH	LOCATION	VALVE	LOCATION	OD
1	C.116"	TL	4/1	1	C.216"
14	C.116"	L	4/0	2	C.216"
6	C.151"	BL	4/0	3	C.216"

ACCIDENT INFLATION WAS ABOVE THE END OF THE CONNECTOR SLEEVE BARREL.

BARREL DIAMETER: 1.765"

Remarks

Tested by [signature] Date 4-10-79

Witness Lloyd Dewees Date 4/10/79

Sheet No. 6 of 6

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 3/1/[illegible] Test Area BRC, [illegible]

Technician D. REAR Project BF3 [illegible] Type Test POST-RADIATION DIMENSIONAL

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	SHEET TYPE A2	SHEET INSTRUMENT TYPE A[illegible] & MFG. CO.	—	NAT 3	C-11		NOT APPLICABLE		
2	CALIPERS	BROWN & SHARPE	571	—	—	C-6"/.001	±.001	NOT AVAILABLE	

Instrument Test Engineer _____ Checked & Received by _____

V-13,14

SECTION VI

TEMPERATURE AGING TEST

Temperature Aging Test Procedure

All of the test items will be subjected to a thermal aging test, with uncontrolled (ambient) humidity. The test is to be conducted in two parts: in circulating air at 217°F for 60 hours, followed by a test in flowing nitrogen at 217°F for 180 hours.

Pre-test flow measurements in the empty oven (chamber) will be made and recorded to determine approximate air circulation flow rates. Pertinent information on the oven, controllers, and other instrumentation will be recorded on data sheets and/or other pertinent documentation.

All test items will be placed in the temperature chamber in a manner to avoid overheating from radiant effects from the chamber heating elements. The temperature chamber will be vented to the atmosphere to prevent buildup of outgasing products, particularly chlorine gas, from the test item inside the chamber. The air inside the chamber will be distributed as uniformly as possible. The test items will be aged in air at 217°F for a time period of 60 hours. Besides the TC's associated with the oven controller and environment monitors, select specimen temperatures are to be monitored and recorded. Record results, TC locations, and observations on data sheets and/or other pertinent documentation.

Following air aging, the test specimens will be removed from the oven. The oven will be purged with flowing nitrogen; the specimens will then be repositioned in the oven.

The oven temperature will be then returned to, and stabilized at 217°F, with this temperature maintained for a total of 180 hours. During nitrogen aging, a continuous flow of nitrogen, about 1/4 cfm, will be introduced into the chamber at ambient pressure. This purge will prevent the outgasing products from accumulating inside the oven. Specimen temperatures will be monitored and recorded as described above.

After completion of the aging test in the nitrogen atmosphere, the test chamber will be normally returned to ambient temperature, under flowing nitrogen conditions, and the test items removed from the oven for post-test examination.

DATA SHEET

Project BF 3 CONNECTORS

Specimen ALL

Part No _____

Ident. TEMPERATURE AGING – PLACEMENT Start Date 4/10/79

ALL CONNECTORS, IN THE STEEL CANS, WERE PLACED ON A RACK IN OVEN #16 (BLDG 5/EC/RM 110); THEY WERE APPROXIMATELY CENTERED IN THE OVEN.

A CALIBRATED TEMPERATURE PROBE WAS PLACED NEAR THE CANS AS THE OVEN MONITOR.

THERMOCOUPLES WERE ATTACHED TO THE CONNECTORS EXACTLY AS THEY WERE FOR THE RADIATION PHASE!

TC #	CONNECTOR #	TC #	CONNECTOR #
1	1	5	7
2	2	6	8
3	3	7	1
4	AMBIENT IN CAN	8	AMBIENT IN CAN

Remarks _____

Tested by _____ Date _____

Witness Lloyd Burgess Date 4/10/79

Sheet No. 1 of 2

Approved _____

DATA SHEET

Project BF's Connectors

Specimen ALL

Part No

Ident. Temperature Aging - Airflow Start Date 4/16/79

-- Using an Anemometer, airflow was measured in the chamber (#16):

Center	170 - 190 cfm
Edge	350 - 360 cfm
Exhaust Fan	~450 cfm

Airflow indicators are that the flow is about 250 - 350 cfm in the region where the connectors are to be placed

Remarks

Tested by Cheryl Bass Date 4/16/79

Witness Fred St. Clair Date 4/16/79

Sheet No. 2 of 2

Approved

DATA SHEET

Project BTS CONNECTORS

Specimen ALL

Part No

Ident. TEMPERATURE AGING - AIR - #16 Start Date 4/10/79

— STARTED AGING 4/10/79, 1431.

— TWO VENT PLUGS REMOVED ON CHAMBER #16.

— REACHED AIR TEMPERATURE 217 ± 2°F AT 1510.

— DUGAN CHECKED SYSTEM AT ~0145 (4/11/79); 217°F CHAMBER.

— DUGAN CHECKED SYSTEM AT ~0530 (4/12/79); 217°F CHAMBER.

— SYSTEM AUTOMATIC SHUTDOWN AT ~0400 ON 4/13/79.
TOTAL TIME AT 217°F WAS ~59 3/5 HOURS.

— TOOK PHOTOS OF OVEN/CONNECTORS.

— SOME CABLE DISCOLORATION WAS NOTED; SOME TC's WERE LOOSE.

Remarks

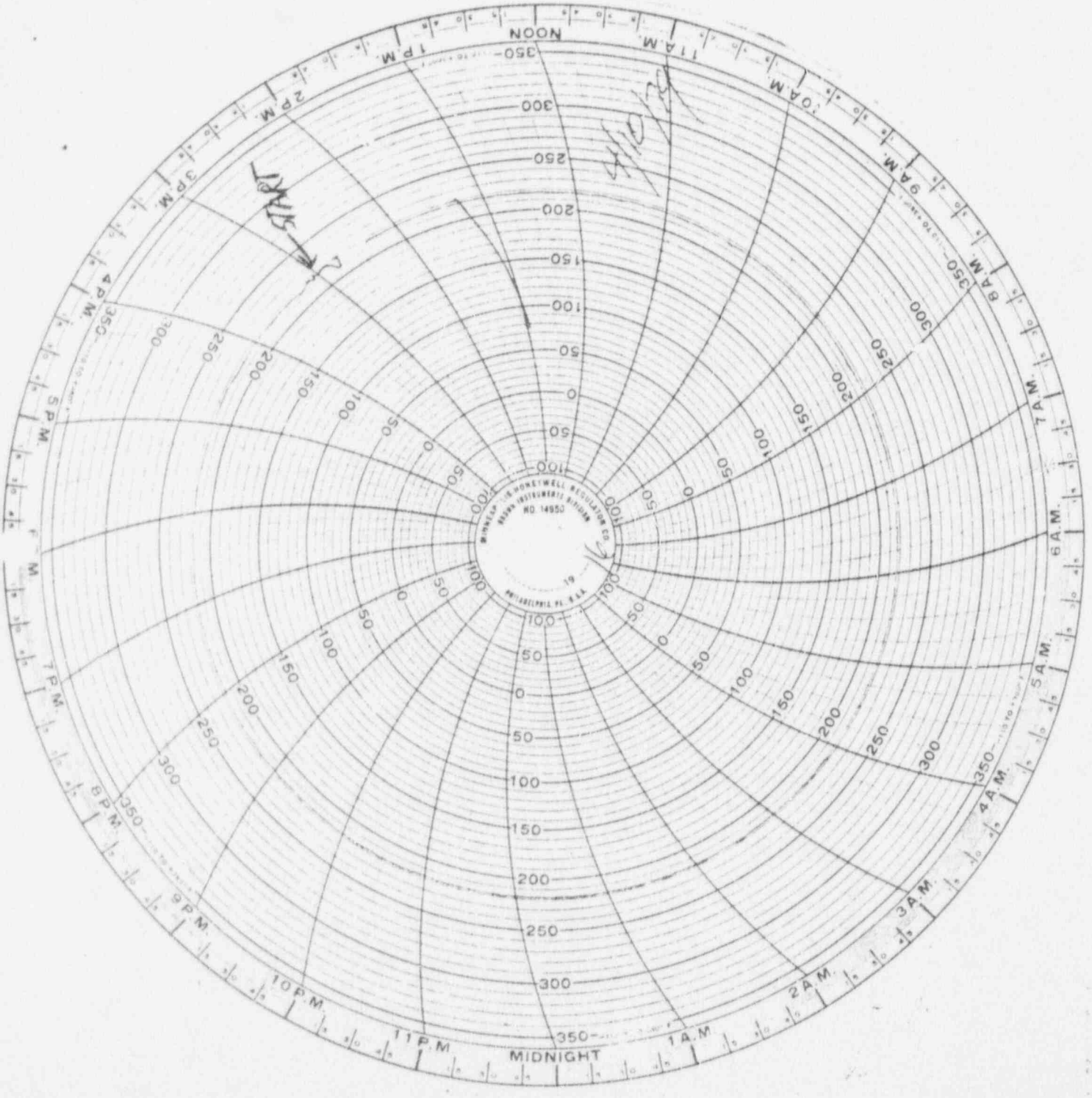
Tested by [signature] Date 4-13-79

Witness [signature] Date 4/13/79

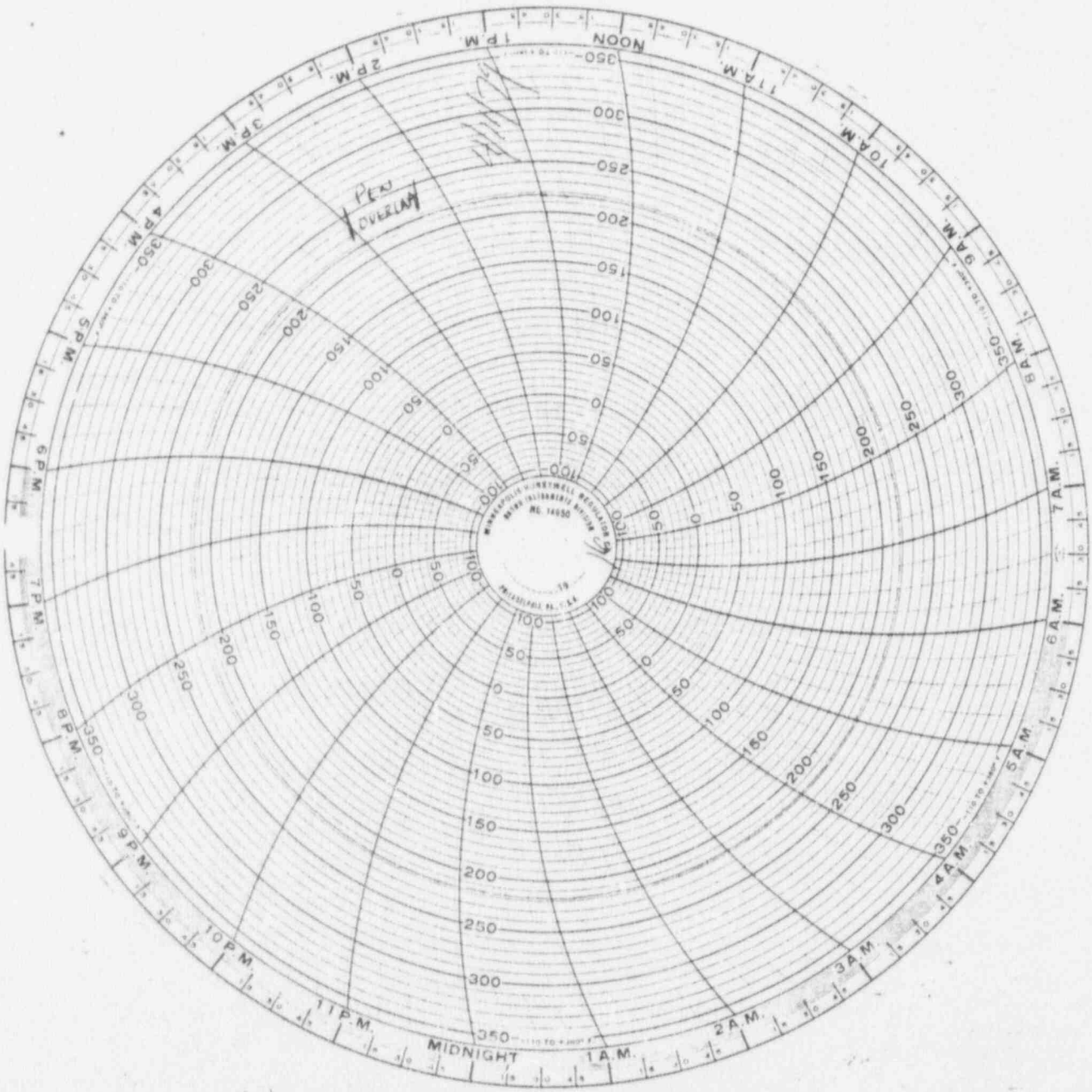
Sheet No. 1 of 1

Approved

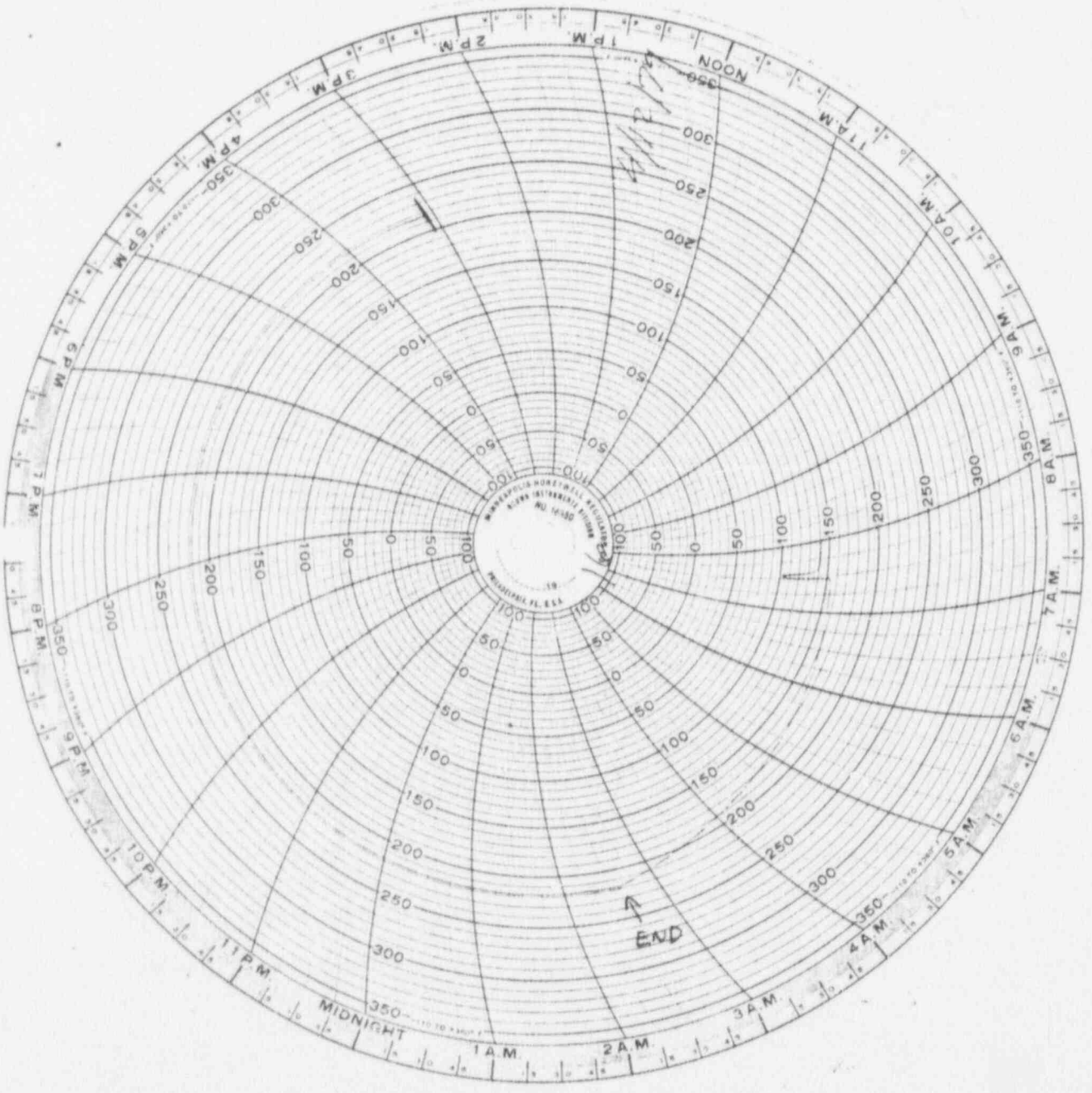
AIR - OVEN CHAMBER TEMPERATURE
4/10-11/79

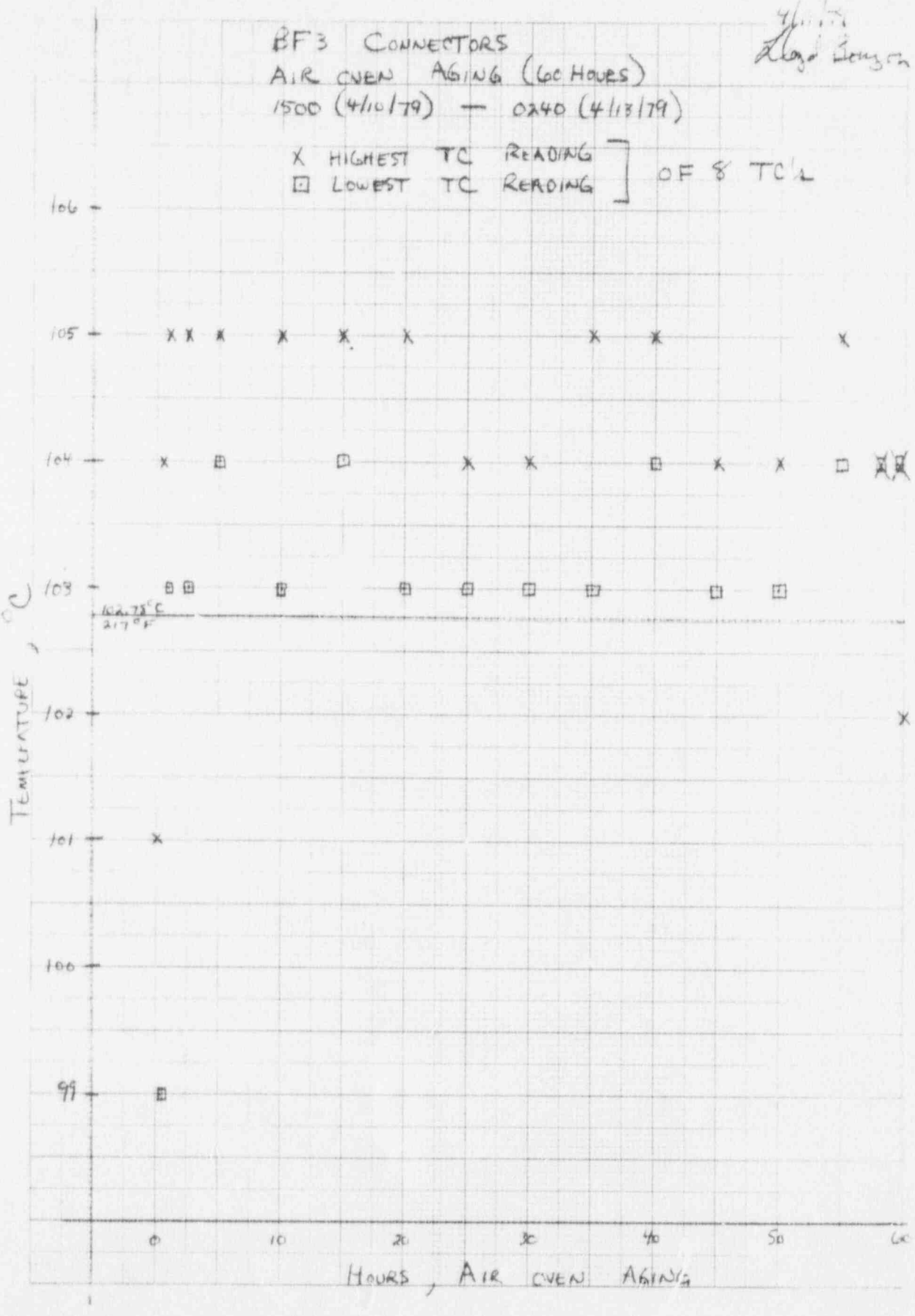


AIR-CLEN CHAMBER TEMPERATURE
4/11-12/79



AIR--OVEN CHAMBER TEMPERATURE
4/11-12/79




BF3 CONNECTORS
AIR OVEN AGING (60 HOURS)
1500 (4/10/79) — 0240 (4/13/79)
X HIGHEST TC READING
⊡ LOWEST TC READING
OF 8 TC'S
106
105
104
103
102
101
100
99
102.78°C
217°F
TEMPERATURE, °C
0
10
20
30
40
50
60
HOURS, AIR OVEN AGING

SHEET

Project FFTF CONNECTORS

Specimen ALL

Part No

Ident. THERMAL AGING – NITROGEN – #16 Start Date 4/16/79

– SAME TC PLACEMENT + HOOKUP AS AIR AGING
– SAME OVEN #16; SAMPLES REMAINED IN PLACE *
– HOOKED UP NITROGEN SUPPLY, OUTLET IN CHAMBER
– INSTALLED DIGITAL THERMOMETER + PLATINUM PROBE
– STARTED NITROGEN PURGE AT 0947 (4/16/79)
– APPROXIMATELY 600 PPM O2 @ 1437
– STARTED TEMPERATURE AT 1441
– REACHED RM TEMPERATURE AT 1540; AT 5 PSI
– CHECKED SYSTEM ON 4/17/79, 0800; ALL OK
– DEGAN CHECKED SYSTEM ON 4/18/79, 0800; ALL OK,
– DEGAN CHECKED SYSTEM ON 4/19/79, 0800; ALL OK,
– DEGAN CHECKED SYSTEM ON 4/20/79 0830; ALL OK

Remarks * SEE RECORD

Tested by [signature] Date 4/24/79

Witness Lloyd Boyer Date 4/24/79

Sheet No. 1 of 2

Approved

DATA SHEET

Project GE's CONNECTORS

Specimen ALL

Part No

Ident. THERMAL AGING – NITROGEN – #16 Start Date 4/6/74

– DUNCAN CHECKED SYSTEM ON 4/20/74, 1400; ALL IS READY FOR WEEKEND.

– DUNCAN & BENZEN CHECKED SYSTEM ON 4/21/74 ~0700; ALL OKAY.

– DUNCAN & BENZEN CHECKED SYSTEM ON 4/22/74 ~0700; ALL OKAY

– DUNCAN CHECKED SYSTEM ON 4/23/74, ~0800; ALL OK.

– SYSTEM AUTOMATIC SHUTDOWN AT ~0200 ON 4/24/74. TOTAL TIME AT 217°C WAS ~179 2/3 HOURS.

– TOOK PHOTOS OF OVEN/CONNECTORS.

– N2 OFF AT ~0745 ON 4/24/74

– ALL TC'S STILL ATTACHED

Remarks DISCOLORATION AT END OF N2 AGING; BUT HAD SOME DISCOLORATION AT END OF AIR AGING ALSO

Tested by [signature] Date 4/24/74

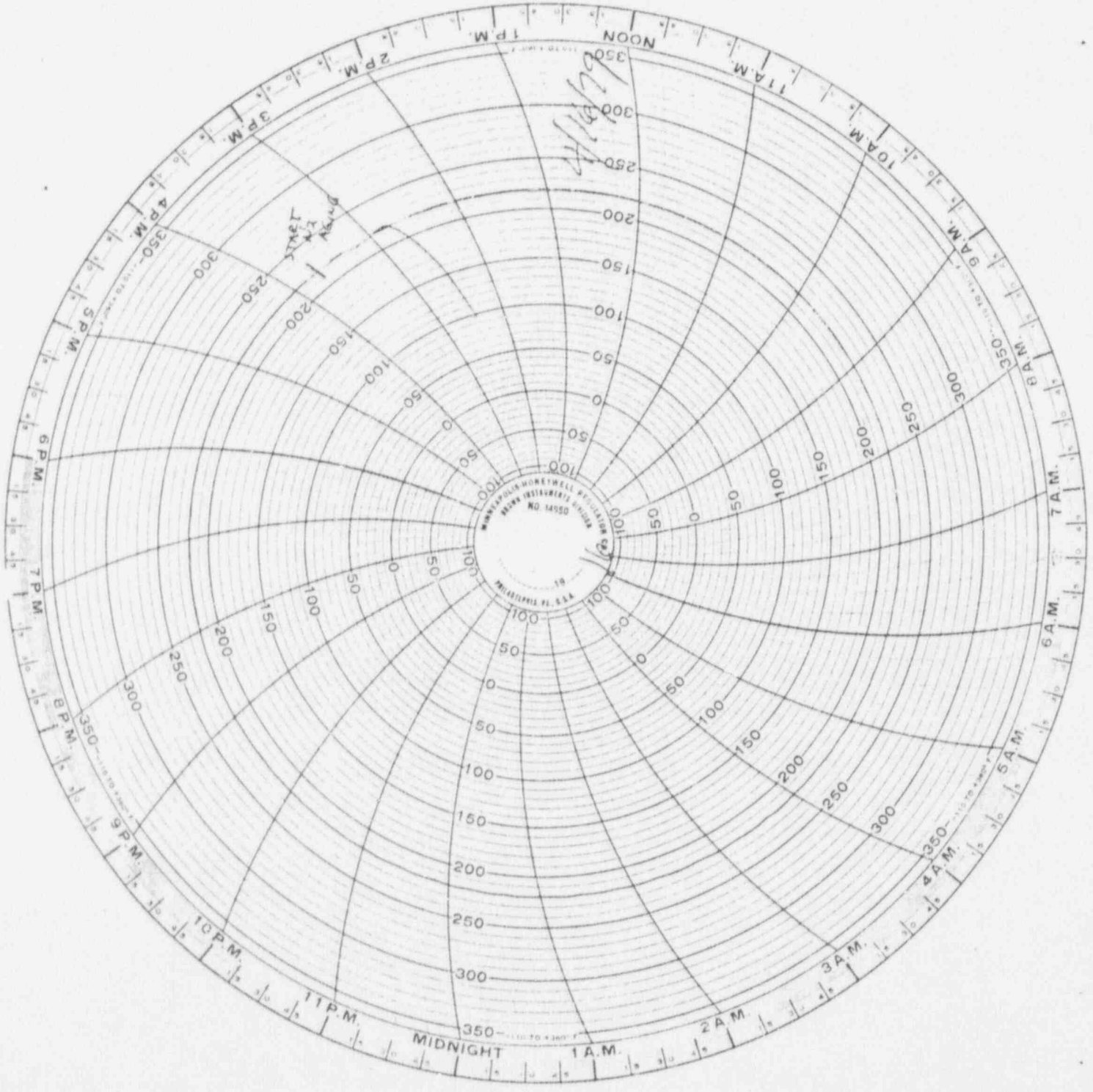
Witness Lloyd Bryson Date 4/24/74

Sheet No. 2 of 2

Approved

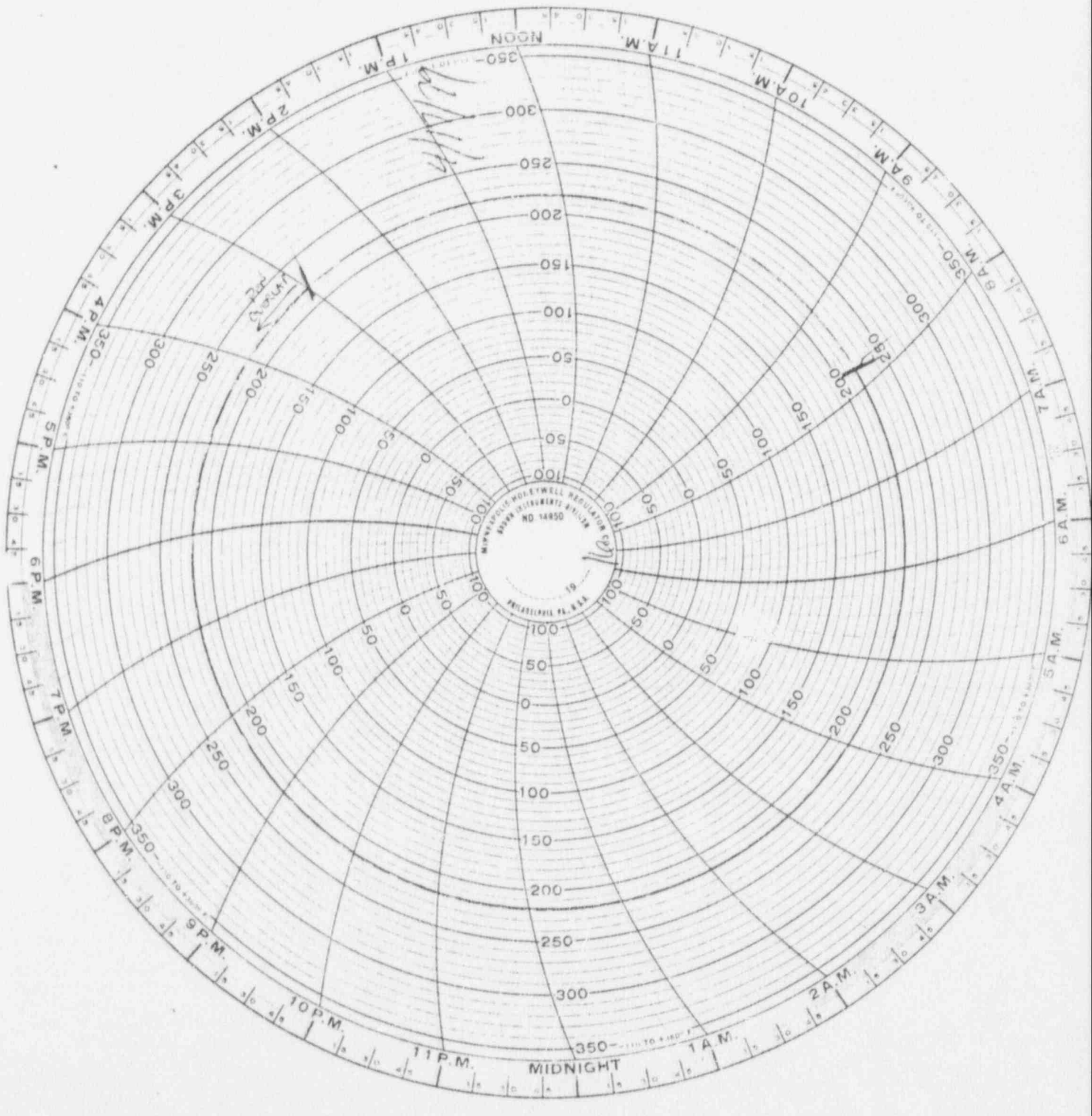
N_2 - OVEN CHAMBER TEMPERATURE

4/16-17/79



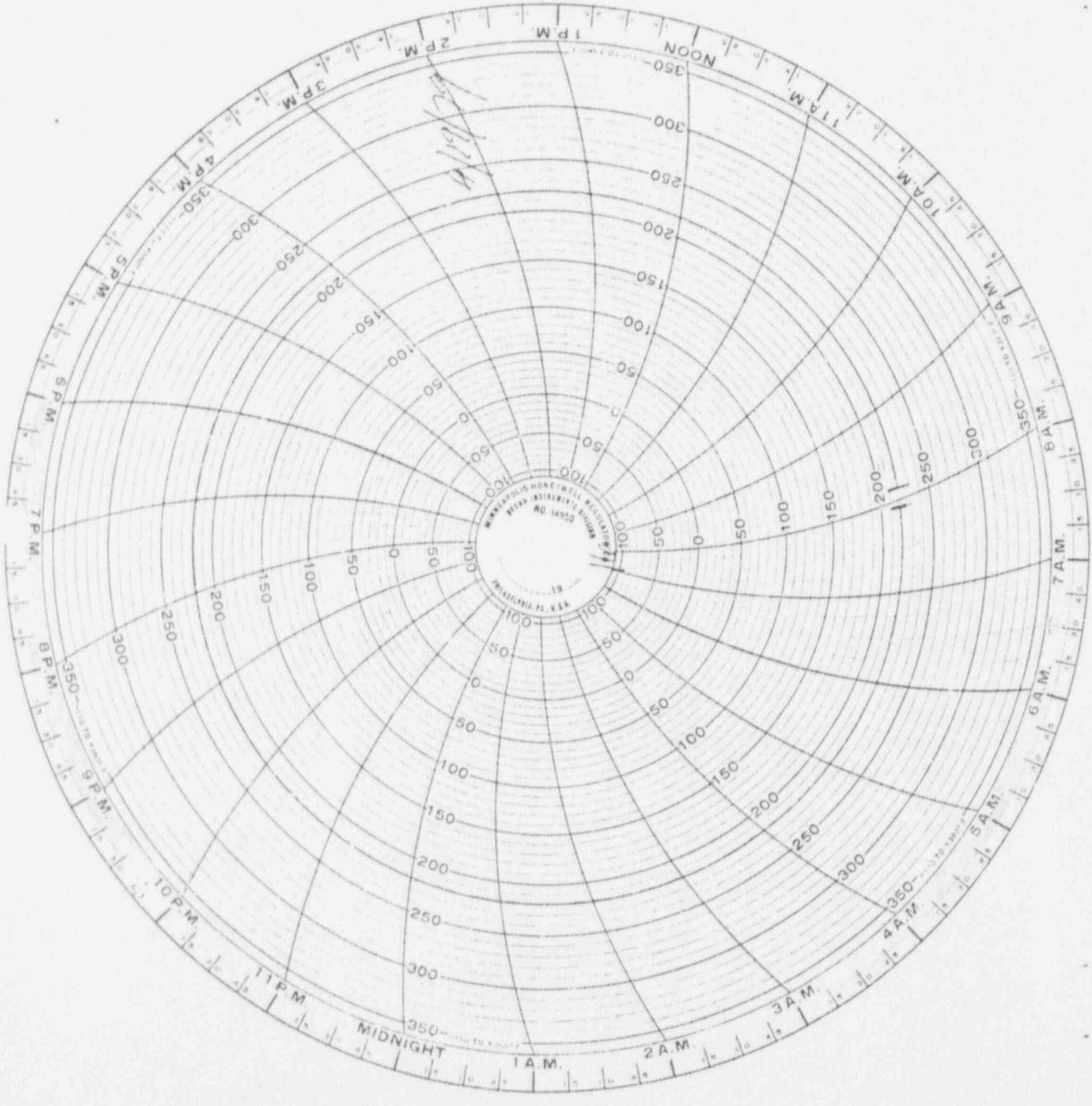
Air-Cell Chamber Temperature

4/17-19/79

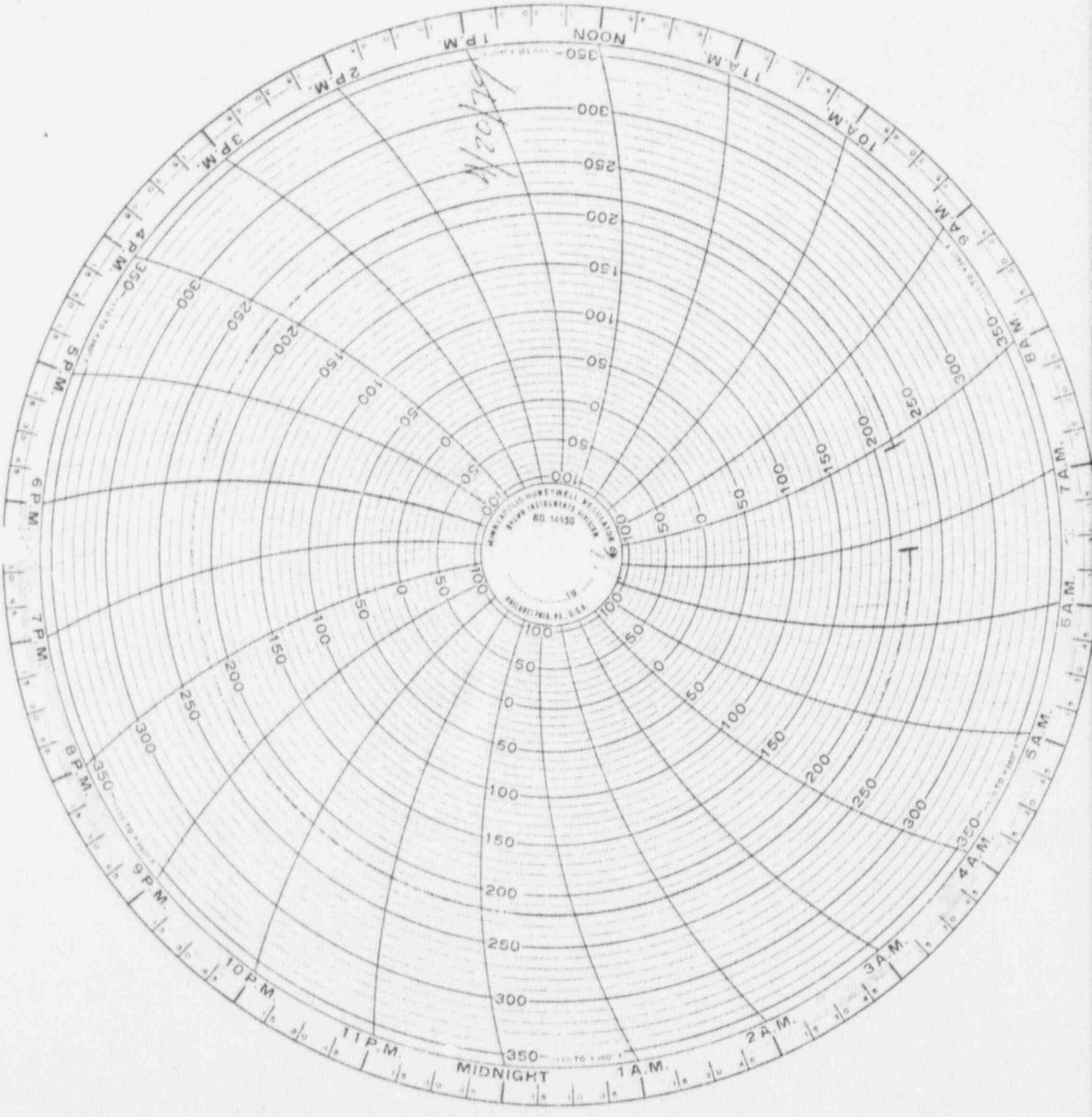


Air-Oven Chamber Temperature

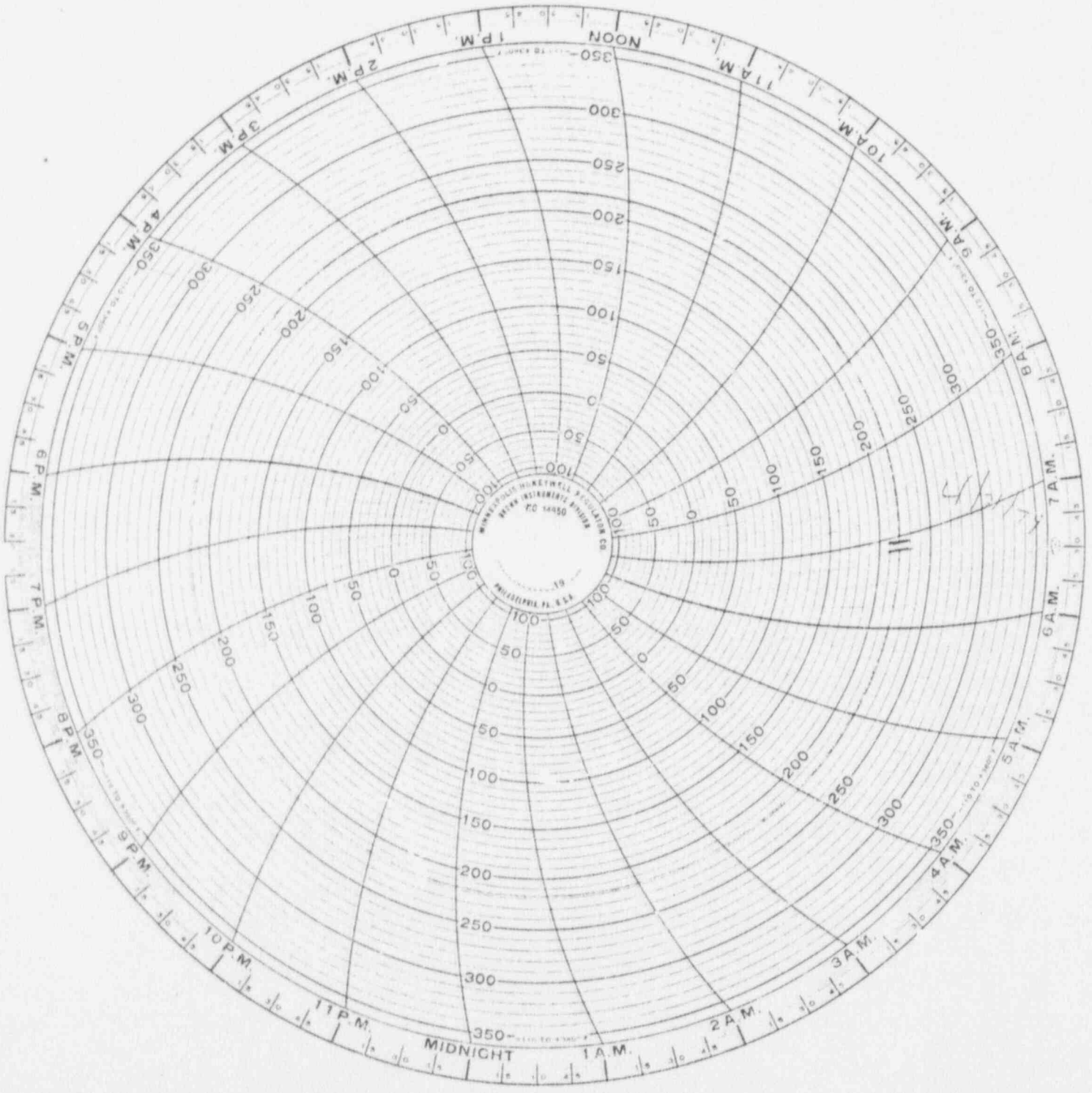
4/19 - 20/79



A/2 - OVEN CHAMBER TEMPERATURE
4/20-21/79

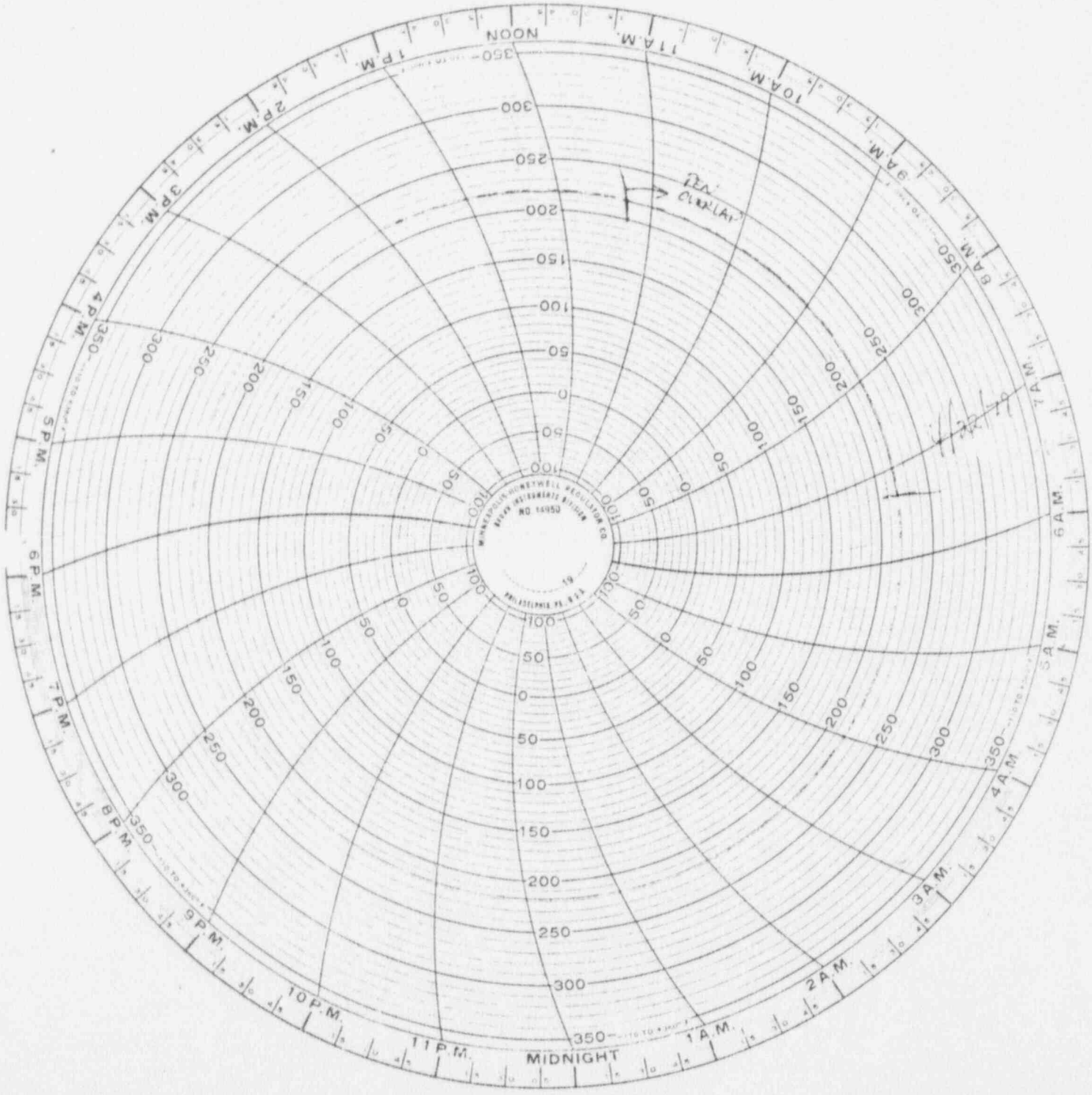


N2 - Oven Chamber Temperature
4/21-22/19



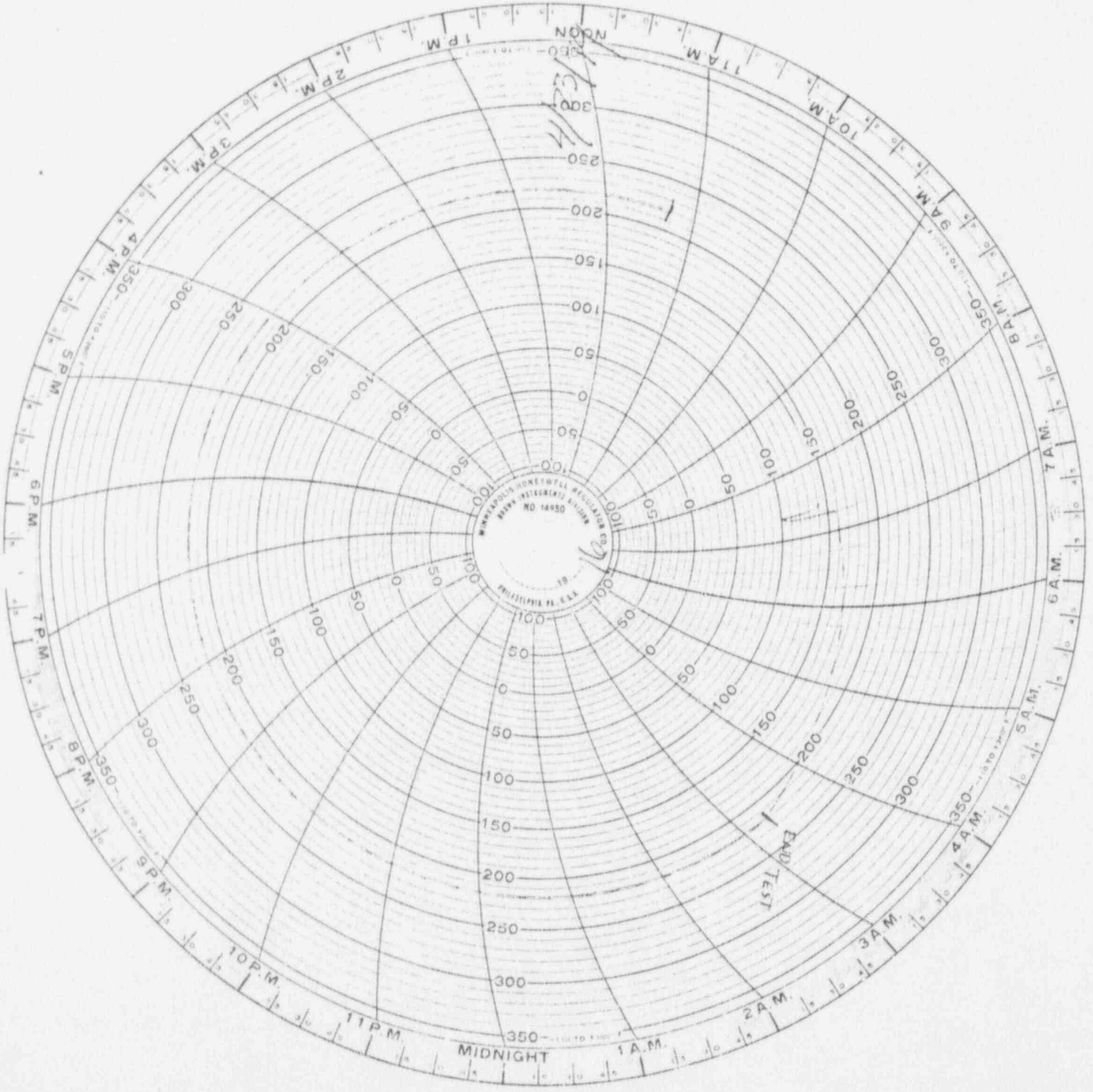
N_3 - OVEN CHAMBER TEMPERATURE

4/22-23/74



N2-OVEN CHAMBER TEMPERATURE

4/23-24/79



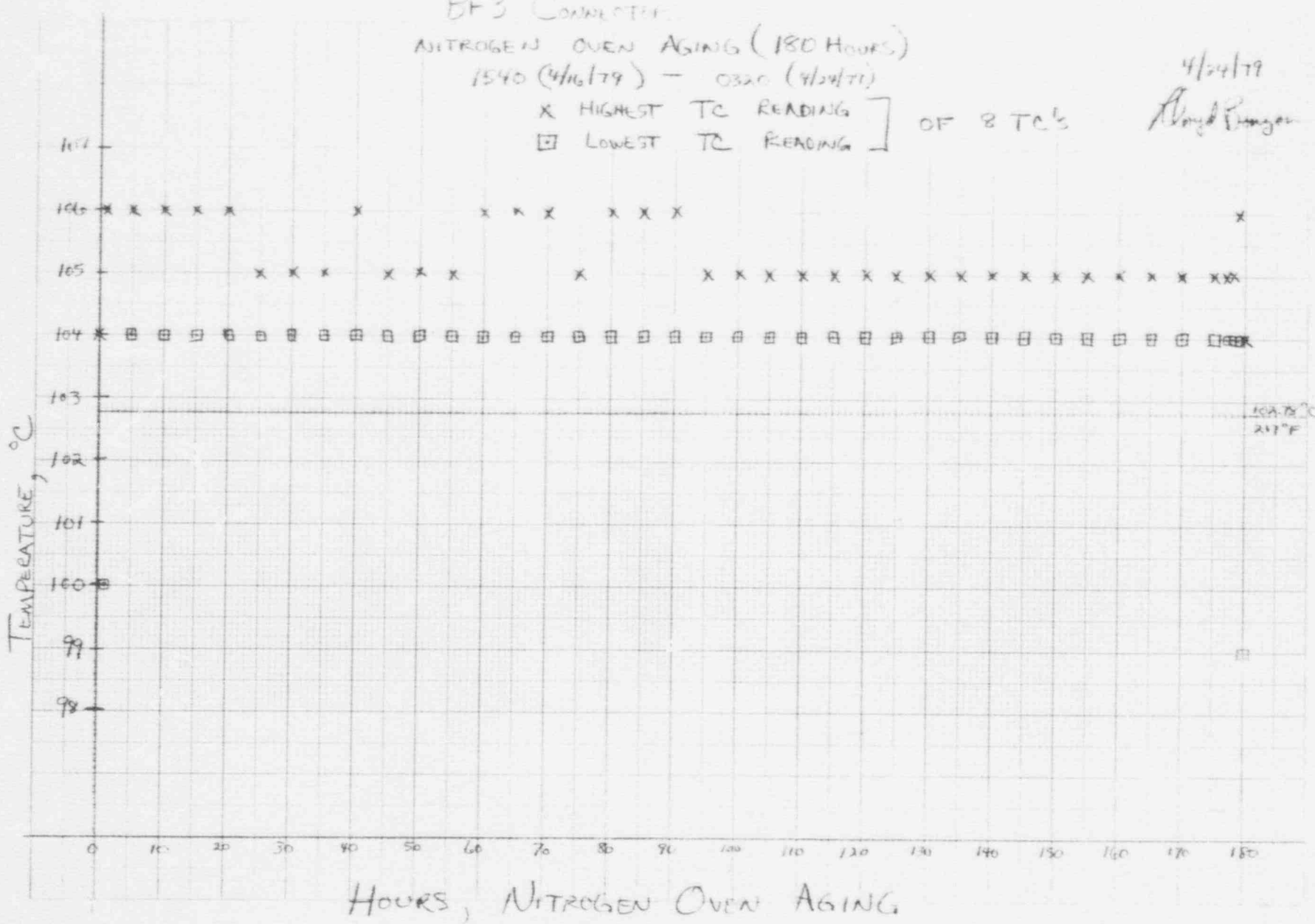
BF3 Connector

Nitrogen Oven Aging (180 Hours)

1540 (4/16/79) – 0320 (4/24/79)

× Highest TC Reading
⊡ Lowest TC Reading
] of 8 TC's

4/24/79
Lloyd Bunger



DATA SHEET

Project BT 3 CONNECTORS

Specimen ALL

Part No

Ident. NITROGEN FLOW/CONCENTRATION Start Date 4/24/79

THE USE OF NITROGEN DURING THERMAL AGING WAS RECORDED AS A CHECK ON FLOW THROUGH THE CHAMBER; FLOW RECORDING WAS FROM 1443 (4/16/79) TO 0745 (4/24/79):

BOTTLE ON	OFF	VALUE USED
1537	1737	200 ft³
285	54	231
297	32	265
276	13	256
275	63	212
281	15 (3 TANKS)	784
116	35 (3 TANKS)	234
		1997 ft³

FOR THE 187 HOURS OF N_2 FLOW, THE FLOW RATE IS ~ 10.7 ft³/HR OR 0.18 ft³/MIN.

Remarks DURING THE TEST THE C_2 ANALYZER INDICATED ~ 600-700 ppm C_2, AND WAS RELATIVELY INSENSITIVE TO TEMPERATURE.

Tested by Date

Witness Lloyd Benson Date 4/24/79

Sheet No. 1 of 1

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 4/16/74 Test Area Bldg 360 / Nac IIC

Technician F. Potts Project AFS Connectors Type Test Thermal Actual

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due	
1	Anemometer	Alnor	8506	1935	203445	10 - [illegible] Cfm				
2	Datalogger	Accufax	A901	1614	C-11405	-128° 128°C	± 1°C	3/8/74	9/8/74	
3	Digital Thermometer	Dric	D51CT	S/N 2233	S217937	-x°F - 40°F	± 1°F	10/30/73	10/2/74	Filt 24186
4	Platinum Probe			15152						
5	Over EC #16	(Comrad)	E1-27-3-3	7012	55:517	-10°F - 2x°F	Based on Digital Thermometer			

Instrument Test Engineer _____ Checked & Received by _____

Standards Laboratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87115

File No. 2418 C

DIGITAL THERMOMETER
Doris Scientific Corporation
Model DS100T, S/N 2233
Sensor S/N 15152

Submitted by: Division 1541

Certified: October 20, 1978
Expires: October 20, 1979

Test Results

Ref. Temp. °F	Readings °F
-90.22	-90.6
-49.76	-50.0
- 0.04	-00.3
50 09	49.8
99.93	99.7
150.53	150.2
199.94	199.7
250.23	250.0
300.27	300.0
349.93	349.7
399.99	399.8

Uncertainties in the reference temperature are estimated not to exceed ±0.02° F.

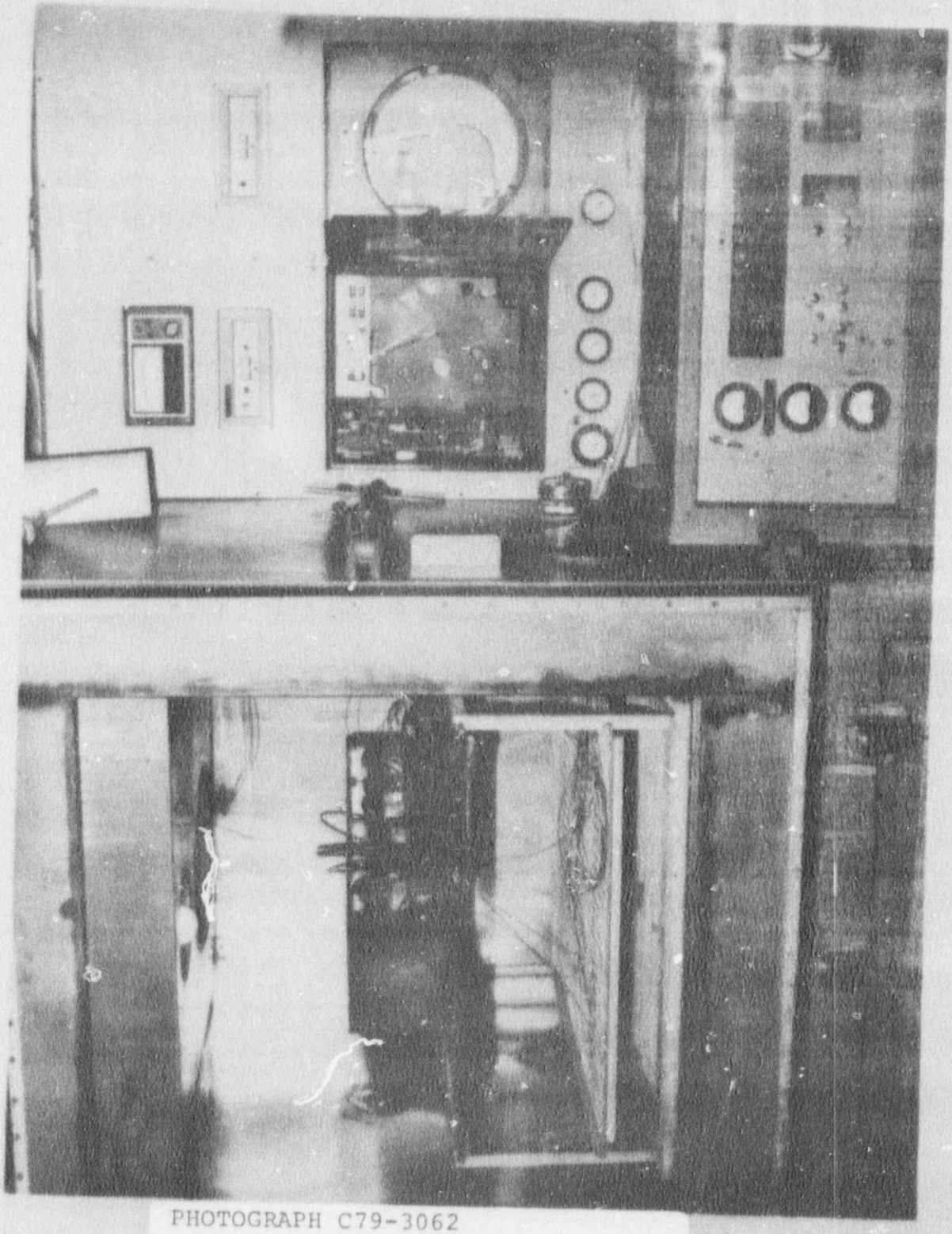
It is estimated that this instrument may be relied upon to within ±1.0°F.

Technical Consultant: G. Gleicher - 2551

Original Signed By
R B FOSTER, JR

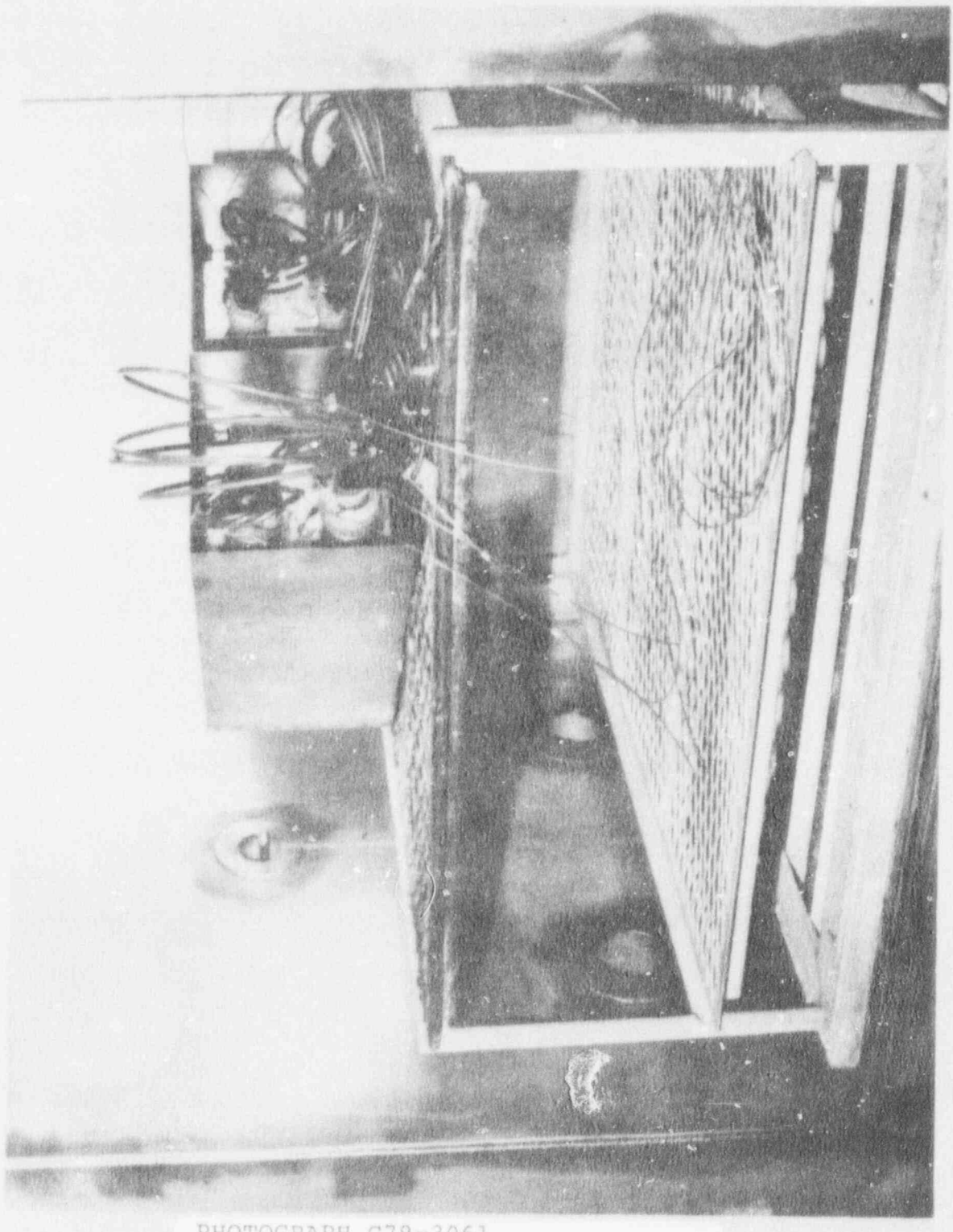
GG:2551:omb Certified by: R. B. Foster - 2551

Copy to:
1541 Organization (2)
2551 File (2)



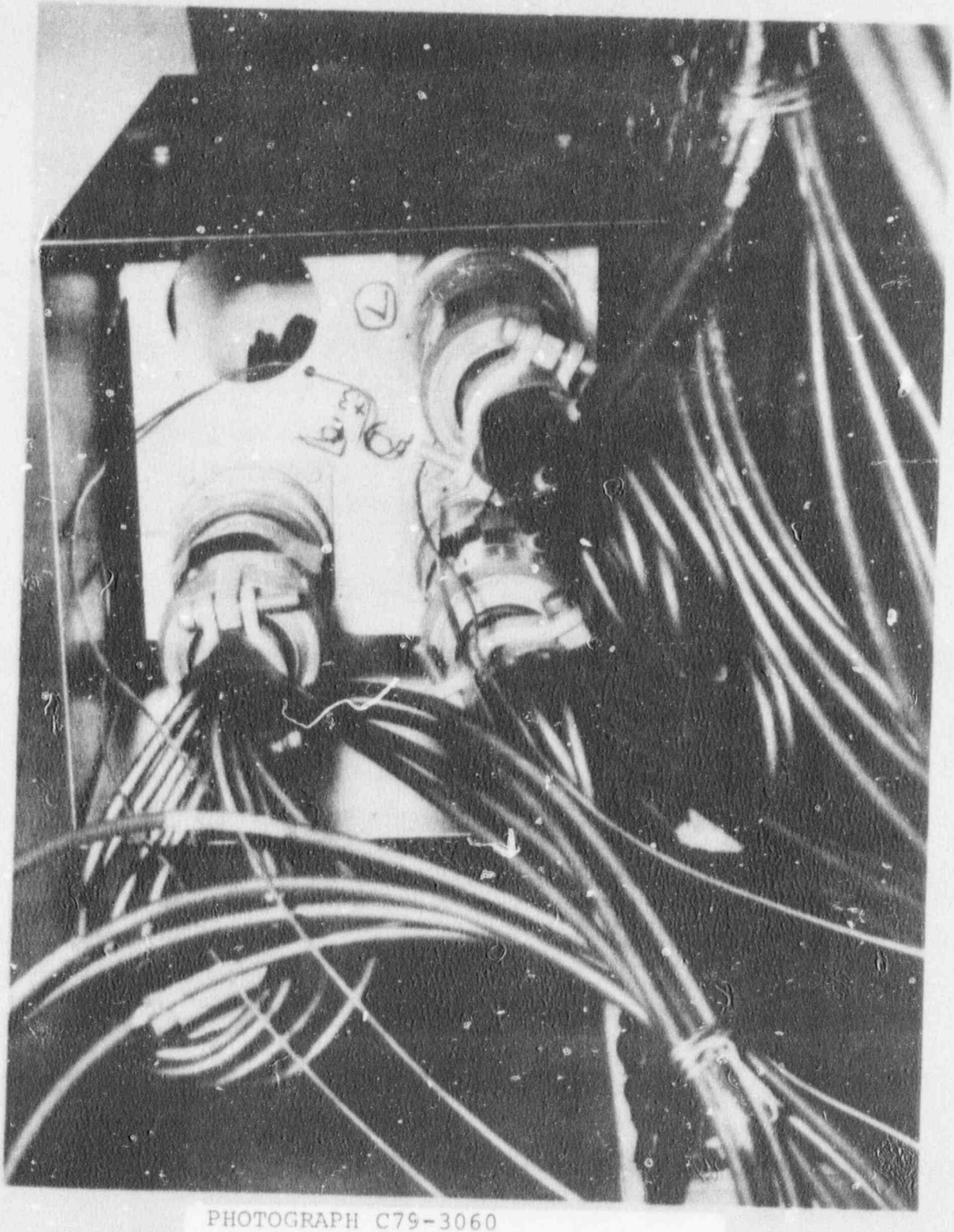
PHOTOGRAPH C79-3062

OVEN AND ASSOCIATED CONTROLLER
WITH CONNECTOR BOXES IN-PLACE
IN THE OVEN



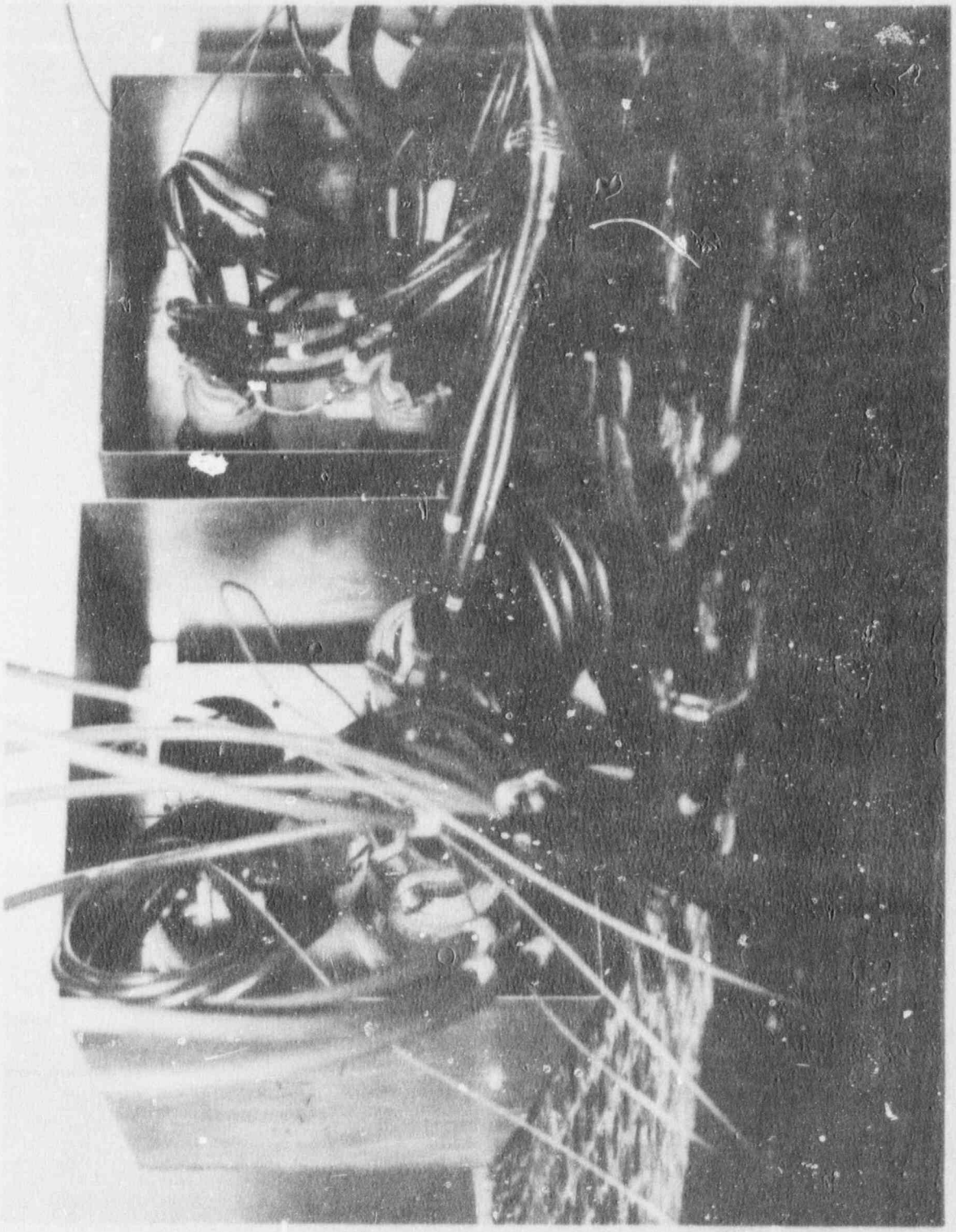
PHOTOGRAPH C79-3061

CONNECTOR BOXES IN TEMPERATURE AGING CHAMBER



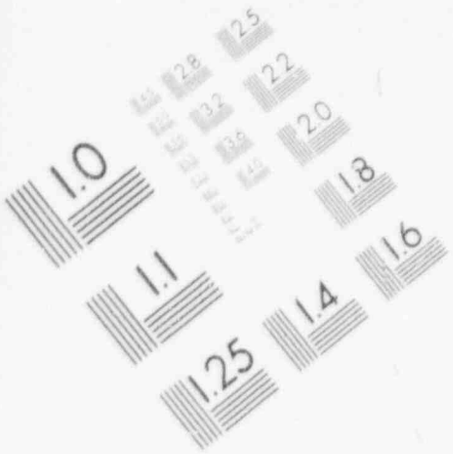
PHOTOGRAPH C79-3060

480-VAC CONNECTORS;
ITEMS 7, 8, 9



PHOTOGRAPH C79-3059

CONNECTOR BOXES IN TEMPERATURE
AGING CHAMBER



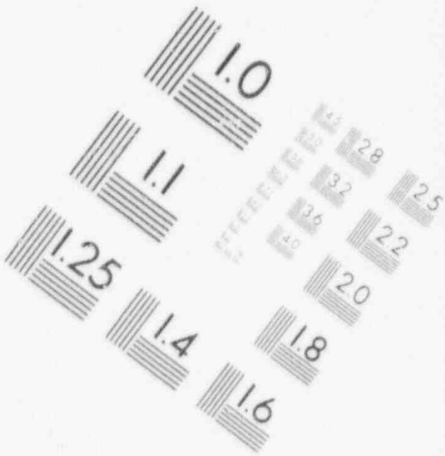
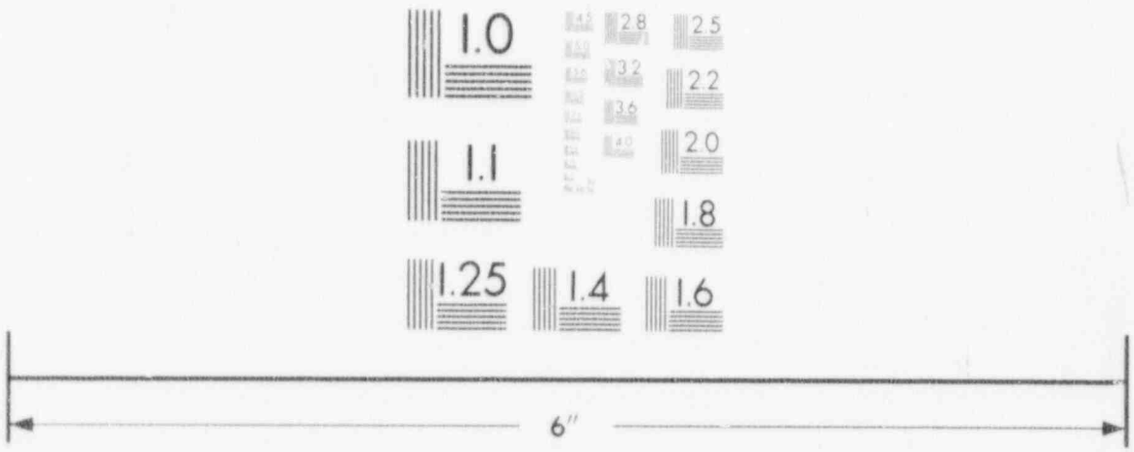
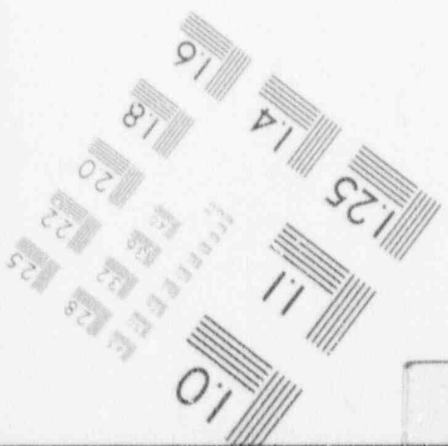
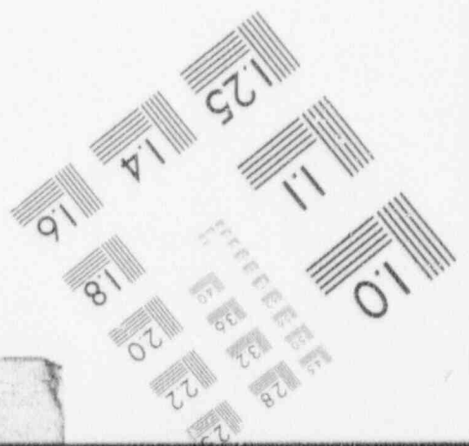


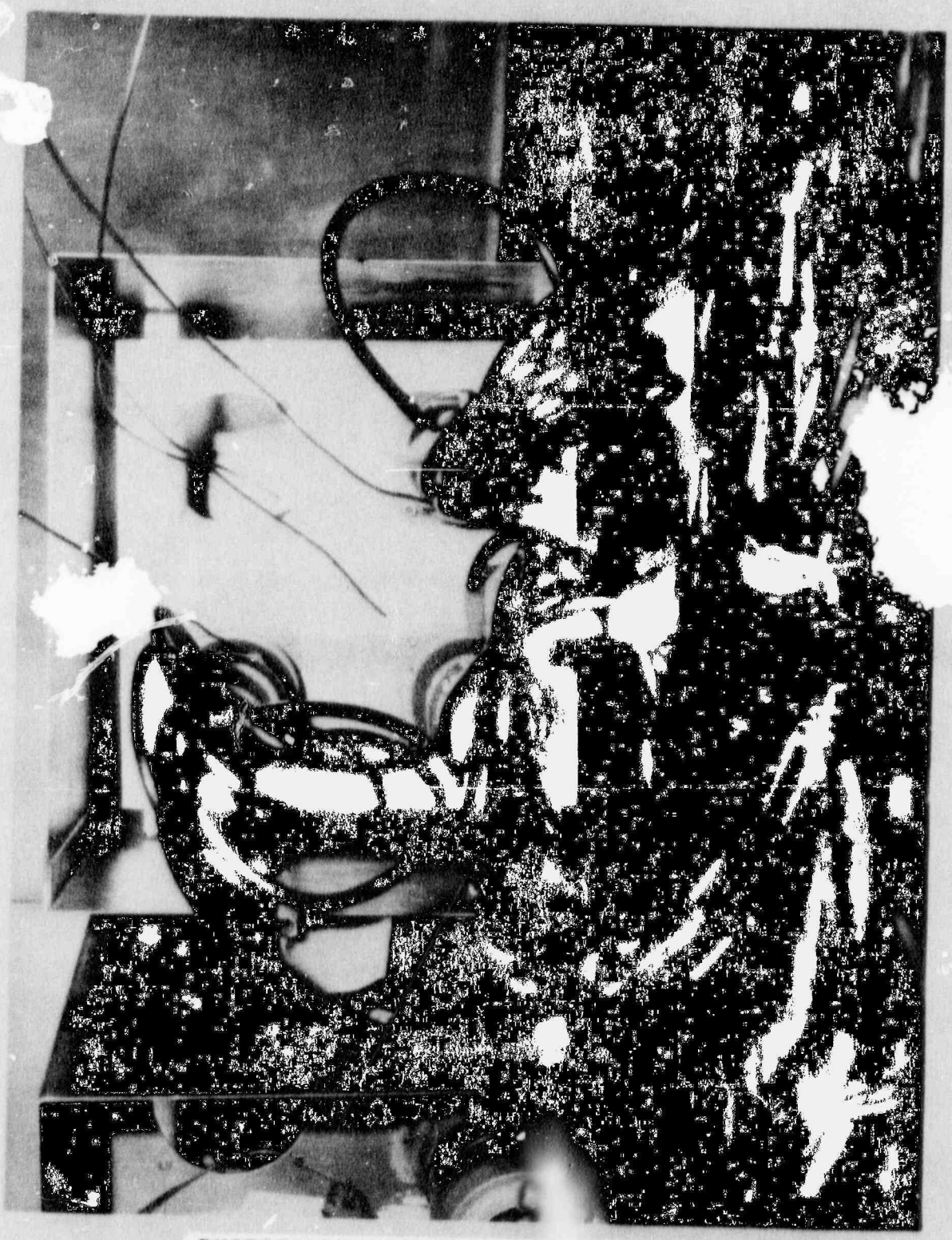
IMAGE EVALUATION
TEST TARGET (MT-3)



MICROCOPY RESOLUTION TEST CHART

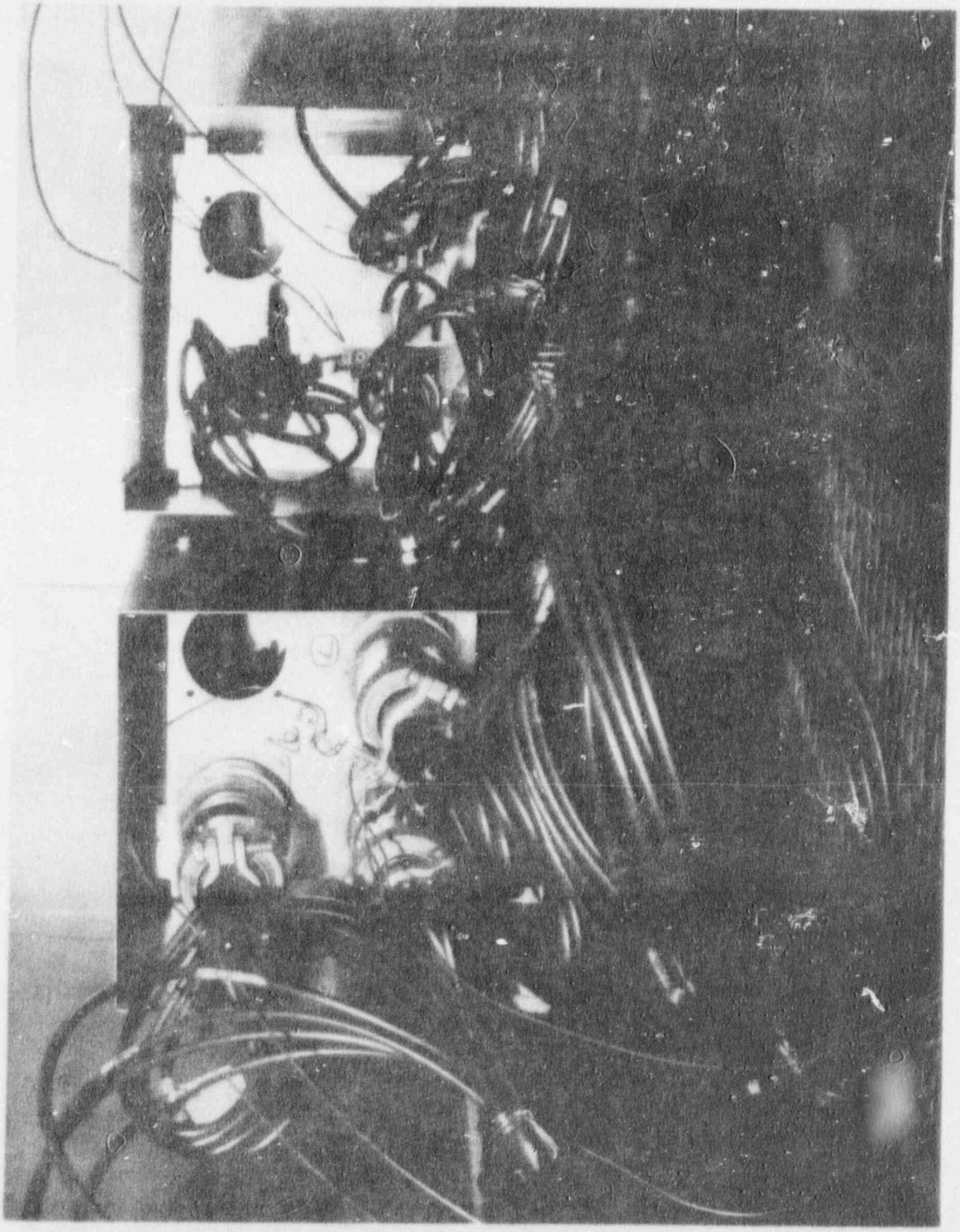






PHOTOGRAPH C79-3058

250-VDC CONNECTORS:
ITEMS 1, 2, 3



PHOTOGRAPH C79-3057

CONNECTOR BOXES IN TEMPERATURE AGING CHAMBER

SECTION VII

POST-AGING FUNCTIONAL/MECHANICAL TESTS

Post-Temperature Aging Functional/Mechanical Tests Procedures

After the electrical connectors have been aged, each item will be subjected to insulation resistance, voltage, load, and dimensional tests. The test procedures outlined in the previous two applicable (Baseline) sections will be followed here as well, except (1) that the electrical loads are held constant and the operating current/voltage is recorded and (2) that the insulation resistance measurement will also be made with a volt-ohmmeter.

DATA SHEET

Project DFT3 CONNECTORS

Specimen ALL

Part No

Ident. POST-THERMAL AGING FUNCTIONAL IR Start Date 4/24/79

PINS (25C & DC CONNECTORS)

ITEM	K TO CASE	Λ TO CASE	K TO Λ
1	1.7×10^{9} Ω	1.4×10^{9} Ω	1.25×10^{9} Ω
2	1.6×10^{9} Ω	1.5×10^{9} Ω	1.25×10^{9} Ω
3	1.25×10^{9} Ω	1.25×10^{9} Ω	600×10^{5} Ω

PINS (48C VAC CONNECTORS)

ITEM	℄ TO CASE	IC TO CASE	℄ TO IC
7	4.5×10^{5} Ω	5×10^{5} Ω	3×10^{5} Ω
8	5×10^{5} Ω	6.25×10^{5} Ω	2.75×10^{5} Ω
℄	5×10^{5} Ω	5×10^{5} Ω	2.5×10^{5} Ω

Remarks AFTER THERMAL AGING, "1" WAS TIGHT; 2, 3, 7, 8, 4 WERE TIGHTENED 1/16 - 1/8 TURN EACH.

Tested by [signature] Date 4/24/79

Witness Lloyd Berger Date 4/24/79

Sheet No. 1 of 3

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 250 V DC

Part No 1, 2, 3

Ident. POST-THERMAL AGING FUNCTIONAL LOAD/VOLTAGE Start Date 4/24/79

ITEM	INIT VOLTAGE	LOAD RESISTANCE	LOAD VOLTAGE	INIT CURRENT
1	250 VDC	247Ω (COLD)	250 VDC	1.013A
2	250 VDC	246Ω (COLD)	251 VDC	1.012A
3	250 VDC	244Ω (COLD)	251 VDC	1.024A

Remarks

Tested by [signature] Date 4/24/79

Witness [signature] Date 4/24/79

Sheet No. 2 of 3

Approved

DATA SHEET

Project BFJ CONNECTORS

Specimen 450 VAC

Part No 7, 8, 9

Ident. POST-THERMAL AGING FUNCTIONAL LOAD/VOLTAGE Start Date 4/24/19

ITEM	INPUT VOLTAGE	LOAD (DC) RESISTANCE	LOAD VOLTAGE	INPUT CURRENT
7	458 VAC	25.6 Ω (COLD)	43 VAC	17.4 A
8	454 VAC	25.6 Ω (COLD)	455 VAC	17.3 A
9	451 VAC	25.6 Ω (COLD)	455 VAC	17.3 A

Remarks

Tested by [illegible] Date [illegible]

Witness [illegible] Date 4/24/19

Sheet No. 3 of 3

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 4/24/79 Test Area BLDG. 356

Technician D. DUGAN Project BT3 CONNECTORS Type Test POST-THERMAL FUNCTIONAL

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	MEGOHMETER	AMERICAN HV TEST SYSTEMS	PM 25CE	5-17-113	R1422	[illegible]	±4% F.S.	3/15/79	4/14/79
2	DIGITAL MULTIMETER	FLUKE	8100A	3318	21343	[illegible]	[illegible]	3/2/79	4/2/79
3	POWER ANALYZER	ANALYTEK	461C	3561	15055	[illegible]	±[illegible]	3/1/79	4/1/79
4	POWER SUPPLY	HEWLETT PACKARD	6115A	—	23767	[illegible]	NOT APPLICABLE		

Instrument Test Engineer _____ Checked & Received by _____

VII-6-11A

DATA SHEET

Project BF3 CONNECTORS

Specimen 250 VDC

Part No 1

Ident. RST - THERMAL AGING DIMENSIONAL Start Date 4/24/79

NEOPRENE INSULATOR		DUROMETER		WIRE A	
PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
A	0.054"	I	91	1	0.181"
K	0.080"	II	93	2	0.155"
M	0.078"	III	91	3	0.180"
E	0.105"				

NEOPRENE INSULATOR WAS SLIGHTLY ABOVE THE END OF THE CONNECTOR PLUG BARREL. UNDULATING SURFACE

BARREL DIAMETER: 1.507 - 1.513"

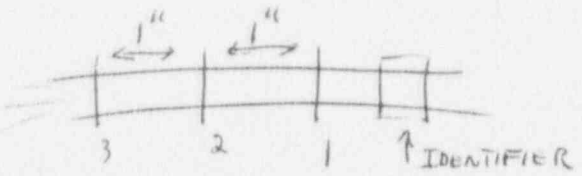
Remarks

Tested by [signature] Date 4/30/79

Witness Lloyd Bowyer Date 4/24/79

Sheet No. 1 of 7

Approved



DATA SHEET

Project PTS CONNECTORS

Specimen 25 VDC

Part No 2

Ident. 1551 THERMAL AGING DIMENSIONAL Start Date 4/24/79

NEOPRENE INSULATOR		DIAMETER		WIRE A	
PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
A	C.166"	I	71	1	C.153"
K	C.153"	II	72	2	C.151"
M	C.115"	III	59	3	C.153"
E	C.051"				

NEOPRENE INSULATOR WAS SLIGHTLY ABOVE TILE END OF THE CONNECTOR PLUG BARREL, UNDULATING SURFACE.

BARREL DIAMETER: 1.510 - 1.512"

Remarks

Tested by [signature] Date 4/24/79

Witness Lloyd Burgess Date 4/24/79

Sheet No. 2 of 7

Approved

DATA SHEET

Project PT3 CONNECTORS

Specimen 250 VDC

Part No 3

Ident. EST - THERMAL AGING DIMENSIONAL Start Date 4/24/74

NEOPRENE INDICATOR DUROMETER WIRE A

PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
A	C.056"	I	76	1	C.156"
K	C.051"	II	73	2	C.154"
M	C.085"	III	53	3	C.153"
E	C.105"				

NEOPRENE INDICATOR WAS SLIGHTLY ABOVE THE END OF THE CONNECTOR PLUG BARREL, UNDULATING SURFACE.

BARREL DIAMETER: 1.505 - 1.512"

Remarks

Tested by [signature] Date 4/24/74

Witness Lloyd Bonzo Date 4/24/74

Sheet No. 3 of 7

Approved

DATA SHEET

Project DF3 CONNECTORS

Specimen 4a VAC

Part No 7

Ident. POST-THERMAL AGING. DIMENSIONAL Start Date 4/24/74

NEOPRENE INSULATOR		DUROMETER		WIRE 14	
DIA	DEPTH	LOCATION	VALUE	LOCATION	CD
1	0.071"	III	87	1	0.207"
14	0.051"	V	84	2	0.207"
6	0.054"	II	80	3	0.207"

NEOPRENE INSULATOR WAS BELOW THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER: 1.968 - 1.970"

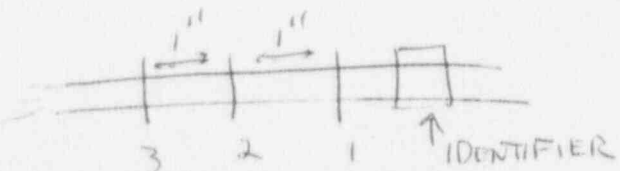
Remarks

Tested by [signature] Date 4/24/74

Witness Lloyd Duncan Date 4/24/74

Sheet No. 4 of 7

Approved



DATA SHEET

Project BF3 CONNECTORS

Specimen 450 VAC

Part No 8

Ident. POST - THERMAL AGING DIMENSIONAL Start Date 4/24/79

NEOPRENE INSULATOR DIAMETER WIRE 14

PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
1	C.C51"	IV	85	1	C.207"
14	C.C12"	V	86	2	C.207"
6	C.C98"	VI	53	3	C.207"

NEOPRENE INSULATOR WAS BELOW THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER: 1.765"

Remarks

Tested by [signature] Date 4/24/79

Witness [signature] Date 4/24/79

Sheet No. 5 of 7

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 451 LAC

Part No 9

Ident. TEST - THERMAL AGING DIMENSIONAL Start Date 4/24/79

NEOPRENE INSULATOR DIAMETER WIRE 14

PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
1	C.040"	IE	53	1	C.165"
14	C.079"	I'	56	2	C.210"
6	C.105"	IT	55	3	C.207"

NEOPRENE INSULATOR WAS BELOW THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER: 1.465"

Remarks

Tested by [signature] Date 4/24/79

Witness Lloyd Bongen Date 4/24/79

Sheet No. 6 of 7

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident. [illegible] - THERMAL MATING DIMENSION Start Date 4/24/79

CONNECTOR	DISTANCE TIP OF RING TO MATING FLAT
7	1.223"
8	1.205"
9	1.226"
1	1.166"
2	1.167"
3	1.166"

Remarks USED AS CHECK OF FUTURE TIGHTNESS.

Tested by [signature] Date 4/24/79

Witness Lloyd Denzer Date 4/24/79

Sheet No. 7 of 7

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 4/24/79 Test Area BLDG. 5NC6

Technician D. DeGA Project IT 3 CONNECTORS Type Test POST-THERMAL DIMENSIONAL

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	SHORE TYPE A2	SHORE INSTRUMENT & MFG CO.	TYPE A2	—	IGT3	0-100	NOT APPLICABLE		
2	CALIPERS	BROWN & SHARPE	571	—	—	0-6"/.001	±.001	NOT APPLICABLE	

Instrument Test Engineer _____ Checked & Received by _____

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident. PRE-LOCA BASELINE FUNCTIONAL IR (WITH MULTIMETER)

Start Date 6/26/79

PINS (28 VDC CONNECTORS)

ITEM	K TO CASE	N TO CASE	K TO N
1	>100 MΩ	>100 MΩ	>100 MΩ
2	>100 MΩ	>100 MΩ	>100 MΩ
3	>100 MΩ	>100 MΩ	>100 MΩ

PINS (450 VAC CONNECTORS)

ITEM	9 TO CASE	10 TO CASE	9 TO 10
7	>100 MΩ	>100 MΩ	>100 MΩ
8	>100 MΩ	>100 MΩ	>100 MΩ
9	>100 MΩ	>100 MΩ	>100 MΩ

Remarks

Tested by [signature] Date 6/26/79

Witness [signature] Date 6/26/79

Sheet No. 1 of 1

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 6/26/79 Test Area T42/Rm5

Technician D. DUGAN Project BT3 CONNECTORS Type Test PRE-LOCA IR WITH MULTIMETER

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	MULTIMETER	KEITHLEY	160	36735	22224	0-100MΩ	±1% + 0.1% RANGE	6/6/79	12/6/79

Instrument Test Engineer _____ Checked & Received by _____

Sandia Laboratories

Standards Laboratory Certificate

DIGITAL MULTIMETER
Keithley
Model No. 160
Serial No. 86735
Property No. 222224

Submitted by: Organization 4442

Certified: June 6, 1979
Expires: December 6, 1979

This instrument was tested on the 1, 10 and 100 megohm ranges only and was found to be within the following limits of error:

1 meg range	± (0.3% of reading + 0.1% of range)
10 meg range	± (2.0% of reading + 0.1% of range)
100 meg range	± (10.0% of reading + 0.1% of range)

Metrologist: C. F. McFall, 2553

Certified by: C. F. McFall, 2553

CFM:2553:bh

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident. PRE-ACCIDENT TEST. COLD RESISTANCE LOADS Start Date 9/21/79

ITEM	SIZE CONNECTOR	DC COLD-LOAD RESISTANCE
1	25C VDC	242.6Ω
2	25C	252.6Ω
3	25C	250.5Ω
7	45C VAC	25.8Ω
5	45C	25.7Ω
6	45C	25.8Ω

Remarks

Tested by [signature] Date 9-21-79

Witness R. Bruyere Date 9/21/79

Sheet No. 1 of 1

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 9/21/79 Test Area GIF, TA-V

Technician D. DeGan Project BT3 Connectors Type Test PRE-ACCIDENT COLD RESISTANCE LOADS

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	MULTIMETER	JOHN FLUKE	8JCA	3318	213CB	0-10MΩ 0.1-1000VDC	±0.1% + 20 DIGITS ±0.05% + 1 DIGIT	9/1/79	3/1/80

Instrument Test Engineer _____ Checked & Received by _____

Sandia Laboratories

Albuquerque, New Mexico 87115

Standards Laboratory Certificate

DIGITAL MULTIMETER E3
JOHN FLUKE
MODEL NO. 8100A
SERIAL NO.3318
PROPERTY NO. 213043

SUBMITTED BY 4442

CERTIFIED 1 SEP 1979
EXPIRES 1 MAR 1980

THIS MULTIMETER WAS TESTED AT SELECTED CHECKPOINTS ON ALL RANGES AND WAS FOUND BE WITHIN THE FOLLOWING MANUFACTURERS ACCURACY CLAIMS.

DC	+/-(0.05% OF READING + 1 DIGIT) 0.1 VOLT TO 1000 VOLTS
RESISTANCE	+/-(0.1% OF READING + 2 DIGITS) 10 OHMS TO 10 MEGOHMS
AC	+/-(0.2% OF READING + 5 DIGITS) 50 HZ TO 10 KHZ +/-(0.5% OF READING + 10 DIGITS) FOR 20 KHZ

METROLOGIST, R. E. PEDERSEN -2553

CERTIFIED BY G. F. MCIALL -2553

DATA SHEET

Project BF3 CONNECTORS

Specimen 2, 8, 9, (480 VAC)

Part No 480 VAC

Ident. SECONDARY CHECK OF PANEL METERS Start Date 9/21/79

LOAD	TIME (MIN)	MAGTROL (250485) VOLT (AC)	AMPS	PANEL METERS (AMPS) LINE	LOAD
#7	0	478	17.6	17.8	17.5
#7	1	477	17.3	17.8	17.6
#7	2	478	17.3	17.8	17.6
#7	3	478	17.3	17.8	17.6
#8	0	477	18.2	17.6	17.4
#8	1	477	17.2	17.3	17.1
#8	2	478	17.1	17.2	17.0
#8	3	478	17.1	17.2	17.0
#4	0	483	18.3	17.3	18.0
#4	1	484	17.1	17.0	17.8
#4	2	484	17.0	17.0	17.7
#4	3	483	16.9	17.0	17.6

Remarks DEAD SHORT REPLACING CONNECTOR ASSEMBLY

Tested by [signature] Date 9-21-79

Witness W. H. Lowdermilk Date 9-21-79

Sheet No. 1 of 1

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 9/21/79 Test Area GIF, TA-V

Technician D. DUGAN Project BF3 COUNTERS Type Test SECONDARY CHECK OF PANEL METERS (48 VAC)

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	POWER ANALYZER	WESTRCL	4610	8C67	25585	C-5A C-600V	±.5%±1DIGIT	9/12/79	3/12/80

Instrument Test Engineer _____ Checked & Received by _____

Standards Laboratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87185

ANALYZER POWER
Magtrol
Model No. 4610
Serial No. 8C67
Property No. 25098

Submitted by: Organization 4442

Certified: September 12, 1979
Expires: March 12, 1980

This instrument was tested and adjusted to meet the following accuracy specification:

± 0.5% + 1 digit on all ranges and functions

Metrologist: W. W. Rowe, 2553

Certified by: G. F. McFall, 2553

WWR:2553:bh

DATA SHEET

Project BF3 CONNECTORS

Specimen 1, 2, 3 (250 VDC)

Part No 250 VDC

Ident. SECONDARY CHECK OF PANEL METERS Start Date 9/25/79

LOAD	TIME (MIN)	MAGTROL (ACROSS) VDC	MAGTROL (ACROSS) AMPS	DC SUPPLY VOLTS	DC SUPPLY CURRENT	PANEL METER LINE	PANEL METER LOAD	DATA LOGGER (CH 4 & 5) VOLTS	DATA LOGGER (CH 4 & 5) CURRENT
1	0	251	1.044	242	1.0	1.1	>1	249	1.047
1	2	251	.990	242	.95	1.05	1.0	249	.999
1	4	251	.986	242	.45	1.05	1.0	249	.996
2	0	252	1.006	258	1.02	1.0	1.0	250	1.01
2	2	252	.994	258	1.02	1.0	1.0	250	1.005
2	4	252	.992	259	1.01	1.0	1.0	250	1.002
3	0	251	.987	253	.975	.975	.98	249	.998
3	2	252	.984	252	.975	.975	.98	249	.994
3	4	251	1.006	253	1.0	1.0	1.0	249	1.01

Remarks

Tested by [signature] Date 9-24-79

Witness [signature] Date 9-24-79

Sheet No. 1 of 1

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 9/25/79 Test Area GIF, TA-V

Technician D. DUGAN Project BF3 CONNECTORS Type Test SECONDARY CHECK OF PANEL/LOGGER METERS (250VDC)

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1.	POWER ANALYZER	MAGTROL	4610	5167	25C985	0-5A 0-600V	±.5%+1 DIGIT	4/12/79	3/12/79
2.	DATALOGGER	ACUREX	A401	1694	011405	(VOLTAGE)	±0.05% FULL SCALE ±0.05% READING	9/4/79	3/14/79

Instrument Test Engineer _____ Checked & Received by _____

Standards Laboratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87185

DATALOGGER
Acurex
Model No. A901
Serial No. 1694
Property No. 011409

Submitted by: Organization 4442

Certified: September 14, 1979
Expires: March 14, 1980

This instrument was adjusted according to manufacturer's calibration procedure and was found to be within these specifications:

Voltage Measurements: ± 0.005% of full scale ± 0.005% of reading after one hour warmup

Metrologist: H. H. Pike, 2553

Certified by: G. F. McFall, 2553

HHP:2553:hh

Conditions of Certification. Neither Sandia Laboratories nor the Government assumes any responsibility with respect to the use of this document, the information contained therein, or the physical device or instrument certified, by any person other than the individual to whom it is issued. Any such use will be at the sole risk and responsibility of such other user.

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SECTION VIII

ACCIDENT TEST

Accident Test Procedure

All test items will be subject to an accident profile approximating the specified time, temperature, pressure conditions displayed in Figure 5 (A, B and C). The 250-VDC connector assemblies will be energized throughout the entire test. The 480-VAC connector assemblies will be energized only during the first 5 minutes, between minutes 15 and 18, and between minutes 57 and 60. (The energizing schedule is construed to imply that the connector assemblies are energized prior to introduction of the steam environment.)

The major features of the originally specified profile are:

-- ramp to chamber conditions of 325°F (163°C), 55 psig, in approximately 2 minutes.

-- maintain stabilized conditions for 5 minutes.

-- at 7 minutes, reduce pressure to psig while holding temperature at 325°F (163°C).

-- between minutes 7 and 30 reduce temperature to 304°F (151°C), while holding pressure at 30 psig.

-- between minutes 30 and 75, reduce temperature to 283°F (139°C) and pressure to 20 psig.

-- at 75 minutes, reduce temperature to 230°F (110°C) while holding pressure at 20 psig.

-- reduce pressure and temperature at an average rate of 3.5°F/hour for 24 hours or until a chamber condition of 150°F (65°C) is attained.

Prior to tests of the connector assemblies, numerous pre-tests to determine capabilities of the autoclave system will be made. The best approximation to the specified profiles will be achieved and the data overplotted against the specified profiles. This best effort profile will be forwarded to NRC staff for review/concurrence before proceeding with the connector assemblies tests. Results and observations will be recorded on data sheets and supplemented with other pertinent documentation. To assure adequate repetition during the actual connector assemblies tests, the final procedures are to be documented as they evolve during the pre-test phase.

The actual adjustments of the pressure and temperature of the test chamber are to be accomplished by manually manipulating the superheater controls and pressure regulators in a systemmatic way.

FIGURE 5A

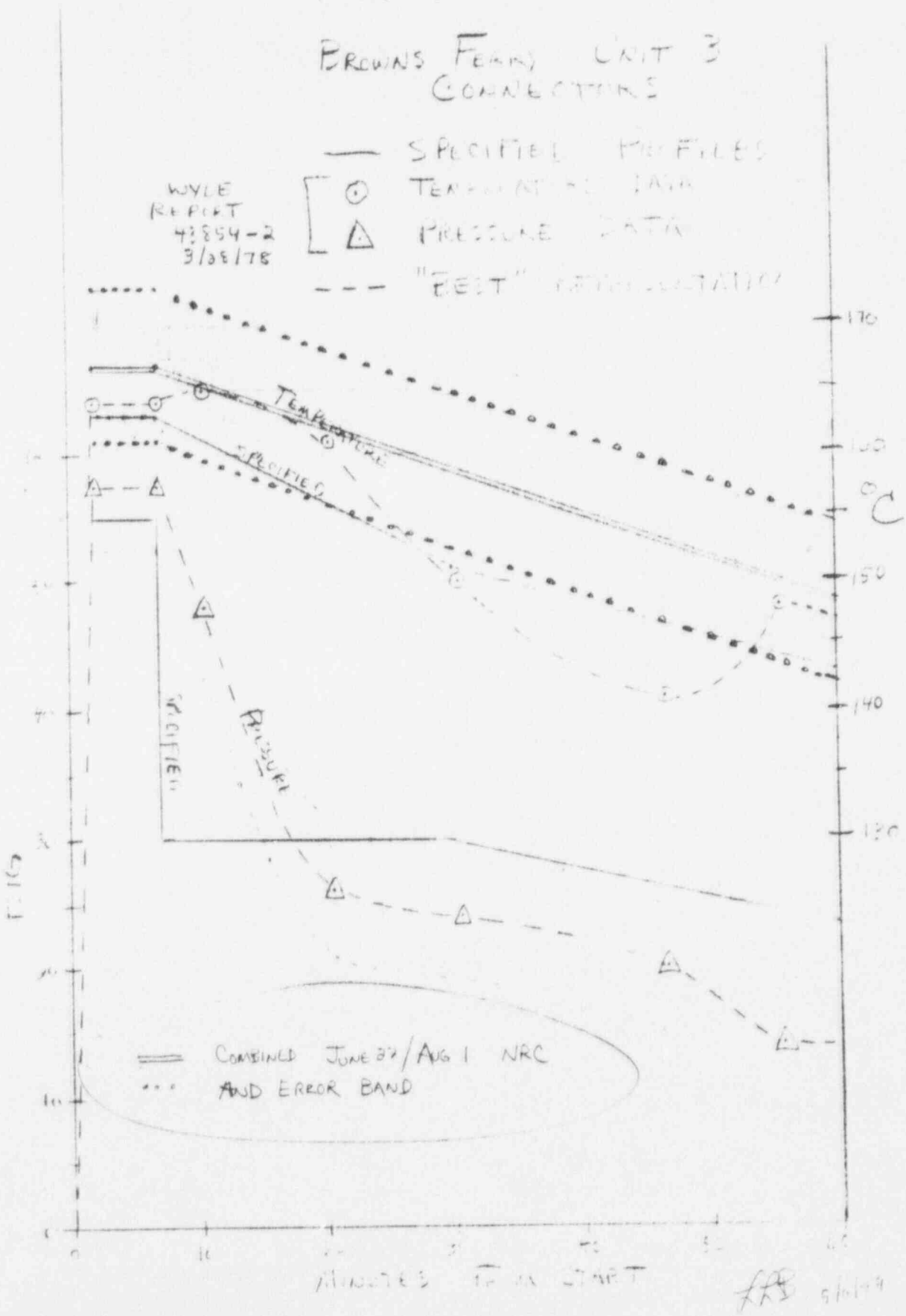

BROWNS FERRY UNIT 3
CONNECTIONS
SPECIFIED PROFILES
WYLE REPORT 47854-2 3/28/78
PRESSURE DATA
"BEST" ESTIMATE
TEMPERATURE
SPECIFIED
PRESSURE
SPECIFIED
COMBINED JUNE 3rd / AUG 1 NRC AND ERROR BAND
MINUTES FROM START
°C
170
150
140
130

FIGURE 5.8

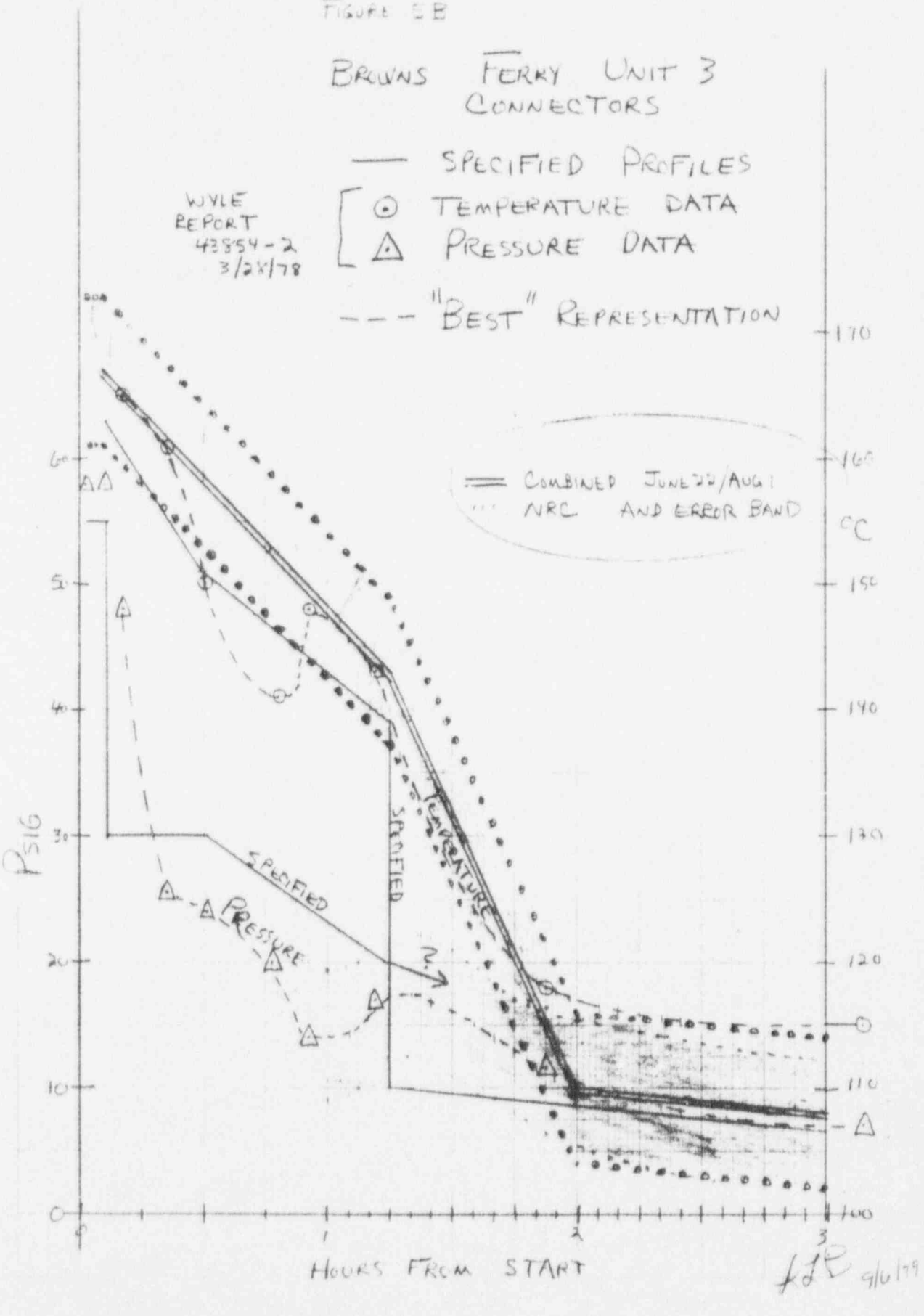

BROWNS FERRY UNIT 3
CONNECTORS
SPECIFIED PROFILES
TEMPERATURE DATA
PRESSURE DATA
"BEST" REPRESENTATION
WYLE REPORT 43854-2 3/28/78
COMBINED JUNE 22/AUG 1
NRC AND ERROR BAND
PSIG
°C
HOURS FROM START
SPECIFIED TEMPERATURE
SPECIFIED PRESSURE
N2
9/6/79

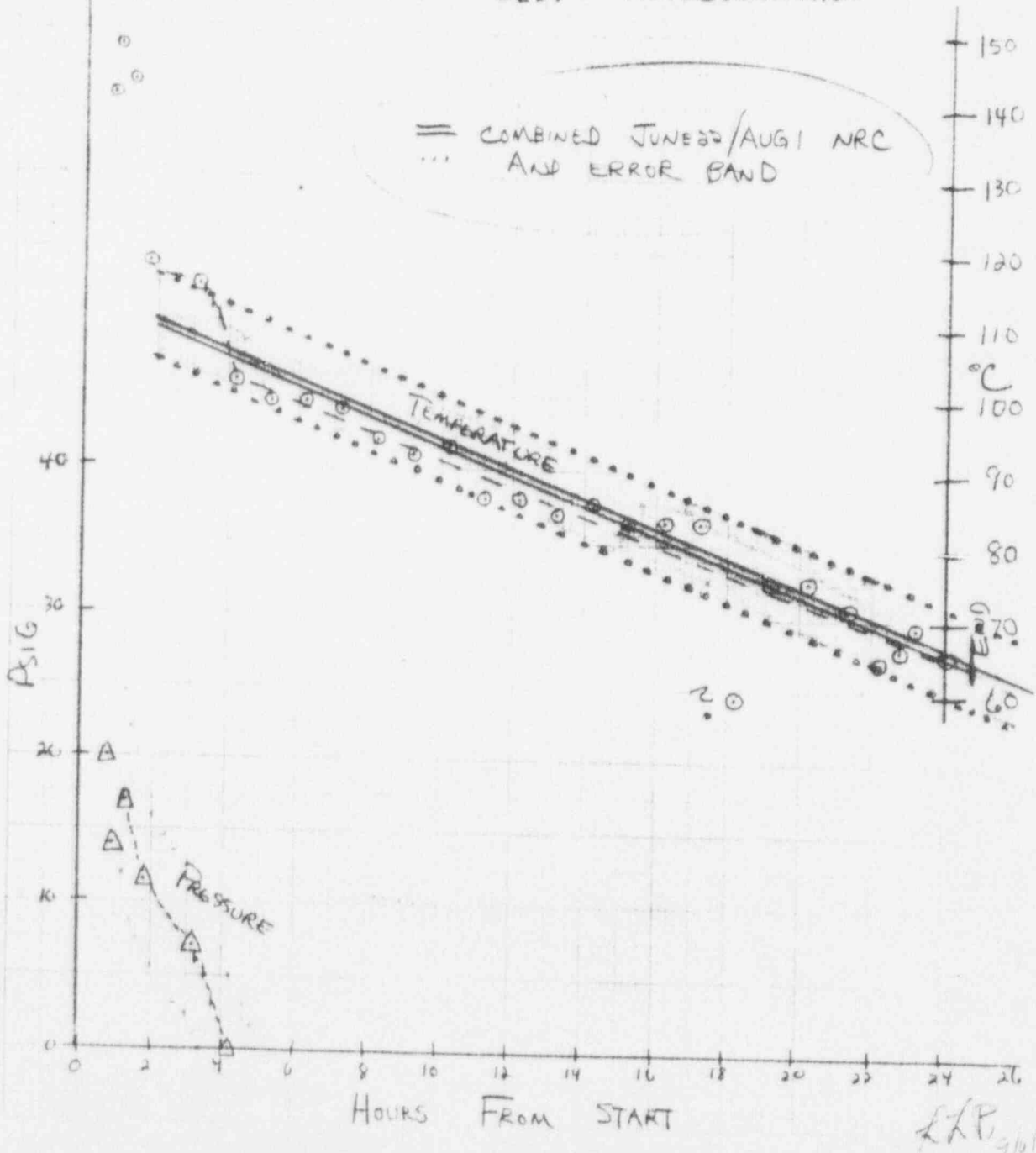
FIGURE 5C

BROWNS FERRY UNIT 3
CONNECTORS

— SPECIFIED PROFILES
⊙ TEMPERATURE DATA
△ PRESSURE DATA
- - - "BEST" REPRESENTATION

WYLE REPORT 43854-2 3/28/78

= COMBINED JUNE 30/AUG 1 NRC
... AND ERROR BAND



All test items will be subject to an accident profile approximating the specified time, temperature, pressure conditions displayed in Figure 5. Also shown in Figures 5A, B, and C is the final NRC-specified enveloping profile for temperature and its $\pm 6^{\circ}C$ error band. This, along with the actual pressure profile with its ± 5 psig error band, constitute the desired accident test signature. These profiles were developed from NRC staff letters:

(1) June 22, 1979, Murley to Schroeder and Eisenhut, "Commission-Requested Connector Tests"

(2) August 1, 1979, Schroeder and Eisenhut to Murley, "Commission-Requested Connector Tests"

Following formal NRC approval of the achievable test chamber conditions, the connector assemblies will be installed in the test chamber. (To make electrical connection through the test chamber seals, Anaconda 3/c #12 nuclear grade cable may be butt spliced to the connector assembly and the splices covered with Raychem nuclear grade (WCSF-series) heat shrink tubing.) Circuit continuity and circuit resistance tests will then be performed with the assemblies installed in the test chamber. The assemblies will be instrumented to measure and record voltage and current; the test chamber will be instrumented with temperature and pressure sensors. Periodic measurements of all parameters will be made during the accident test phase.

During the environmental exposure of the connector assemblies the specimens and environment temperatures will be periodically monitored and recorded and the connectors will be powered with their operating voltage/current loads as described above. Failure to carry the required voltage/current loads will be considered as failure of the assembly.

After achieving the $150^{\circ}F$ ($65^{\circ}C$) condition, the test chamber will be opened and the connector assemblies removed for examination.

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident. PRE-ACCIDENT TEST DEMONSTRATIONS AUTOCLAVE Start Date 10/29-30/79

AS REQUIRED BY THE TEST PROCEDURES, DEMONSTRATION RUNS WERE MADE TO VERIFY THE CAPABILITIES TO ACHIEVE THE DESIRED PRESSURE/TEMPERATURE PROFILES.

TWO OF THESE ARE SHOWN IN THE ATTACHMENTS OF TABULATED DATA AND PRESSURE-RISE CURVES DATED 10/29 and 10/30/79.

THESE TESTS WERE WITNESSED BY R. FEIT, M. CHERAMAL, AND J. ZWILINSKI OF THE ARC.

Remarks

Tested by [signature] Date 10/31/79

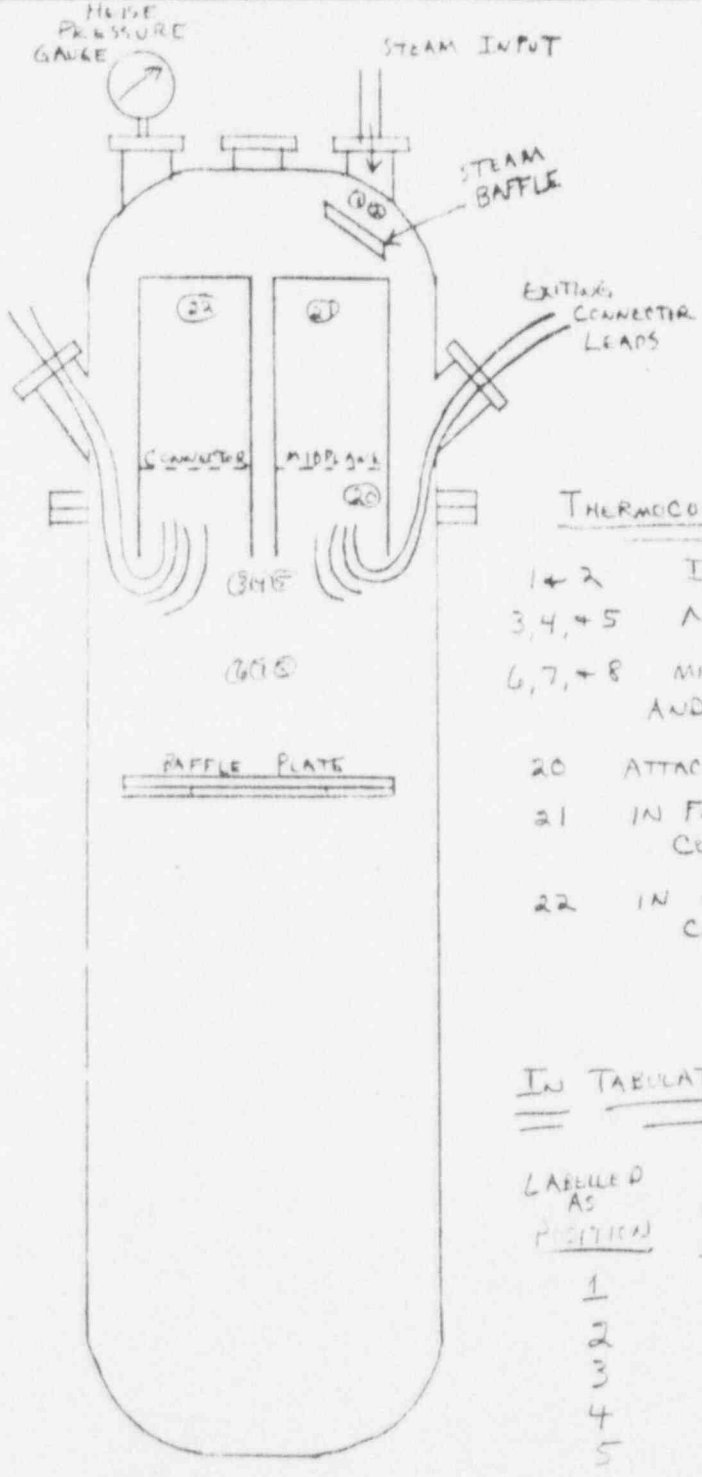
Witness [signature] Date

Sheet No. 1 of 1

Approved

BY [illegible] SKETCH SHEET 10 X 10

PREPARED BY LLB	DWG CLASSIFICATION LEVEL (If class., also show category of information if not line through this block)	PAGE NO OF
CHECKED BY	GENERALIZED SKETCH OF	HF3 CONNECTOR REPORT NO
DATE	TEST CHAMBER AND CONTENTS	MODEL NO



THERMOCOUPLE POSITIONS

1 + 2 INLINE STEAM

3, 4, + 5 NEAR BASE OF CANS

6, 7, + 8 MIDWAY (~7½") BETWEEN CANS AND BAFFLE PLATE

20 ATTACHED TO DUMMY CONNECTOR MASS

21 IN FREE SPACE AT TOP OF CONNECTOR CAN

22 IN FREE SPACE AT TOP OF CONNECTOR CAN.

IN TABULATED DATA

LABELLED AS POSITION	TC's AT THIS POSITION
1	1 + 2
2	20
3	21
4	22
5	3, 4, + 5
6	6, 7, + 8

DWG CLASSIFICATION LEVEL

10/26/79

Time			Temperatures °C			FREE FIELD		Pressure
m:ss	Pos 1	Pos 2	Pos 3	Pos 4	Pos 5	Pos 6	Pos 9	Pos 7
0:00	89	59	58	54	66-69-66	69-68-66	99	0.0
0:20	4	91	71	73	67-65-[illegible]	76-76-74	44	0.0
0:26	192	198	194	188	191-194-[illegible]	192-194-195	113	10.8
0:40	215	156	151	145	156-[illegible]	151-151-152	132	6.0
1:00	231-236	158	152	149	153-152	166-163-156	198	0.0
1:20	241-237	153	154	151	162-159	164-168-167	127	5.5
1:40	239-239	151	159	149	164-157	178-168-169	151	5.5
2:00	241-233	156	158	154	163-165	170-164-170	153	5.5
2:20	236-231	157	161	155	166-162	172-171-174	154	5.5
2:40	236-234	156	163	161	166-166	170-169-171	150	5.5
3:00	231-235	158	168	164	164-165	171-170-171	150	5.5
4:00	226-233	156	170	166	163-162	169-167-168	150	5.5
5:00	223-217	157	174	168	168-164	169-166-168	150	5.5
6:00	212-207	158	176	173	168-166	170-168-169	156	5.5
7:00	203-199	157	177	176	166-167	170-168-170	151	5.5
8:00	196-192	156	178	177	166-166	168-166-169	150	5.5
9:00	190-188	155	177	176	166-166	167-167-168	149	4.5
10:00	188-186	154	176	175	165-165	167-167-167	150	4.7
12:00	182-180	150	173	173	163-165	165-165-165	152	4.0
14:00	176-175	149	171	171	162-164	166-166-166	154	4.0
16:00	182-189	144	169	169	162-163	164-164-165	155	3.8
18:00	185-184	144	170	170	163-163	164-164-164	156	2.4
20:00	177-176	144	169	170	162-162	163-163-163	157	2.2
22:00	173-175	144	167	168	161-160	161-161-161	157	2.6
24:00	181-179	150	167	167	166-162	163-162-162	158	2.5
26:00	179-174	151	167	167	161-161	161-161-161	158	2.9
28:00	169-168	151	165	166	160-160	160-159-160	158	2.6
30:00	181-178	150	163	163	159-159	159-159-159	157	2.6
	TC 1 & 2	TC 20	TC 21	TC 22	TC 9 & 23	TC 6, 7, 8	TC 9	

Chamber given 10 minute skin preheat T(0) = 58°C @ 10 min, T(0) = 81°C @ 23 min
Chamber given additional 8 minutes preheat to 81°C

Ramp procedure same as 10-26-74 test

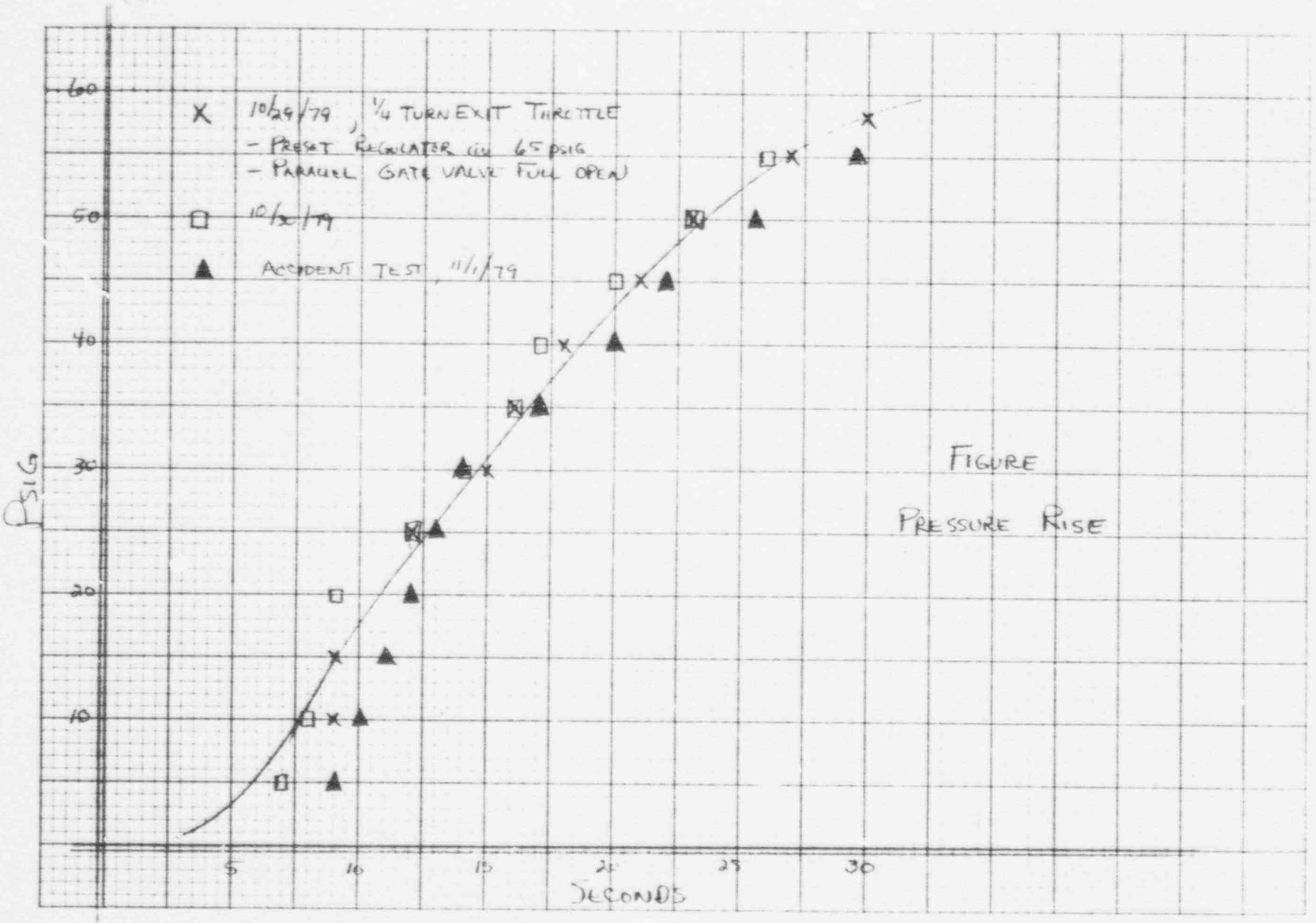
Time			Temperatures °C			FREE FIELD				
Run SEC	Pos 1	Pos 2	Pos 3	Pos 4	Pos 5	Pos 6	Pos 7			
0:00	51-58	58	59	56	61-65	69-69-69	91	0.0		62-69
:20	53-66	102	84	86	66-67	70-70-73	91	0.0		64-0.0
0:20	198-184	143	146	140	144-143	142-146-147	113	45		61-
0:40	201-168	152	151	147	157-157	158-157-160	143	60		140-58
1:00	218-214	153	154	151	161-161	164-164-165	150	60		117-58
1:20	222-217	153	154	152	161-164	164-167-169	151	60		135-58
1:40	222-216	158	155	153	164-165	168-170-171	152	60		150-58
2:00	221-216	151	155	151	162-163	167-165-169	150	55		147-58
2:20	218-212	152	156	153	163-168	168-168-170	149	55		
2:40	215-211	159	159	157	164-165	169-168-170	150	55		
3:00	214-209	159	159	159	161-163	168-167-168	150	55		167-58
4:00	201-202	155	162	162	161-163	167-165-167	150	55		161 58
5:00	200-196	156	168	165	160-162	166-166-167	150	55		161-58
6:00	194-191	157	170	169	162-162	166-165-166	150	58		167-58
7:00	196-190	157	171	171	163-163	166-166-167	157	58		161-58
8:00	212-198	158	174	173	168-167	171-171-172	150	56		169 55
9:00	209-205	158	177	175	168-167	171-170-170	150	52		166 52
10:00	205-204	157	179	178	169-167	170-170-170	151	50		164-49
00	199-191	159	179	177	168-167	168-168-168	153	40		161-49.5
19:00	189-186	162	176	175	163-166	166-166-166	155	35		159-49.5
16:00	196-194	161	176	175	167-166	163-163-167	156	30		164-49.5
18:00	188-186	157	175	175	166-165	166-166-166	157	28		163 49
20:00	180-178	157	173	173	164-164	164-164-164	157	27		163 27
22:00	172-171	160	170	171	161-161	161-161-162	157	25.5		161-26
24:00	168-167	160	167	167	161-161	160-160-160	157	25.0		161-25
26:00	161-179	157	166	166	161-161	161-161-161	157	24.5		160 24.5
28:00	172-175	159	166	166	161-161	160-160-161	157	24.0		159 24
30:00	170-170	161	164	165	160-159	159-159-159	157	24.0		159 24
	TC-12	TC-10	TC-11	TC-12	TC-9 & 8	TC 6-7-8	TC-9			

repeated 10:00-24:00 hrs

Same chamber pressure

Same ramp-up procedure

Chamber head removed & replaced prior to test



FIGURE

PRESSURE RISE

INSTRUMENTATION EQUIPMENT SHEET

Date 10/29-30/79 Test Area GIF, TA-V

Technician D. DEGAN Project BF3 CONNECTORS Type Test RSE - ACCIDENT TEST
AUTOCLAVE DEMONSTRATIONS

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	PRESSURE GAUGE	HEISE		29155		0-15 PSIG	±0.1% FS	5/9/79	5/31/80
2	DATALOGGER	ACUREX	A'101	1694	01140	-17°C 0-121°C	TC ±0.05% FS ±0.05%	9/14/79	3/14/80

Instrument Test Engineer _____ Checked & Received by _____

VIII-12

DATA SHEET

Project B-1 Continuity

Specimen All

Part No

Ident.

Start Date 10-30-79

Post vacuum Check of all connectors

AC Connectors

	continuity - terminals	open - terminals
#1	10→14, 9-12	10-(9 & 12); 14-(9 & 12)
#2	10-14, 9-12	10-(9 & 12); 14-(9 & 12)
#4	10-14, 9-12	10-(9 & 12); 14-(9 & 12)

DC Connectors

	continuity	open
#1	7-9, 8-10	7-(8 & 10); 9-(8-10)
#2	7-9; 9-10	7-(8 & 10); 9-(8 & 10)
#3	7-9; 9-10	7-(8 & 10); 9-(8 & 11)

Remarks

Tested by [signature] Date 10 31 79

Witness W. H. Richardson Date 10-31-79

Sheet No. 1 of 1

Approved

SANDIA LABORATORIES
STANDARDS LAB
File 5699E
5/9/79 | 5/31/80
2551 | 4442
S/N 29155
See Certificate

...ratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87115

File No. 5699E

PRESSURE GAUGE
Heise
Serial No. 29155
P/N S-

Submitted by: Organization 4442

Date Calibrated: May 9, 1979
Expires: May 31, 1980

Reference Pressure psig	Gauge Reading psig
0.00	0.00
14.98	14.90
29.97	30.00
44.95	45.30
59.93	60.00
74.92	74.80
89.90	89.90
104.89	105.00
119.87	119.90
134.85	134.90
149.84	149.95

When corrections are applied, it is estimated that the error in the above gauge is no greater than ± 0.1% of full scale.

Technical Consultant: H. L. Myers, 2551

Certified by: J. L. Hartley, 2551

Copy to:
Organization 4442 (2)
2551 File

Standards Laboratory Certificate

Sandia Laboratories
Albuquerque, New Mexico 87185

DATALOGGER
Acurex
Model No. A901
Serial No. 1694
Property No. 011409

Submitted by: Organization 4442

Certified: September 14, 1979
Expires: March 14, 1980

This instrument was adjusted according to manufacturer's calibration procedure and was found to be within these specifications:

Voltage Measurements: ± 0.005% of full scale ± 0.005% of reading after one hour warmup

Metrologist: H. H. Pike, 2553

Certified by: G. E. McFall, 2553

HHP:2553:bh

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident. ACCIDENT TEST /DATA Start Date 11/1/79

THE (33) DATA SHEETS DESCRIBE THE TEST DATA AND CONNECTOR ASSEMBLIES PERFORMANCE. THE THERMOCOUPLE READINGS ARE THOSE AT POSITION #6 (TC's 6, 7 & 8) AGREED TO BY USNRC STAFF.

ALL CONNECTOR ASSEMBLIES REMAINED FUNCTIONAL THROUGHOUT THE TEST.

Remarks

Tested by L. Berger Date 11/2/79

Witness Date

Sheet No. 1 of 1

Approved

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time — 0:01 hours T_o - 1 min

Chamber Environments: Temperature 63-62-63 °C

Pressure 0.0 psig

Test Items: Assembly

1	250.0 volts	1.0016 amps	LOAD/LINE	
2	249.7 volts	1.007 amps		
3	249.6 volts	1.0134 amps		
7	____ volts	17.9/17.1 amps		
8	____ volts	17.9/16.9 amps		
9	____ volts	17.9/16.5 amps		

Time 0:01 hours T_o + 1 min

Chamber Environments: Temperature 153-161-163 °C

Pressure 60.2 psig

Test Items: Assembly

1	240.0 volts	.9957 amps	
2	249.8 volts	1.042 amps	
3	249.3 volts	1.0163 amps	
7	____ volts	17.1/17.1 amps	
8	____ volts	16.6/17.0 amps	
9	____ volts	17.1/16.5 amps	

Time 0:02 hours T_o + 2 min

Chamber Environments: Temperature 170-170-169 °C

Pressure 55 psig

Test Items: Assembly

1	250.0 volts	.9998 amps	
2	249.6 volts	1.0010 amps	
3	249.3 volts	1.0149 amps	
7	____ volts	17.9/17.1 amps	
8	____ volts	16.7/17.0 amps	
9	____ volts	17.4/16.5 amps	

Remarks: _____

Recorded by [signature]

Witnessed by [signature]

Sheet No. 1 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 0103 hours T_o+3 min
Chamber Environments: Temperature 169-169-170 °C
Pressure 55 psig

Test Items:

Assembly		
1	250.0 volts	.9937 amps
2	249.6 volts	1.0001 amps
3	249.2 volts	1.014 amps
7	____ volts	17.0/17.1 amps
8	____ volts	16.8/17.0 amps
9	____ volts	17.9/16.6 amps

Time 0104 hours T_o+4 min
Chamber Environments: Temperature 167-167-167 °C
Pressure 55.0 psig

Test Items:

Assembly		
1	250.0 volts	.9936 amps
2	249.7 volts	.9997 amps
3	249.2 volts	1.0139 amps
7	____ volts	17.9/17.2 amps
8	____ volts	16.6/17.0 amps
9	____ volts	17.4/16.5 amps

Time 0:045 hours T_o + 4.5 min
Chamber Environments: Temperature 167-167-168 °C
Pressure 56.0 psig

Test Items:

Assembly		
1	250.1 volts	.9931 amps
2	249.6 volts	.9994 amps
3	249.3 volts	1.0139 amps
7	____ volts	17.9/17.1 amps
8	____ volts	16.6/17.0 amps
9	____ volts	17.9/16.1 amps

Remarks: _____

Recorded by Wm. Bendabow

Witnessed by [illegible]

Sheet No. 2 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 0:05 hours T_0+5 min
Chamber Environments: Temperature 169-168-170 °C
Pressure 56 psig

Test Items: Assembly		
1	250.0 volts	.9933 amps
2	249.6 volts	.9992 amps
3	249.6 volts	1.0129 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Time 0:06 hours T_0+6 min
Chamber Environments: Temperature 168-168-168 °C
Pressure 55.0 psig

Test Items: Assembly		
1	250.1 volts	.9931 amps
2	249.8 volts	.9991 amps
3	249.6 volts	1.0125 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Time 0:07 hours T_0+7 min
Chamber Environments: Temperature 167-168-168 °C
Pressure 55.0 psig

Test Items: Assembly		
1	250.0 volts	.9933 amps
2	249.0 volts	.9994 amps
3	249.3 volts	1.0125 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Remarks: ———

Recorded by W. H. Gunderson
Witnessed by [illegible]
Sheet No. 3 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 0:08 hours T_0 + 8 min

Chamber Environments: Temperature 167-167-167 °C

Pressure 52.0 psig

Test Items: Assembly

1	250.0 volts	.9931 amps
2	249.6 volts	.9948 amps
3	249.2 volts	1.0147 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 0:09 hours T_0 + 9 min

Chamber Environments: Temperature 167-168-167 °C

Pressure 52.0 psig

Test Items: Assembly

1	250.2 volts	.9919 amps
2	249.7 volts	.9988 amps
3	249.2 volts	1.0144 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 0:10 hours T_0 + 10 min

Chamber Environments: Temperature 166-166-166 °C

Pressure 49.0 psig

Test Items: Assembly

1	250.0 volts	.9927 amps
2	249.7 volts	.9986 amps
3	249.2 volts	1.0143 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Remarks: _____

Recorded by Walt Brubaker

Witnessed by [illegible]

Sheet No. 4 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 0:15 hours T_0 +15 min
Chamber Environments: Temperature 163/163/164 °C
Pressure 37.5 psig

Test Items: Assembly

1	250.1 volts	.9944 amps
2	249.7 volts	.9985 amps
3	249.3 volts	1.0123 amps
7	____ volts	17.6/17.5 amps
8	____ volts	17.1/17.2 amps
9	____ volts	17.6/16.5 amps

Time 0:16 hours T_0 + 16 min
Chamber Environments: Temperature 163/163/164 °C
Pressure 35.0 psig

Test Items: Assembly

1	250.1 volts	.9942 amps
2	249.7 volts	.9986 amps
3	249.2 volts	1.0123 amps
7	____ volts	17.5/17.4 amps
8	____ volts	16.9/17.0 amps
9	____ volts	17.9/16.1 amps

Time 0:17 hours T_0 + 17 min
Chamber Environments: Temperature 163/163/164 °C
Pressure 30.0 psig

Test Items: Assembly

1	250.1 volts	.9944 amps
2	249.7 volts	.9944 amps
3	249.3 volts	1.0124 amps
7	____ volts	17.5/17.4 amps
8	____ volts	16.9/17.0 amps
9	____ volts	17.0/16.2 amps

Remarks: _____

Recorded by Walt Buchalter
Witnessed by [signature]
Sheet No. 5 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BT3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 0:175 hours T_0 + 17½'
Chamber Environments: Temperature 165-165-165 °C
Pressure 30.0 psig

Test Items:

Assembly		
1	250.1 volts	.9944 amps
2	249.6 volts	.9932 amps
3	249.2 volts	1.0123 amps
7	——— volts	17.5/17.2 amps
8	——— volts	16.9/16.9 amps
9	——— volts	17.9/16.5 amps

Time 0:15 hours T_0 + 15 min
Chamber Environments: Temperature 165-165-165 °C
Pressure 29.0 psig

Test Items:

Assembly		
1	250.0 volts	.9943 amps
2	249.7 volts	.9982 amps
3	249.3 volts	1.0124 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Time 0:20 hours T_0 + 20 min
Chamber Environments: Temperature 162-162-162 °C
Pressure 27.0 psig

Test Items:

Assembly		
1	250.1 volts	.9944 amps
2	249.7 volts	.9985 amps
3	249.3 volts	1.0123 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Remarks: _____

Recorded by W. H. Bruckner
Witnessed by [illegible]
Sheet No. 6 of 33

Date 1-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 0:25 hours T_0 +25 min
Chamber Environments: Temperature 161:161:161 °C
Pressure 26.0 psig

Test Items: Assembly

1	250.1	volts	.9946	amps
2	249.7	volts	.9986	amps
3	249.3	volts	1.0125	amps
7	/	volts	/	amps
8	/	volts	/	amps
9	/	volts	/	amps

Time 0:30 hours T_0 +30 min
Chamber Environments: Temperature 159:159:161 °C
Pressure 24.0 psig

Test Items: Assembly

1	250.1	volts	.9944	amps
2	249.7	volts	.9983	amps
3	249.3	volts	1.0123	amps
7	/	volts	/	amps
8	/	volts	/	amps
9	/	volts	/	amps

Time 0:35 hours T_0 +35 min
Chamber Environments: Temperature 156:156:157 °C
Pressure 23.5 psig

Test Items: Assembly

1	250.1	volts	.9950	amps
2	249.7	volts	.9989	amps
3	249.4	volts	1.0143	amps
7	/	volts	/	amps
8	/	volts	/	amps
9	/	volts	/	amps

Remarks: _____

Recorded by W H Rankin
Witnessed by [illegible]
Sheet No. 7 of 33

Date [illegible]

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 6:40 hours T_0 + 90 min

Chamber Environments: Temperature 128/128/128 °C

Pressure 21.0 psig

Test Items: Assembly

1	248.0 volts	.9949 amps
2	248.7 volts	.9984 amps
3	249.3 volts	1.0168 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Time 6:45 hours T_0 + 45 min

Chamber Environments: Temperature 126/126/127 °C

Pressure 20.9 psig

Test Items: Assembly

1	250.1 volts	.9919 amps
2	249.7 volts	.9993 amps
3	249.4 volts	1.0129 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Time 6:50 hours T_0 + 1 hr

Chamber Environments: Temperature 127/127/127 °C

Pressure 17.5 psig

Test Items: Assembly

1	250.2 volts	.9950 amps
2	249.7 volts	.9988 amps
3	249.7 volts	1.0120 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Remarks: _____

Recorded by W. H. Gustafson

Witnessed by [illegible]

Sheet No. 9 of 33

Date 11-1-74

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 0.55 hours T_0 + 11 min

Chamber Environments: Temperature 152-152-153 °C

Pressure 15.0 psig

Test Items: Assembly

1	252.4 volts	.4951 amps
2	277.7 volts	.4947 amps
3	277.7 volts	1.01.9 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 0.57 hours T_0 + 13 min

Chamber Environments: Temperature 150-152-153 °C

Pressure 14.9 psig

Test Items: Assembly

1	252.4 volts	.4944 amps
2	277.7 volts	.4944 amps
3	277.3 volts	1.0128 amps
7	volts	17.5/17.5 amps
8	volts	17.0/17.1 amps
9	volts	17.5/17.4 amps

Time 0.58 hours T_0 + 14 min

Chamber Environments: Temperature 144-144-144 °C

Pressure 14.2 psig

Test Items: Assembly

1	252.4 volts	.4952 amps
2	277.7 volts	.4944 amps
3	277.4 volts	1.0128 amps
7	volts	17.5/17.4 amps
8	volts	16.9/17.0 amps
9	volts	17.4/17.5 amps

Remarks: _____

Recorded by W. H. Burkholder

Witnessed by _____

Sheet No. 9 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 0259 hours T_0 +5h

Chamber Environments: Temperature 149-199-199 °C

Pressure 14.0 psig

Test Items:

Assembly		
1	250.3 volts	.9950 amps
2	249.7 volts	.9986 amps
3	249.4 volts	1.0124 amps
7	____ volts	12.9/12.4 amps
8	____ volts	16.7/17.0 amps
9	____ volts	12.9/12.5 amps

Time 0545 hours T_0 + 5h 15min

Chamber Environments: Temperature 149-149-150 °C

Pressure 14.0 psig

Test Items:

Assembly		
1	____ volts	____ amps
2	____ volts	____ amps
3	____ volts	____ amps
7	____ volts	12.9/12.1 amps
8	____ volts	16.6/17.0 amps
9	____ volts	12.4/12.5 amps

Time 1100 hours

Chamber Environments: Temperature 149-149-150 °C

Pressure 14.0 psig

Test Items:

Assembly		
1	250.2 volts	.9949 amps
2	249.7 volts	.9985 amps
3	249.4 volts	1.0128 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Remarks: _____

Recorded by W H Swinhoe

Witnessed by [illegible]

Sheet No. 10 of 33

Date 12-1-79

DATA SHEET--ACCIDENT SIMULATION
BIB CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 1:10 hrs
Chamber Environments: Temperature 145-144-145 °C
Pressure 15.0 psig

Test Items: Assembly

1	250.2 volts	.9998 amps
2	249.7 volts	.9994 amps
3	249.4 volts	1.0129 amps
7	volts	amps
8	volts	amps
9	volts	amps

Time 1:20 hours
Chamber Environments: Temperature 142-141-142 °C
Pressure 17.0 psig

Test Items: Assembly

1	250.2 volts	.9999 amps
2	249.7 volts	.9984 amps
3	249.5 volts	1.0149 amps
7	volts	amps
8	volts	amps
9	volts	amps

Time 1:30 hours
Chamber Environments: Temperature 135-135-135 °C
Pressure 15 psig

Test Items: Assembly

1	250.2 volts	.9996 amps
2	249.7 volts	.9983 amps
3	249.5 volts	1.0131 amps
7	volts	amps
8	volts	amps
9	volts	amps

Remarks:

Recorded by N. H. Gentry
Witnessed by Eckert
Sheet No. 11 of 833

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 1:40 hours
Chamber Environments: Temperature 121-121-121 °C
Pressure 14 psig

Test Items: Assembly		
1	240.4 volts	.9996 amps
2	249.7 volts	.9990 amps
3	249.4 volts	1.0121 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 1:50 hours
Chamber Environments: Temperature 113-121-113 °C
Pressure 9.0 psig

Test Items: Assembly		
1	239.2 volts	.9999 amps
2	249.9 volts	.9990 amps
3	249.0 volts	1.0131 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 2:00 hours
Chamber Environments: Temperature 118-117-117 °C
Pressure 5.0 psig

Test Items: Assembly		
1	240.4 volts	.9999 amps
2	249.7 volts	.9989 amps
3	249.5 volts	1.0131 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Remarks: All readings taken @ 23°C ambient

Recorded by [signature]
Witnessed by [signature]
Sheet No. 2 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 2:10 hours
Chamber Environments: Temperature 137-141-142 °C
Pressure 5.0 psig

Test Items: Assembly		
1	250.2 volts	.9999 amps
2	249.2 volts	.9994 amps
3	249.5 volts	1.0122 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 2:20 hours
Chamber Environments: Temperature 142-142-142 °C
Pressure 6.0 psig

Test Items: Assembly		
1	250.2 volts	.9997 amps
2	249.7 volts	.9999 amps
3	249.1 volts	1.0131 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 2:40 hours
Chamber Environments: Temperature 149-149-149 °C
Pressure 7.0 psig

Test Items: Assembly		
1	250.2 volts	.9990 amps
2	249.7 volts	.9994 amps
3	249.6 volts	1.0134 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Remarks: _____

Recorded by W. Gates

Witnessed by A. Lewis

Sheet No. 13 of 33

Date 1- -79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 2:50 hours
Chamber Environments: Temperature 109-104-104 °C
Pressure 7.0 psig

Test Items: Assembly		
1	282.3 volts	.9996 amps
2	299.4 volts	.9984 amps
3	299.6 volts	1.0132 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 3:00 hours
Chamber Environments: Temperature 108-104-104 °C
Pressure 7.0 psig

Test Items: Assembly		
1	284.4 volts	.9947 amps
2	299.7 volts	.9988 amps
3	299.5 volts	1.0133 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 3:10 hours
Chamber Environments: Temperature 107-103-103 °C
Pressure 6.5 psig

Test Items: Assembly		
1	284.4 volts	.9948 amps
2	299.7 volts	.9988 amps
3	299.5 volts	1.0131 amps
7	volts	amps
8	volts	amps
9	volts	amps

Remarks:

Recorded by [signature]
Witnessed by [signature]
Sheet No. 7 of 53

Date _____

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 322 hours
Chamber Environments: Temperature 104-102-104 °C
Pressure 6.5 psig

Test Items: Assembly

1	250.3	volts	.9949	amps
2	244.4	volts	.9988	amps
3	244.6	volts	1.0133	amps
7	/	volts	/	amps
8	/	volts	/	amps
9	/	volts	/	amps

Time 3:30 hours
Chamber Environments: Temperature 106-105-106 °C
Pressure 6.5 psig

Test Items: Assembly

1	250.3	volts	.9949	amps
2	244.7	volts	.9988	amps
3	244.5	volts	1.0133	amps
7	/	volts	/	amps
8	/	volts	/	amps
9	/	volts	/	amps

Time 3:40 hours
Chamber Environments: Temperature 106-105-105 °C
Pressure 5.5 psig

Test Items: Assembly

1	250.2	volts	.9947	amps
2	244.7	volts	.9949	amps
3	244.	volts	1.0134	amps
7	/	volts	/	amps
8	/	volts	/	amps
9	/	volts	/	amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 1 of 33

Date 11-7-74

DATA SHEET--ACCIDENT SIMULATION
BT3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 4.00 hours
Chamber Environments: Temperature 103-102-103 °C
Pressure 3.2 psig

Test Items: Assembly		
1	250.2 volts	.9947 amps
2	249.7 volts	.9946 amps
3	249.7 volts	1.0135 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Time 4.10 hours
Chamber Environments: Temperature 104-103-104 °C
Pressure 3.5 psig

Test Items: Assembly		
1	250.2 volts	.9944 amps
2	249.7 volts	.9987 amps
3	249.5 volts	1.0132 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Time 4.20 hours
Chamber Environments: Temperature 105-103-105 °C
Pressure 3.4 psig

Test Items: Assembly		
1	250.1 volts	.9951 amps
2	249.9 volts	.9991 amps
3	249.5 volts	1.0135 amps
7	——— volts	——— amps
8	——— volts	——— amps
9	——— volts	——— amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 12 of 033

Date 12-1-74

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 4:30 hours
Chamber Environments: Temperature 104-104-104 °C
Pressure 3.4 psig

Test Items: Assembly

1	250.3	volts	.9951	amps
2	249.8	volts	.9941	amps
3	249.8	volts	1.0135	amps
7		volts		amps
8		volts		amps
9		volts		amps

Time 4:40 hours
Chamber Environments: Temperature 104-103-104 °C
Pressure 3.2 psig

Test Items: Assembly

1	250.4	volts	.9954	amps
2	249.7	volts	.9941	amps
3	249.4	volts	1.0135	amps
7		volts		amps
8		volts		amps
9		volts		amps

Time 4:50 hours
Chamber Environments: Temperature 104-103-104 °C
Pressure 3.2 psig

Test Items: Assembly

1	250.4	volts	.9954	amps
2	249.7	volts	.9941	amps
3	249.4	volts	1.0135	amps
7		volts		amps
8		volts		amps
9		volts		amps

Remarks:

Recorded by [illegible]
Witnessed by [illegible]
Sheet No. 6 of 53

Date 11-1-17

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 5:00 hours
Chamber Environments: Temperature 104-103-104 °C
Pressure 3.3 psig

Test Items: Assembly

1	250.2 volts	.9952 amps
2	249.7 volts	.9988 amps
3	249.5 volts	1.0036 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 5:10 hours
Chamber Environments: Temperature 104 °C
Pressure 3.2 psig

Test Items: Assembly

1	253 volts	.9994 amps
2	247 volts	.995 amps
3	249 volts	1.0028 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 5:20 hours
Chamber Environments: Temperature 104-103-103 °C
Pressure 3.2 psig

Test Items: Assembly

1	250.1 volts	.9950 amps
2	249.6 volts	.9976 amps
3	249.5 volts	1.0034 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Remarks: _____

Recorded by W. H. Gardner

Witnessed by _____

Sheet No. 1 of 33

Date _____

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 5:30 hours
Chamber Environments: Temperature 103 104 104 °C
Pressure 3.7 psig

Test Items: Assembly		
1	250.3 volts	.4468 amps
2	249.7 volts	.4405 amps
3	249.6 volts	1.0113 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 5:40 hours
Chamber Environments: Temperature 102 102 102 °C
Pressure 3.1 psig

Test Items: Assembly		
1	250.3 volts	.4451 amps
2	249.2 volts	.4443 amps
3	249.6 volts	1.0136 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 5:50 hours
Chamber Environments: Temperature 103 103 103 °C
Pressure 3.1 psig

Test Items: Assembly		
1	250.2 volts	.4444 amps
2	249.8 volts	.4427 amps
3	249.3 volts	1.0137 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Remarks: _____

Recorded by _____
Witnessed by _____
Sheet No. 11 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 6:00 hours
Chamber Environments: Temperature 102-104-102 °C
Pressure 3.00 psig

Test Items: Assembly

1	239.3 volts	.9951 amps
2	239.6 volts	.9989 amps
3	239.6 volts	1.034 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 6:20 hours
Chamber Environments: Temperature 101-101-101 °C
Pressure 2.90 psig

Test Items: Assembly

1	239.2 volts	.9950 amps
2	239.6 volts	.9991 amps
3	239.7 volts	1.0134 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 6:40 hours
Chamber Environments: Temperature 101-101-101 °C
Pressure 2.5 psig

Test Items: Assembly

1	239.3 volts	.9949 amps
2	239.7 volts	.9991 amps
3	239.7 volts	1.0135 amps
7	_____ volts	_____ amps
8	_____ volts	_____ amps
9	_____ volts	_____ amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 11 of 33

Date 11-1-74

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 7:00 hours
Chamber Environments: Temperature 99-99-99 °C
Pressure 14 psig

Test Items: Assembly

1	250.3 volts	.9999 amps
2	249.7 volts	.9974 amps
3	249.5 volts	1.0133 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 720 hours
Chamber Environments: Temperature 100-99-100 °C
Pressure 14 psig

Test Items: Assembly

1	250.3 volts	.9999 amps
2	249.2 volts	.9978 amps
3	249.4 volts	1.0134 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Time 7:40 hours
Chamber Environments: Temperature 99-99-99 °C
Pressure 13 psig

Test Items: Assembly

1	250.3 volts	.9997 amps
2	249.8 volts	.9980 amps
3	249.7 volts	1.0131 amps
7	/ volts	/ amps
8	/ volts	/ amps
9	/ volts	/ amps

Remarks:

Recorded by [signature]
Witnessed by [signature]
Sheet No. 22 of 33

Date 11-1-74

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 8:00 hours
Chamber Environments: Temperature 92.2-92.9 °C
Pressure 1.2 psig

Test Items: Assembly

1	252.3	volts	.1449	amps
2	249.1	volts	.1474	amps
3	299.0	volts	1.1251	amps
7		volts		amps
8		volts		amps
9		volts		amps

Time 9:10 hours
Chamber Environments: Temperature 92.4-92.7 °C
Pressure 0.9 psig

Test Items: Assembly

1	250.2	volts	.1427	amps
2	249.8	volts	.1441	amps
3	299.6	volts	1.1137	amps
7		volts		amps
8		volts		amps
9		volts		amps

Time 9:40 hours
Chamber Environments: Temperature 92.4-92.7 °C
Pressure _____ psig

Test Items: Assembly

1	210.3	volts	.1449	amps
2	249.7	volts	.1423	amps
3	250.0	volts	1.1134	amps
7		volts		amps
8		volts		amps
9		volts		amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 21 of 33

Date 11-1-79

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 9:00 hours
Chamber Environments: Temperature 93.44-95 °C
Pressure 0.0 psig

Test Items: Assembly		
1	2503 volts	.9947 amps
2	2497 volts	.9992 amps
3	2501 volts	1.034 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 9:20 hours
Chamber Environments: Temperature 95.93-95 °C
Pressure 0.0 psig

Test Items: Assembly		
1	2503 volts	.9991 amps
2	2498 volts	.9926 amps
3	2501 volts	1.034 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 9:40 hours
Chamber Environments: Temperature 95.4-95 °C
Pressure 0.0 psig

Test Items: Assembly		
1	2502 volts	.9949 amps
2	2497 volts	.9993 amps
3	2501 volts	1.037 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 2 of 33

Date _____

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 10:00 hours
Chamber Environments: Temperature 11 13 13 °C
Pressure 0.00 psig

Test Items: Assembly		
1	257.3 volts	.9448 amps
2	244.8 volts	.9490 amps
3	254.8 volts	1.0390 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 10:20 hours
Chamber Environments: Temperature 92/92/92 °C
Pressure — psig

Test Items: Assembly		
1	256.3 volts	.9944 amps
2	249.7 volts	.9956 amps
3	254.9 volts	1.0354 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Time 10:40 hours
Chamber Environments: Temperature 94/93/94 °C
Pressure — psig

Test Items: Assembly		
1	256.4 volts	.9947 amps
2	249.6 volts	.9951 amps
3	254.8 volts	1.0346 amps
7	____ volts	____ amps
8	____ volts	____ amps
9	____ volts	____ amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 13 of 33

DATA SHEET--ACCIDENT SIMULATION Date 11/1/74
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 11:00 hours
Chamber Environments: Temperature 92/92/92 °C
Pressure ——— psig

Test Items: Assembly

1	250.5	volts	.9947	amps
2	249.6	volts	.9951	amps
3	254.8	volts	1.0359	amps

Time 11:20 hours
Chamber Environments: Temperature 90/90/90 °C
Pressure ——— psig

Test Items: Assembly

1	250.2	volts	.9947	amps
2	249.1	volts	.9950	amps
3	254.1	volts	1.0341	amps

Time 11:40 hours
Chamber Environments: Temperature 90/90/90 °C
Pressure ——— psig

Test Items: Assembly

1	250.3	volts	.9948	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0337	amps

Time 12:00 hours
Chamber Environments: Temperature 89/89/89 °C
Pressure ——— psig

Test Items: Assembly

1	250.3	volts	.9947	amps
2	249.7	volts	.9979	amps
3	254.5	volts	1.0339	amps

Remarks: _____

Recorded by L Brown
Witnessed by [illegible]
Sheet No. 34 of 33

DATA SHEET--ACCIDENT SIMULATION Date 11/1/79
BF? CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 12:20 hours
Chamber Environments: Temperature 90/90/90 °C
Pressure ——— psig

Test Items: Assembly

1	250.3	volts	.9947	amps
2	249.7	volts	.9950	amps
3	254.9	volts	1.0354	amps

Time 12:40 hours
Chamber Environments: Temperature 88/88/88 °C
Pressure ——— psig

Test Items: Assembly

1	250.3	volts	.9948	amps
2	249.7	volts	.9950	amps
3	254.9	volts	1.0340	amps

Time 13:00 hours
Chamber Environments: Temperature 87/87/88 °C
Pressure ——— psig

Test Items: Assembly

1	250.2	volts	.9948	amps
2	249.7	volts	.9978	amps
3	254.9	volts	1.0339	amps

Time 13:20 hours 22:11 on 11/1/79
Chamber Environments: Temperature 87/87/87 °C
Pressure ——— psig

Test Items: Assembly

1	250.2	volts	.9951	amps
2	249.7	volts	.9980	amps
3	254.9	volts	1.0339	amps

Remarks: _____

Recorded by L. Dawson

Witnessed by _____

Sheet No. 25 of 33

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Date 11/1/79

Time 13:40 hours
Chamber Environments: Temperature 87/87/89 °C
Pressure ——— psig

Test Items: Assembly

1	250.3	volts	.9950	amps
2	249.6	volts	.9980	amps
3	254.9	volts	1.0339	amps

Time 14:00 hours
Chamber Environments: Temperature 85/86/86 °C
Pressure ——— psig

Test Items: Assembly

1	250.2	volts	.9949	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0340	amps

Time 14:20 hours
Chamber Environments: Temperature 86/86/86 °C
Pressure ——— psig

Test Items: Assembly

1	250.2	volts	.9949	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0339	amps

Time 14:40 hours
Chamber Environments: Temperature 85/85/85 °C
Pressure ——— psig

Test Items: Assembly

1	250.3	volts	.9950	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0339	amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 26 of 33

DATA SHEET--ACCIDENT SIMULATION Date 11/1-2 '74
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 15:00 hours
Chamber Environments: Temperature 85/85/85 °C
Pressure — psig

Test Items: Assembly
1 250.3 volts .9950 amps
2 249.7 volts .9950 amps
3 254.9 volts 1.0341 amps

Time 15:20 hours
Chamber Environments: Temperature 84/84/84 °C
Pressure — psig

Test Items: Assembly
1 250.2 volts .9949 amps
2 249.6 volts .9949 amps
3 254.9 volts 1.0339 amps

Time 15:40 hours
Chamber Environments: Temperature 83/83/83 °C
Pressure — psig

Test Items: Assembly
1 250.2 volts .9954 amps
2 249.7 volts .9949 amps
3 254.9 volts 1.0340 amps

Time 16:00 hours 11/2/74
Chamber Environments: Temperature 83/83/83 °C ~0051
Pressure — psig

Test Items: Assembly
1 250.1 volts .9954 amps
2 249.6 volts .9950 amps
3 254.9 volts 1.0340 amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 27 of 33

DATA SHEET--ACCIDENT SIMULATION
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Date 11/2/79

Time 16:20 hours
Chamber Environments: Temperature 81/81/81 °C
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9953	amps
2	249.7	volts	.9950	amps
3	254.9	volts	1.0340	amps

Time 16:40 hours
Chamber Environments: Temperature 82/82/82 °C
Pressure —— psig

Test Items: Assembly

1	250.3	volts	.9955	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0340	amps

Time 17:00 hours
Chamber Environments: Temperature 80/80/80 °C
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9955	amps
2	249.7	volts	.9975	amps
3	254.9	volts	1.0340	amps

Time 17:20 hours
Chamber Environments: Temperature 80/80/80 °C
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9953	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0340	amps

Remarks: _____

Recorded by J. Dragon
Witnessed by _____
Sheet No. 28 of 33

DATA SHEET--ACCIDENT SIMULATION Date 11/1/79
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 17:40 hours
Chamber Environments: Temperature 78 78 79 °C
Pressure — — psig

Test Items: Assembly

1	250.1	volts	.9952	amps
2	249.7	volts	.9978	amps
3	254.8	volts	1.0341	amps

Time 18:00 hours 0251 on 11/1/79
Chamber Environments: Temperature 78 78 78 °C
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9953	amps
2	249.7	volts	.9980	amps
3	254.9	volts	1.0341	amps

Time 18:20 hours
Chamber Environments: Temperature 77 77 77 °C
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9956	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0340	amps

Time 18:40 hours
Chamber Environments: Temperature 77/77/77 °C
Pressure —— psig

Test Items: Assembly

1	250.1	volts	.9953	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0340	amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 27 of 33

DATA SHEET--ACCIDENT SIMULATION Date 11/1/79
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 19:00 hours 11/2/79
Chamber Environments: Temperature 76/75/76 °C ~0351
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9955	amps
2	249.7	volts	.9979	amps
3	254.8	volts	1.0340	amps

Time 19:20 hours
Chamber Environments: Temperature 76.75-75°C
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9953	amps
2	249.6	volts	.9979	amps
3	254.8	volts	1.0341	amps

Time 19:40 hours
Chamber Environments: Temperature 75/75/75°C
Pressure —— psig

Test Items: Assembly

1	250.3	volts	.9954	amps
2	249.7	volts	.9975	amps
3	254.7	volts	1.0341	amps

Time 20:00 hours 11/2/79
Chamber Environments: Temperature 75/75/75°C ~0451
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9954	amps
2	249.6	volts	.9950	amps
3	254.9	volts	1.0342	amps

Remarks: _____

Recorded by T. Berger
Witnessed by _____
Sheet No. 30 of 33

DATA SHEET--ACCIDENT SIMULATION Date 11/2/79
BT3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 20:20 hours
Chamber Environments: Temperature 73/73/73 °C
Pressure — psig

Test Items: Assembly

1	250.3	volts	.9944	amps
2	249.7	volts	.9978	amps
3	254.8	volts	1.034	amps

Time 20:40 hours
Chamber Environments: Temperature 72/72/72 °C
Pressure — psig

Test Items: Assembly

1	250.2	volts	.9952	amps
2	249.7	volts	.9979	amps
3	254.9	volts	1.0341	amps

Time 21:00 hours 11/2/79
Chamber Environments: Temperature 70/70/69 °C 0551
Pressure — psig

Test Items: Assembly

1	250.2	volts	.9951	amps
2	249.7	volts	.9979	amps
3	254.8	volts	1.0341	amps

Time 21:20 hours
Chamber Environments: Temperature 71/70/71 °C
Pressure — psig

Test Items: Assembly

1	250.2	volts	.9952	amps
2	249.6	volts	.9955	amps
3	254.8	volts	1.0340	amps

Remarks: _____

Recorded by J. Bergen
Witnessed by _____
Sheet No. 31 of 33

DATA SHEET--ACCIDENT SIMULATION Date 11/2/79
BF3 CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 21:40 hours
Chamber Environments: Temperature 70/70/71 °C
Pressure —— psig

Test Items: Assembly

1	250.4	volts	.9953	amps
2	249.7	volts	.9974	amps
3	254.7	volts	1.0334	amps

Time 22:00 hours 11/2/79
Chamber Environments: Temperature 70/70/71 °C 0651
Pressure —— psig

Test Items: Assembly

1	250.3	volts	.9952	amps
2	249.5	volts	.9957	amps
3	254.9	volts	1.0335	amps

Time 22:20 hours
Chamber Environments: Temperature 69/68/69 °C
Pressure —— psig

Test Items: Assembly

1	250.2	volts	.9953	amps
2	249.6	volts	.9958	amps
3	254.9	volts	1.0338	amps

Time 22:40 hours
Chamber Environments: Temperature 69/69/69 °C
Pressure —— psig

Test Items: Assembly

1	250.3	volts	.9951	amps
2	249.7	volts	.9959	amps
3	254.9	volts	1.0338	amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 32 of 33

DATA SHEET--ACCIDENT SIMULATION Date 11/1/79
BFJ CONNECTOR ASSEMBLIES: 1, 2, 3, 7, 8, 9

Time 23:00 hours
Chamber Environments: Temperature 69/69/69 °C 11/2/79
Pressure — psig 0751

Test Items: Assembly

1	250.3	volts	.9951	amps
2	249.7	volts	.9954	amps
3	255.0	volts	1.0339	amps

Time 23:20 hours
Chamber Environments: Temperature 68/68/68 °C
Pressure — psig

Test Items: Assembly

1	250.1	volts	.9951	amps
2	249.7	volts	.9958	amps
3	254.9	volts	1.0338	amps

Time 23:40 hours
Chamber Environments: Temperature 66/66/66 °C
Pressure — psig

Test Items: Assembly

1	250.3	volts	.9951	amps
2	249.7	volts	.9958	amps
3	254.8	volts	1.0337	amps

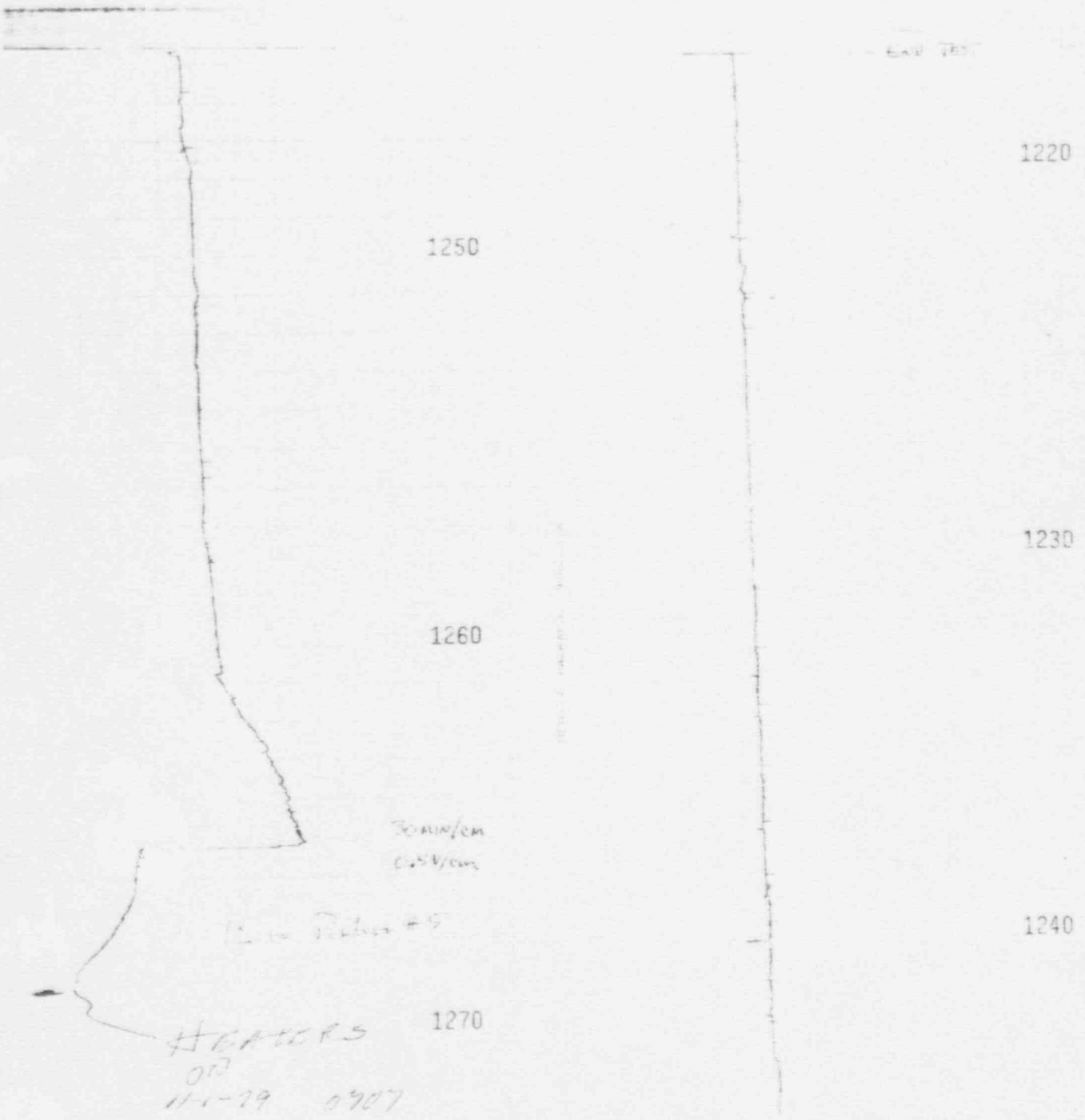
Time 24:00 hours
Chamber Environments: Temperature 64/64/64 °C
Pressure — psig

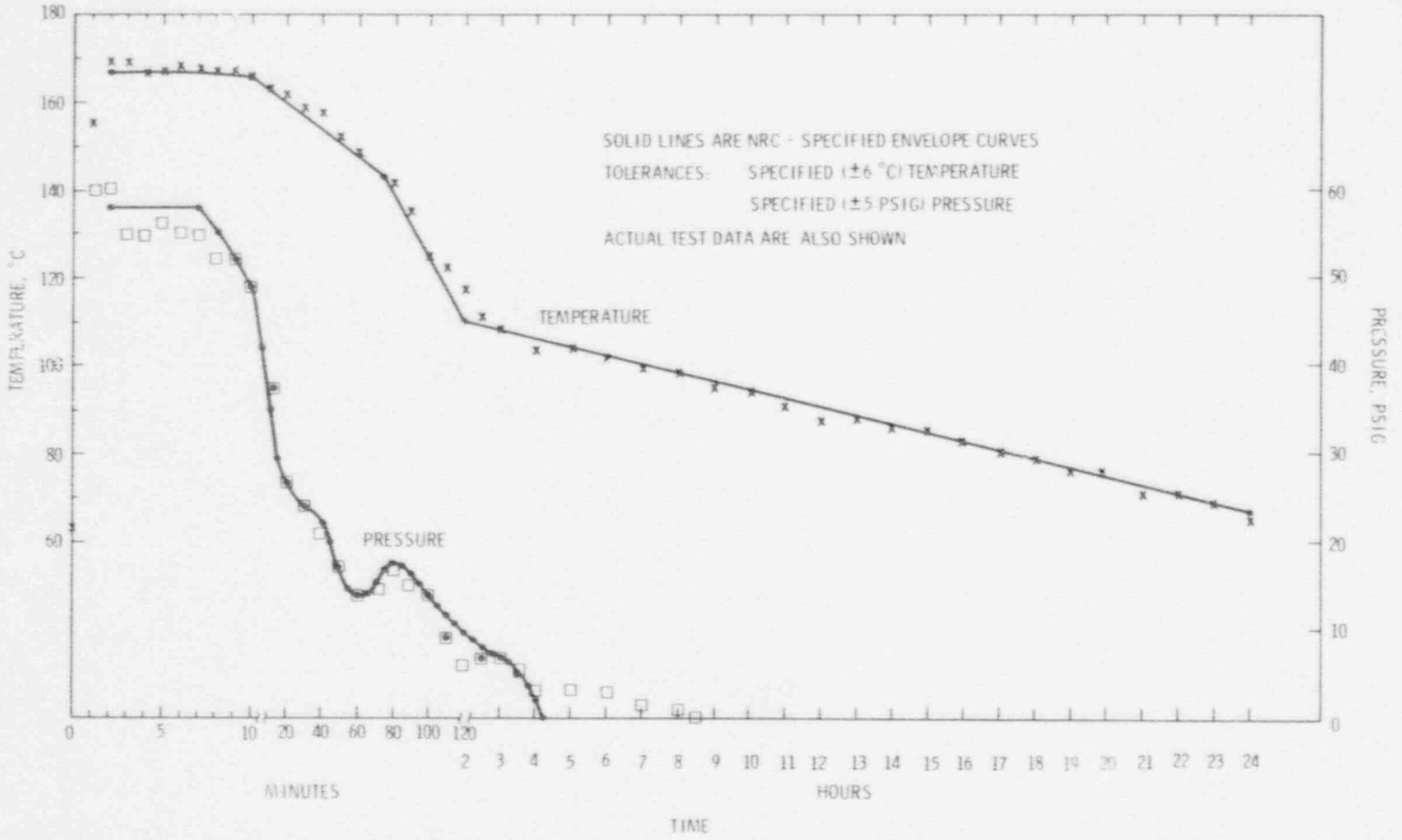
Test Items: Assembly

1	250.3	volts	.9953	amps
2	249.7	volts	.9915	amps
3	254.9	volts	1.0338	amps

Remarks: _____

Recorded by [signature]
Witnessed by [signature]
Sheet No. 33 of 33


1250
1260
1270
1220
1230
1240
30 min/cm
0.5V/cm
HEATERS
ON
11-1-79 0907



BF 3 CONNECTOR ACCIDENT TEST PROFILE OF NOVEMBER 1 & 2, 1979.

Test Procedures
Browns Ferry, Unit 3, Connectors
Accident Simulation

Objective:

These procedures describe the functional processes to achieve the accident-simulation tests of Browns Ferry Unit 3 Bendix connectors in accordance with the (effective revision of) "Connector Assembly Test Plan for Browns Ferry, Unit 3, Connectors."

Apparatus:

The simulation apparatus consists of a steam autoclave and pressure generation system (principally the boiler, accumulator, test chamber, and pressure regulators/throttles), steam or temperature conditioning equipment (principally the external strip heaters, and an inline superheater), and the connector-assemblies electrical loading and diagnostic equipment.

Associated with the simulation apparatus are the various diagnostic equipment such as pressure gauges, thermocouples, data acquisition system (data logger), and the like.

Personnel and Function:

To accomplish the simulation test, up to five functional operations must be manned. The initial test phases require five individuals; later during the quasi steady-state test phases fewer people are required, but never less than two individuals.

The test coordinator directs all operations based on the real-time data compared with the desired test profiles.

The environments regulator performs all adjustments of pressure regulators, superheater, throttle valves, and the like as directed by the test coordinator.

The connector assemblies loader performs all electrical loading and diagnostics of the connector assemblies as directed by the test coordinator.

The data taker records the various data derived from the environments monitors and other data as necessary.

The generalist provides backup support as required or as directed by the test coorindator.

External Strip Heaters:

These have two functions and modes of operation. First, to achieve an elevated chamber temperature prior to the accident-simulation test, and second, to control the long-term temperature rampdown of approximately -2°C/hour.

To achieve the elevated chamber temperature, the strip heaters are energized (in advance of the simulation test) for approximately 12 minutes, until the exterior skin thermocouple reaches about 70°C. The strip heaters are then deenergized and the test chamber is allowed to equilibrate for about 1 hour (or as necessary) until the interior selected thermocouple(s) reach 60-80°C.

Second, to control the temperature rampdown (after the steam phase), the strip heaters are periodically

energized (10-60 seconds) as required to follow the desired temperature profile. (Empirically, 10 seconds results in approximately a 1°C temperature rise.)

Boiler/Accumulator:

The accumulators are brought to approximately 150 psig in advance of the accident test in accordance with established safe operation procedures (SOP) and the valving is similarly lined-up preparatory to steam delivery to the test chamber according to the SOP.

Electrical Loading of the Connector Assemblies:

In accordance with the test plan, the 250-VDC connector assemblies will be energized throughout the entire accident test and the 480-VAC connector assemblies will be energized only during the first 5 minutes, between minutes 15 and 18, and between minutes 57 and 60.

For at least 5 minutes prior to the accident test initiation, all electrical loads will be applied to the connector assemblies to provide baseline data. The electrical loading during the test is according to the schedule described above.

In-Line Superheater:

The 20 kilowatt in-line superheater provides initial surge and quasi-steady-state superheat to the incoming steam.

Prior to test start, the superheater is energized

and its controller set at 400+°C (with a continuous flow of steam through it). The superheater is allowed to reach the desired temperature and to equilibrate as necessary.

During the test, the controller/superheater is manually adjusted as directed by the test coordinator to follow the desired temperature profile.

Accident Test Sequence:

The test coordinator will use the attached (appendix) test sequence sheets to achieve the test profile. These provide desired time/temperature/pressure/heaters/loading signatures. Based on these sequence sheets, he will direct the personnel to make necessary adjustments in the control apparatus. They also serve as a checklist to sequence operations prior to the start of the accident test.

Data Retrieval and Records

Chamber environment and connector-assemblies loading data will be periodically recorded on data logger printouts, strip charts, and/or data sheets as appropriate. During the early test phase, data will be recorded frequently (e.g., every 20-60 seconds). Later in the test the recording frequency will be adjusted to reflect the qu si-steady-state test aspects; the appropriate data will be recorded at least hourly.

Appendix -- Pre-Accident Test Checklist

✓ 1. Desired elevated chamber temperature has been accomplished.

Date/Time 11/1/79 0545

✓ 2. Boiler/accumulators at working pressures and valving lineup completed.

Date/Time 11/1/79 0855

✓ 3. In-line superheater is at desired temperature with steam flow.

Date/Time 11/1/79 0835

___ 4. Electrical loading of the connector assemblies is completed and baseline data taken.

Date/Time To start @ ~ 23:57

✓ 5. All support staff in place to accomplish test.

Date/Time 11/1/79 0545

✓ 6. All prepared to initialize data loggers and data time intervals.

Date/Time 11/1/79 0550

ZLB

Note: This form to be checked, initialed, and dated as specified.

Appendix -- Time from 23 Hours, 57 Minutes to 2 Minutes

Data Logger Hours-Min-Sec	Desired Pressure (Psig)	Desired Temperature (°C)	Electrical Loads ON/OFF	Remarks
Initialize, start, data loggers to 23-57-0				
23-57-0	0	60-80	All On	
23-58	0	60-80	All On	
23-59	0	60-80	All On	
0-0-0	0	60-80	All On	Valve alignment 1. Chamber bypass open 2. Chamber inlet open 3. Superheater bypass closed 4. Exit throttle open 1/4 turn 5. Open inline 1/4 tur regulator valve (Regulator preset; 65 psig against deadhead) 6. Bring up on regulat bypass valve
0-10	Ramp to 60 psig	75	All On	
0-20		83	All On	
0-30		92	All On	
0-40	60	100	All On	
0-50	60	109	All On	
1-0	60	117	All On	
1-10	60	125	All On	
1-20	60	133	All On	
1-30	60	142	All On	
1-40	60	150	All On	
1-50	60	159	All On	
2-0	60	167	All On	

Appendix -- Time from 2 Minutes to 7 Minutes

Data Logger Min-Sec	Desired Pressure (Psig)	Desired Temperature °C	Electrical Loads On/Off
2-0	60	167	All On
3-0	60	167	All On
4-0	59	167	All On
5-0	59	167	480V Off 250V On
6-0	58	167	Minute-5
7-0	58	167	

Appendix -- Time from 7 Minutes to 1 Hour

Data Logger Min	Desired Pressure (Psig)	Desired Temperature (°C)	Electrical Loads On/Off
7	58	167	
8	55	167	
9	52	166	
10	49	166	
11	47	166	
12	43.5	165	
13	40	165	
14	37.5	164	
15	35	164	480V on
16	32.5	164	for 3 minutes
17	30	164	15-18
18	29	163	
19	28	163	
20	27	163	
21	26.5	162	
22	26	162	
23	25.5	161	
24	25	161	
25	25	161	
26	24.5	160	
28	24	159	
30	24	159	(Remarks: Change print interva
32	23.5	158	to 1 minute; change tape.
34	23.5	157	
36	23	157	
38	22.5	156	
40	22	156	
42	21.5	155	
44	21	154	
46	20	154	
48	19	153	
50	17.5	152	
52	16	151	
54	15	151	
56	14	150	
57	14	150	480V on
58	14	149	for 3 minutes
59	14	149	57-60
60	14	148	

NOTE: 1. 250V loads ON during entire test.
2. 480V OFF after Minute 60 for accident-test duration.

Appendix -- Time from 1 Hour to 3 Hours

Data Logger Hours-Min	Desired Pressure (Psig)	Desired Temperature (°C)	Remarks
1-0	14	148	(117+ Saturated)
-5	14	147	
-10	15.5	145	
-15	17	143	
-20	17.5	139	(121+ Saturated)
-25	17	136	
-30	16	132	Change print interv to 5 minutes
-35	15	128	
-40	14	124	
-45	13	121	
-50	12	117	
-55	11	114	
2-0	10	110	(112+ Saturated)
-5	9.5	110	
-10	9.5	110	
-15	9	110	
-20	8.5	109	
-25	8	109	
-30	8	109	
-35	8	109	
-40	8	109	
-45	7.5	108	(109+ Saturated)
-50	7.5	108	
-55	7.5	108	
3-0	7	108	

Note: 1. 250V Loads ON during accident test.
2. 480V Loads OFF for accident-test duration.

Appendix -- Time from 3 Hours to 24 Hours

Data Logger Hours-Min	Desired Pressure (Psig)	Desired Temperature (°C)	Remarks
3-0	7	108	
-15	6.5	108	
-30	5	107	Start wall temperatur
-45	3.5	107	to 108°C
4-0	1.5	106	Open top center port
-15	0	106	to allow heat flow
-30	0	105	
-45	0	105	
5-0	0	104	
6	0	102	
7	0	100	
8	0	98	
9	0	96	
10	0	94	
11	0	92	
12	0	90	
13	0	88	
14	0	86	
15	0	84	
16	0	82	
17	0	80	
18	0	78	
19	0	76	
20	0	74	
21	0	72	
22	0	70	
23	0	68	
24	0	66	
	ALL LOADS OFF		

Note: 1. 250V loads ON to end of test.
2. 480V loads OFF

INSTRUMENTATION EQUIPMENT SHEET

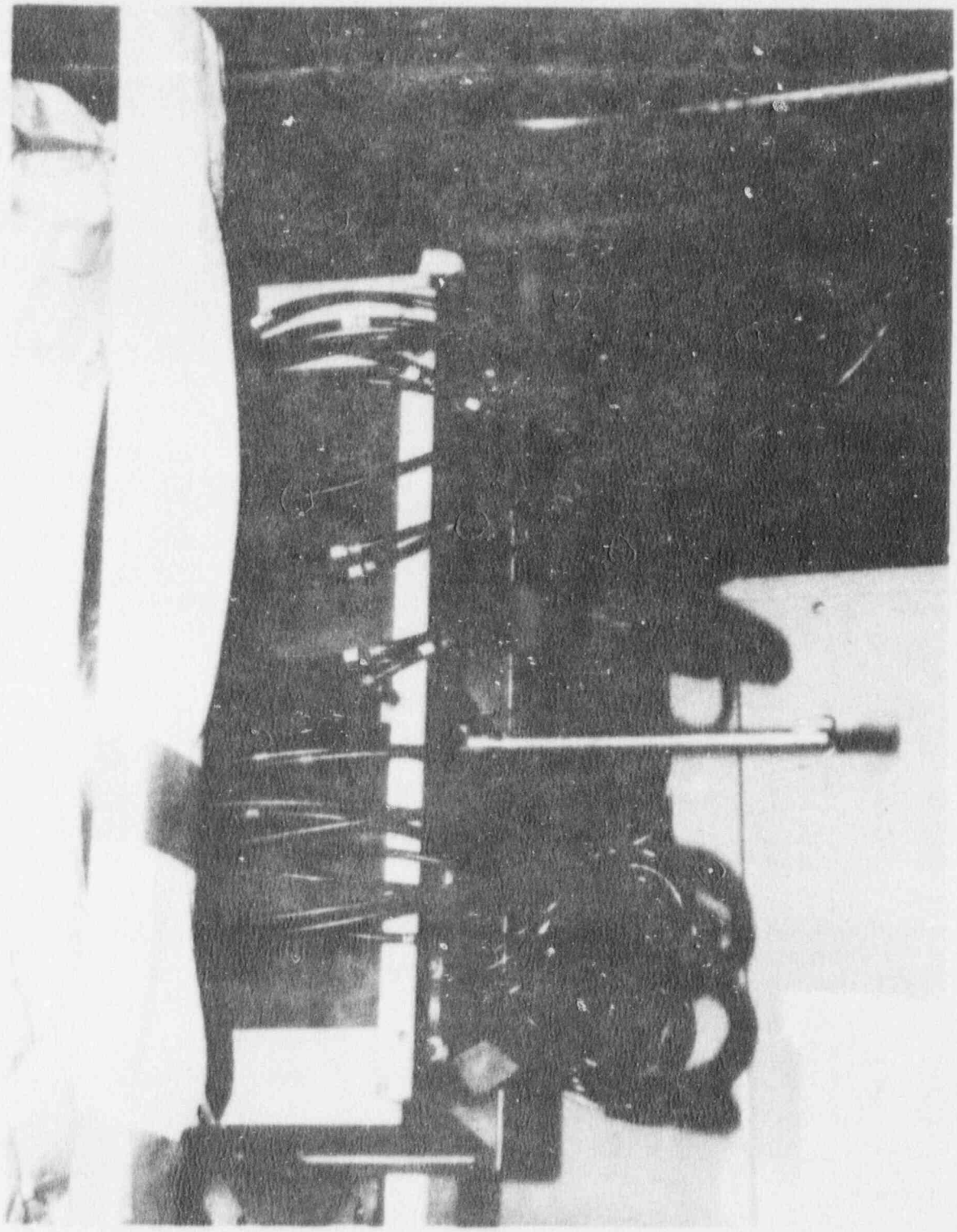
Date 11/1-2/79 Test Area GIF, TA-V

Technician D. DUGAN Project DF3 CONNECTORS Type Test ACCIDENT TEST

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	PRESSURE GAUGE	HEISE		29155		0-15 PSIG	±0.1% FS	5/4/79	5/31/80
2	DATA LOGGER	ACUREX	A901	1684	CH4[illegible]	-12°C to 120°C	±1°C ±0.05% FS	9/14/79	3/14/80

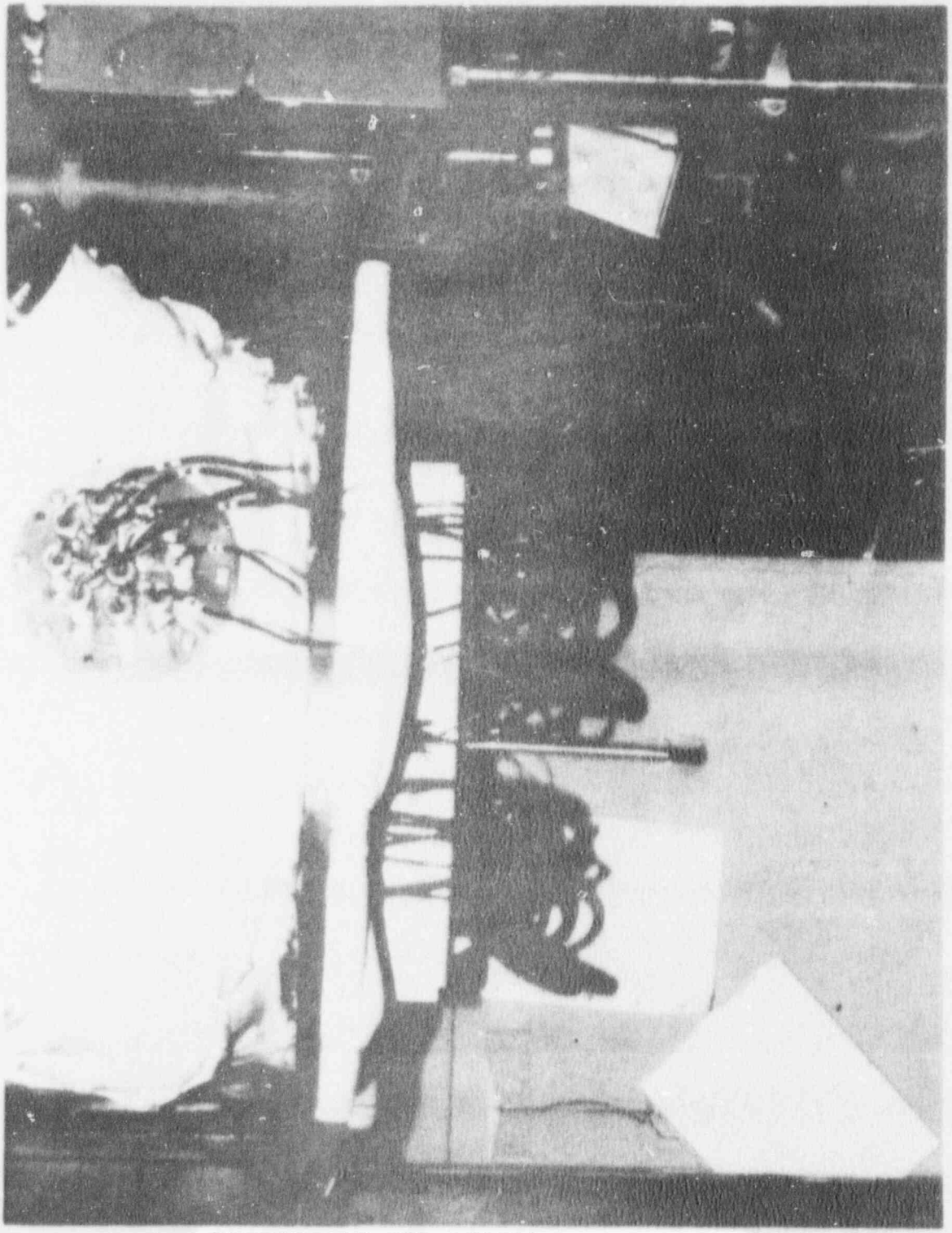
SEE ALSO "SECONDARY CHECK OF PANEL METERS" ON 9/25/79

Instrument Test Engineer _____ Checked & Received by _____



PHOTOGRAPH C79-10073A

CONNECTORS/CANS IN POSITION IN UPPER TEST CHAMBER SECTION; ALSO SHOWS POSITION OF THERMOCOUPLES



PHOTOGRAPH C79-10072A

CONNECTORS/CANS IN POSITION IN UPPER TEST CHAMBER SECTION; ALSO SHOWS POSITION OF THERMOCOUPLES AND EXITING [illegible]

SECTION IX

POST-ACCIDENT FUNCTIONAL/MECHANICAL TESTS

Post-Accident Functional/Mechanical Tests Procedures

After the electrical connectors have been exposed to the accident environments, each item will be subjected to insulation resistance, voltage, load, and dimensional tests. The test procedures outlined in the previous two applicable (Baseline) sections will be followed here as well, except (1) that the electrical loads are held constant and the operating current/voltage is recorded and (2) that the insulation resistance measurement will also be made with a volt-ohmmeter.

These post-accident functional tests are for information only and do not constitute any acceptance criteria.

DATA SHEET

Project BF3 CONNECTORS

Specimen 250 VDC

Part No 1, 2, 3

Ident. POST-ACCIDENT FUNCTIONAL LOAD/VOLTAGE Start Date 11/5/79

ITEM	INPUT VOLTAGE	LOAD RESISTANCE	LOAD VOLTAGE	INPUT CURRENT
1	~250	227.3 (COLD)	249.9	.996
2	~250	234.4 (COLD)	249.6	.997
3	~250	243.2 (COLD)	249.6	.998

Remarks

Tested by [signature] Date 11/5/79

Witness [signature] Date 11/5/79

Sheet No. 1 of 3

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 450 VAC

Part No 7, 8, 9

Ident. POST-ACCIDENT FUNCTIONAL LOAD/VOLTAGE Start Date 11/5/79

ITEM	INPUT VOLTAGE	LOAD (DC) RESISTANCE	LOAD VOLTAGE	INPUT CURRENT
7	477 VAC	28.6 (COLD)	475 VAC	17.5
8	477	25.52 (COLD)	476	16.8
9	476	26.22 (COLD)	474	17.4

Remarks

Tested by [signature] Date 11/5/79

Witness [signature] Date 11/5/79

Sheet No. 2 of 3

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen ALL

Part No

Ident. POST-ACCIDENT FUNCTIONAL IR Start Date 11/5/79

PINS (250 VAC CONNECTORS)

ITEM	K TO CASE	N TO CASE	K TO N
1	>100 MΩ	>100 MΩ	>100 MΩ
2	>100 MΩ	>100 MΩ	>100 MΩ
3	32 [redacted] MΩ	>100 MΩ	>100 MΩ

PINS (450 VAC CONNECTORS)

ITEM	9 TO CASE	10 TO CASE	9 TO 10
7	>100 MΩ	>100 MΩ	>100 MΩ
8	>100 MΩ	>100 MΩ	>100 MΩ
9	>100 MΩ	>100 MΩ	>100 MΩ

Remarks

Tested by [signature] Date 11/5/79

Witness L. Berryga Date 11/5/79

Sheet No. 3 of 3

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date 11/5/79 Test Area C&IF, TA-V

Technician D. DUGAN Project BF3 CONNECTORS Type Test POST-ACCIDENT FUNCTIONAL

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	DIGITAL MULTIMETER	FLUKE	8100A	3314	21343	0-1KMΩ 0.1-1000VDC	±0.1%+2DIGIT ±0.05%+1DIGIT	8/3/79	3/1/80
2	DIGITAL MULTIMETER	KEITHLEY	160	56735	22224	0-100MΩ	±1% READING +0.1% RANGE	6/6/79	12/6/79

Instrument Test Engineer _____ Checked & Received by _____

DATA SHEET

Project DF3 CONNECTORS

Specimen 25 VDC

Part No 1

Ident. POST- ACCIDENT DIMENSIONAL Start Date 11/6/79

NEOPRENE INSULATOR DIAMETER WIRE A

PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
A	0.051"	I	88	1	0.188"
K	0.073"	II	94	2	0.183"
M	0.070"	III	91	3	0.185"
E	0.049"				

NEOPRENE INSULATOR WAS SLIGHTLY BELOW THE END OF THE CONNECTOR PLUG BARREL

BARREL DIAMETER: 1.506" – 1.513"

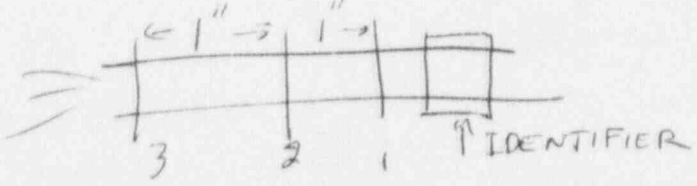
Remarks

Tested by [signature] Date 11/6/79

Witness D. Bowyer Date 11/6/79

Sheet No. 1 of 6

Approved



DATA SHEET

Project BF3 CONNECTORS

Specimen 25C VPC-

Part No 2

Ident. POST-ACCIDENT DIMENSIONAL Start Date 11/6/79

NEOPRENE INSULATOR		DIAMETER		WIRE A	
Pin	DEPTH	LOCATION	VALUE	LOCATION	ID
A	0.093"	I	88	1	0.185"
K	0.077"	II	92	2	0.192"
M	0.088"	III	86	3	0.187"
E	0.086"				

NEOPRENE INSULATOR WAS SLIGHTLY ABOVE THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER: 1.510 - 1.513"

Remarks

Tested by [signature] Date 11/6/79

Witness L. Bonzon Date 11/6/79

Sheet No. 2 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 25C VDC

Part No 3

Ident. POST-ACCIDENT DIMENSIONAL Start Date 11/6/79

NEOPRENE INSULATOR DIAMETER WIRE A

Pin	Depth	Location	Value	Location	OD
A	0.091"	I	89	1	0.154"
K	0.080"	II	93	2	0.154"
N	0.078"	III	54	3	0.154"
E	0.101"				

NEOPRENE INSULATOR WAS RAISED IN CENTER, EVEN WITH END OF THE CONNECTOR PLUG BARREL AT SIDES.

BARREL DIAMETER: 1.510 - 1.513"

Remarks

Tested by [signature] Date 11/6/79

Witness J. Dreyer Date 11/6/79

Sheet No. 3 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 45 VAC

Part No 7

Ident. TEST - ACCIDENT DIMENSIONAL Start Date 11/6/79

NEOPRENE INSULATOR DUROMETER WIRE 14

PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
1	0.074"	IV	82	1	0.205"
14	0.067"	V	83	2	0.206"
6	0.073"	VI	78	3	0.205"

NEOPRENE INSULATOR WAS CONSIDERABLY BELOW THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER: 1.968 - 1.969"

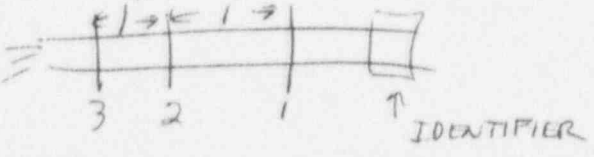
Remarks

Tested by [signature] Date 11/6/79

Witness [signature] Date 11/6/79

Sheet No. 4 of 6

Approved



DATA SHEET

Project BF3 CONNECTORS

Specimen 45 VAC

Part No 8

Ident. POST-ACCIDENT DIMENSIONAL Start Date 11/6/79

NEOPRENE INSULATOR DIAMETER

PIN	DEPTH	LOCATION	VALUE	WIRE 14 LOCATION	OD
1	0.068"	IV	81	1	0.209"
14	0.057"	V	81	2	0.207"
6	0.057"	VI	73	3	0.208"

NEOPRENE INSULATOR WAS CONSIDERABLY BELOW THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER: 1.967 - 1.975"

Remarks

Tested by [signature] Date 11/6/79

Witness L. Bruzzese Date 11/6/79

Sheet No. 5 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 45C VAC

Part No 9

Ident. POST-ACCIDENT DIMENSIONAL Start Date 11/6/79

NEOPRENE INSULATOR DUROMETER WIRE 14

PIN	DEPTH	LOCATION	VALUE	LOCATION	OD
1	0.068"	IV	77	1	0.212"
14	0.064"	V	85	2	0.203"
6	0.091"	VI	77	3	0.212"

NEOPRENE INSULATOR WAS CONSIDERABLY BELOW THE END OF THE CONNECTOR PLUG BARREL.

BARREL DIAMETER: 1.968"

Remarks

Tested by [signature] Date 11/6/79

Witness L.O. Bergeron Date 11/6/79

Sheet No. 6 of 6

Approved

INSTRUMENTATION EQUIPMENT SHEET

Date _____ _____ Test Area BLDG 57C B

Technician D. DUGAN Project BF 3 CONNECTORS Type Test POST-ACCIDENT DIMENSIONAL

No.	Instrument	Manufacturer	Model No.	Serial No.	Ident No.	Range	Accuracy	Calibration On	Calibration Due
1	SHORE TYPE A2	SHORE	TYPE A^2	—	162T3	0-100		NOT APPLICABLE	
2	CALIPERS	BROWN & SHARPE	574	—	—	0-6"/.001	±.001	NOT APPLICABLE	

Instrument Test Engineer _____ Checked & Received by _____

SECTION X

POST-TESTS INSPECTIONS

Post-Test Inspection Procedures

Each test item will be inspected and tested as described below, to assess the physical degradation of the connectors assemblies. All results and observations will be recorded on data sheets and supplemented with other pertinent documentation:

-- the insulation will be inspected for surface texture, discoloration, cracks, or splitting.

-- the connector shells, threads, and cable clamps will be inspected for general conditions.

-- the connector pins on the face side will be inspected for corrosion, oxidation, pitting, or burning.

DATA SHEET

Project BF3 CONNECTORS

Specimen 250 VDC

Part No 1

Ident. POST- TEST INSPECTION Start Date 11/6/79

INSULATION: DISCOLORED TO A BROWNISH-BLACK, SLIGHT SHRINKAGE, SOME SWELLING OF OUTER LAYER, NO CRACKS

SHELLS: EXCELLENT, SLIGHT DISCOLORIZATION OF ANODIZED SURFACE, RUBBER STRAIN-RELIEF IS CRACKED.

PINS/INSERT: EXCELLENT, NO DEGRADATION

Remarks

Tested by [signature] Date 11/6/79

Witness L. Bergen Date 11/6/79

Sheet No. 1 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 250 VDC

Part No 3

Ident. POST-TEST INSPECTION Start Date 11/6/79

INSULATION: DISCOLORED TO A BROWNISH - BLACK, SLIGHT SHRINKAGE, J WIRE SHOWED SOME PHYSICAL DAMAGE

SHELLS: EXCELLENT, SLIGHT DISCOLORIZATION OF ANODIZED SURFACE, RUBBER STRAIN-RELIEF IS CRACKED.

PINS/INSERT: EXCELLENT, NO DEGRADATION.

Remarks

Tested by [signature] Date 11/6/79

Witness L. Bergen Date 11/6/79

Sheet No. 3 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 250 VDC

Part No 3

Ident. POST-TEST INSPECTION Start Date 11/6/79

INSULATION: DISCOLORED TO A BROWNISH-BLACK, SLIGHT SHRINKAGE, J WIRE SHOWED SOME PHYSICAL DAMAGE.

SHELLS: EXCELLENT, SLIGHT DISCOLORATION OF ANODIZED SURFACE, RUBBER STRAIN-RELIEF IS CRACKED.

PINS/INSERTS: EXCELLENT, NO DEGRADATION.

Remarks

Tested by [signature] Date 11/6/79

Witness L. Bayon Date 11/6/79

Sheet No. 3 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 458 VAC

Part No 7

Ident. POST-TEST INSPECTION Start Date 11/6/79

INSULATION: DISCOLORED TO A BURGUNDY, BUBBLES IN COLOR LAYER

SHELLS: EXCELLENT, SLIGHT DISCOLORATION OF ANODIZED SURFACE, RUBBER STRAIN-RELIEF IS CRACKED.

PINS/INSERTS: EXCELLENT, NO DEGRADATION.

Remarks

Tested by [signature] Date 11/6/79

Witness [signature] Date 11/6/79

Sheet No. 4 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 48 VAC

Part No 8

Ident. POST-TEST INSPECTION Start Date 11/6/87

INSULATION: DISCOLORED TO A BURGUNDY, BUBBLES IN COLOR LAYER.

SHELLS: EXCELLENT, SLIGHT DISCOLORATION OF ANODIZED SURFACE, RUBBER STRAIN-RELIEF IS CRACKED.

PINS/INSERTS: EXCELLENT, NO DEGRADATION.

Remarks

Tested by [signature] Date 11/6/87

Witness [signature] Date 11/6/87

Sheet No. 5 of 6

Approved

DATA SHEET

Project BF3 CONNECTORS

Specimen 48CVAC

Part No 9

Ident. POST-TEST INSPECTION Start Date 11/6/79

INSULATION: DISCOLORED TO A BURGUNDY, BUBBLES IN OUTER LAYER.

SHELLS: EXCELLENT, SLIGHT DISCOLORATION OF ANODIZED SURFACE, RUBBER STRAIN-RELIEF IS CRACKED.

PIN/INSERTS: EXCELLENT, NO DEGRADATION.

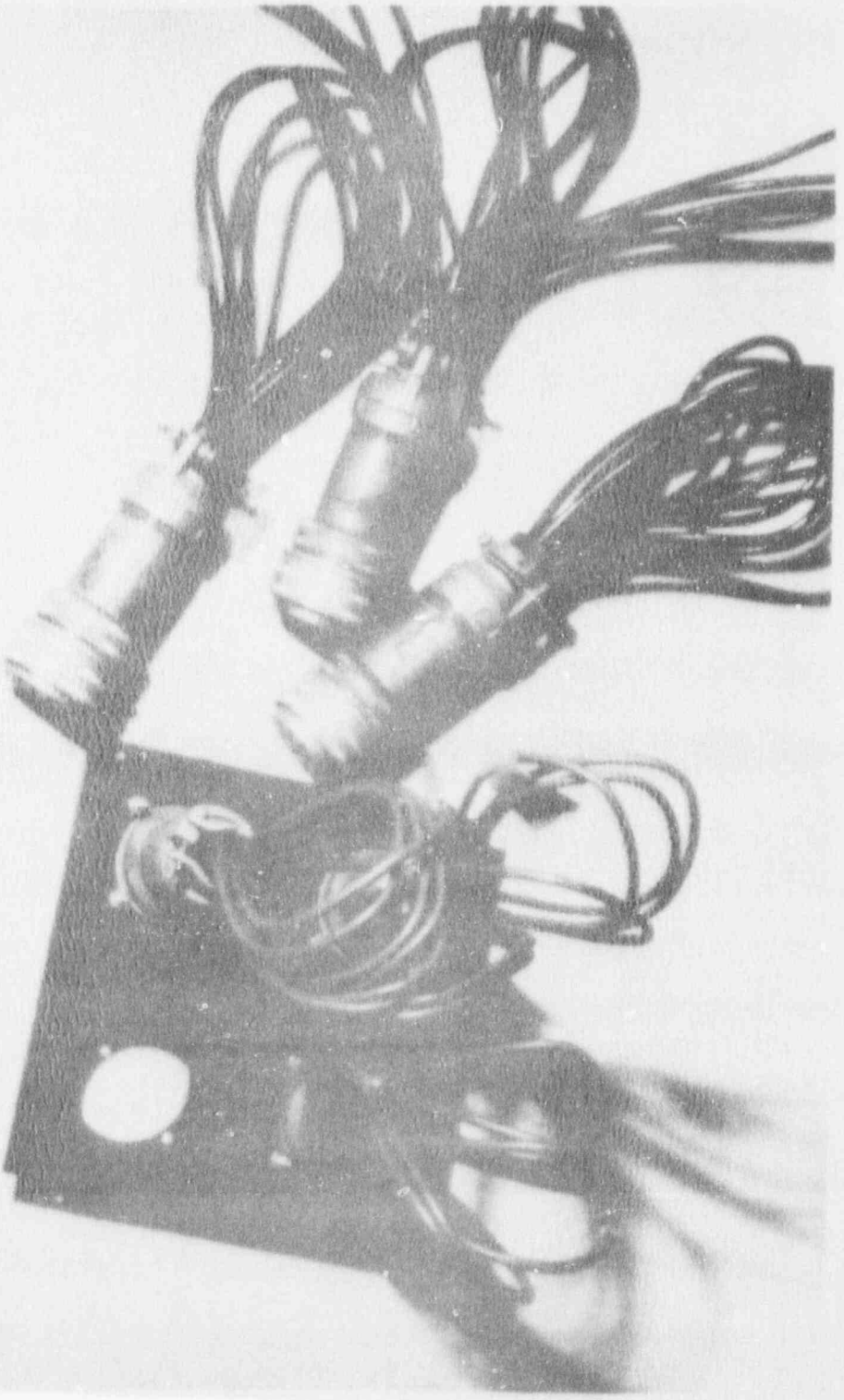
Remarks

Tested by [signature] Date 11/6/79

Witness L. Benson Date 11/6/79

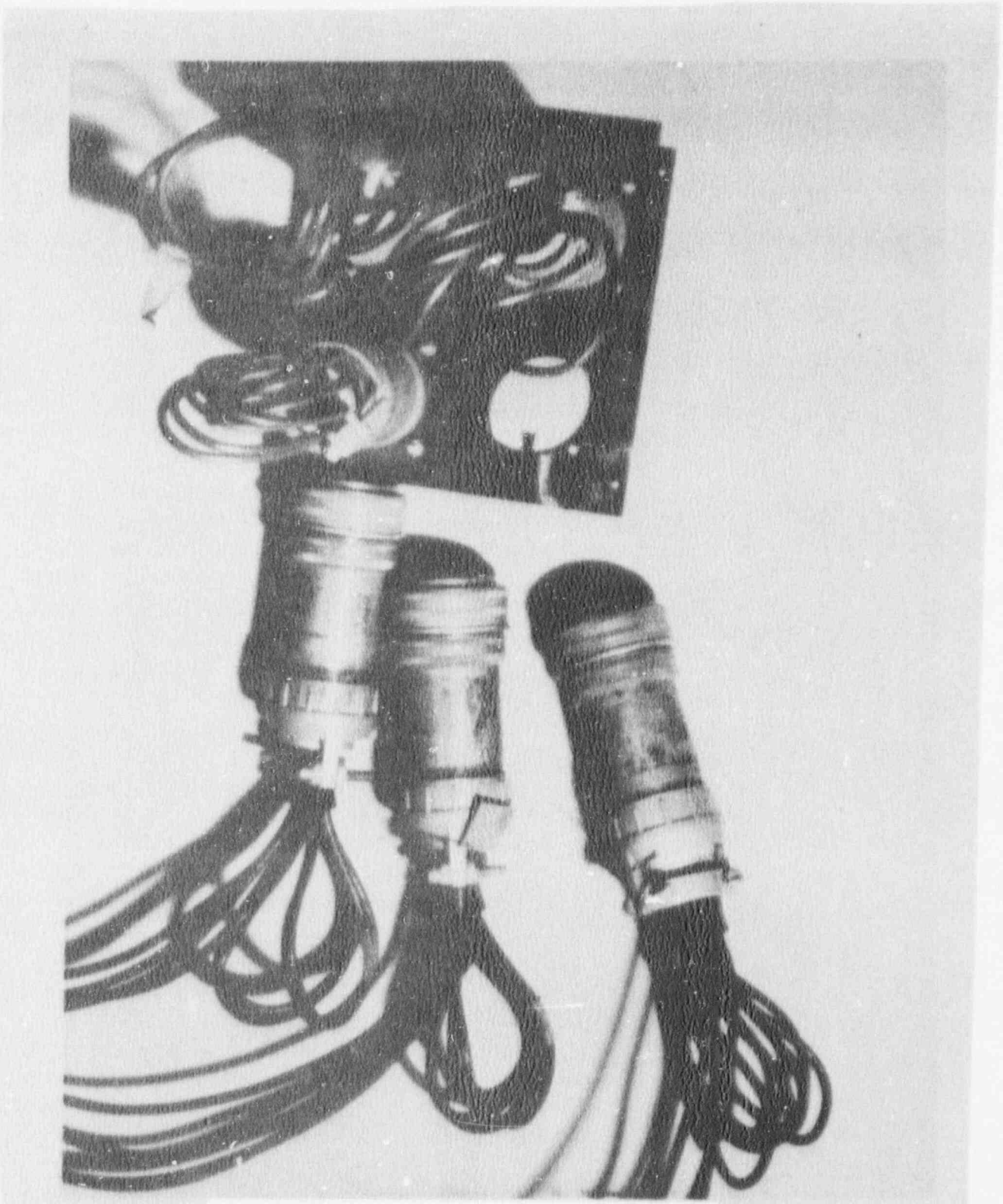
Sheet No. 6 of 6

Approved



PHOTOGRAPH C79-10071A

POST-TESTS DISASSEMBLY OF
250-VDC CONNECTORS



PHOTOGRAPH C79-10067A

POST-TESTS DISASSEMBLY OF
480-VAC CONNECTORS

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