

APPENDIX IV
INSTRUMENTATION EQUIPMENT SHEET

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INSTRUMENTATION EQUIPMENT SHEET

PAGE 1 OF 1

Page No. IV-31

Test Report No. 18056-1

DATE: 11/29/88
TECHNICIAN: B. HARDY

JOB NUMBER: 18056-00
CUSTOMER: T. V. A.

TEST AREA: LOCA
TYPE TEST: POST ACCIDENT RAD. FUNCT.

NO.	INSTRUMENT	MANUFACTURER	MODEL#	SERIAL #	WYLE #	RANGE 1	ACCURACY 1	CALDATE	CALCUE
1	MEG MTR	GENERAL RADIO	1864	1864-9700-00	106840	50K-50T OHM	2-5% RANGE	10/03/89	03/31/89
2	MEG MTR	GENERAL RADIO	1864	657113180	011898	50K-50T OHM	2-5% RANGE	10/13/88	04/11/89

THIS IS TO CERTIFY THAT THE ABOVE INSTRUMENTS WERE CALIBRATED USING STATE-OF-THE-ART TECHNIQUES WITH STANDARDS WHOSE CALIBRATION IS TRACEABLE TO THE NATIONAL BUREAU OF STANDARDS.

INSTRUMENTATION R.E. Archer 11-29-88

CHECKED & RECEIVED BY [Signature] 11-29-88

G.A. TR Hamble 11/29/88 (W.19)

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**ACCIDENT SIMULATION AND
POST-TEST FUNCTIONAL TEST**

SECTION V

ACCIDENT SIMULATION AND POST-TEST FUNCTIONAL TEST

1.0 REQUIREMENTS

1.1 Accident Simulation

The test specimens shall be subjected to the Accident Simulation (LOCA) specified in Paragraph 3.10 of Section VII.

1.2 Post-Test Functional Test

The test specimens shall be subjected to a Functional Test upon completion of the Accident Simulation (LOCA). The Functional Test shall be performed as specified in Paragraph 3.11 of Section VII.

2.0 PROCEDURES

2.1 Test Setup

2.1.1 Chamber Calibration

A "trial run" accident simulation was performed in the test chamber which encompassed the first four hours of the required profile. The "trial run" was conducted to verify the actual temperature and pressure capabilities of the test chamber. Dummy loads were placed in the chamber to approximate actual volume and mass of the test specimens. The period of the "trial run" accident simulation, which required chemical spray, was performed using a DI water solution.

2.1.2 Test Specimen Preparation

The test specimens of Cable Trays A, C, and E, were spliced to the test leads using uninsulated butt splices and Raychem WCSF-N heatshrink tubing. The test leads, butt splices, and heatshrink tubing were provided by Tennessee Valley Authority (TVA). The splices between the cable specimens and the test leads were prepared by TVA technician personnel before mounting the cable trays in the test chamber. The small cable lengths of Cable Trays A and E were used to familiarize the technicians with the test specimen material. Several of the test specimen lead ends were cut back from the original lead end due to visible cracks in the silicone rubber insulation. The first six inches of cable on both ends of each specimen was considered not to be a part of the test specimen as documented in Paragraph 2.4 of Section VII.

TVA personnel used new Tefzel cable ties to secure the test specimens to the cable trays. The cable ties were also used to secure the test specimen splices and test leads to the inclined section of each cable tray. The splices and test leads of the cable trays were secured to prevent damage to the test specimens during installation into the test chamber.

2.0 **PROCEDURES (Continued)**
2.1 **Test Setup (Continued)**
2.1.2 **Test Specimen Preparation (Continued)**

Before mounting the specimen cable trays in the chamber, the test specimens were submerged in a water bath and subjected to an Insulation Resistance Functional Test. The cable trays were then mounted in the test chamber and the test lead chamber penetrations were sealed per Wyle Laboratories' standard practice.

2.1.3 **Electrical Powering**

Each test specimen in the program was connected to an individual circuit typical of the circuit shown in Figure 3 of Section VII. The test specimens were powered as listed below:

<u>Cable Tray</u>	<u>Specimen No.</u>	<u>Circuit No.</u>	<u>Test Current (A)</u>
A	RWC-S-A.40	1	15 Amps
	RWC-S-B.40	2	15 Amps
	RWC-S-C.40	3	15 Amps
	RWC-S-D.40	4	15 Amps
	RWC-S-E.40	5	15 Amps
C	RWC-W-A.40	6	15 Amps
	RWC-W-B.40	7	15 Amps
	RWC-W-C.40	8	15 Amps
	RWC-W-D.40	9	15 Amps
	RWC-W-E.40	10	15 Amps
E	ANA-S-A.40	11	21 Amps
	ANA-S-B.40	12	15 Amps
	ANA-S-C.40	13	21 Amps
	ANA-S-D.40	14	15 Amps
	ANA-S-E.40	15	21 Amps

The applied voltage to all of the test specimens was 305 VAC with allowable tolerances for voltage and current as follows:

Voltage	+10, -0 VAC
Current	+10%, -0% of specified value

2.1.4 **Monitoring**

The test specimen circuits were monitored and recorded as specified in Paragraph 3.10.5 of Section VII. The monitored channels on the Data Acquisition System (DAS) were as follows:

2.0 **PROCEDURES (Continued)**
 2.1 **Test Setup (Continued)**
 2.1.4 **Monitoring (Continued)**

<u>Channel No.</u>	<u>Units</u>	<u>Description</u>
1	°F	Thermocouple No. 1 mounted within 2 inches of top center of Cable Tray "E"
2	°F	Thermocouple No. 2 mounted within 2 inches of top center of Cable Tray "A"
3	°F	Thermocouple No. 3 mounted within 2 inches of bottom center of Cable Tray "A"
4	°F	Average Temperature of Thermocouple Nos. 1, 2, and 3
5	PSIG	Chamber Pressure
6	GPM	Chemical Spray Flow
7-21	VAC	Circuits 1 through 15 Applied Voltage
22-36	Amps	Circuits 1 through 15 Current
37-51	mAmps	Circuits 1 through 15 Specimen Leakage

Chemical spray PH was monitored and recorded hourly during the 24-hour period in which the chemical spray was present. The Data Acquisition System (DAS) was used to monitor the environmental channels, applied voltage, current, and leakage on each of the specimen circuits. The DAS displayed requested information on a color monitor, fed a high-speed line printer, and fed a Hewlett Packard (HP) Model 1000 minicomputer. The HP 1000 stored data on hard disk and was used to generate the plots of various parameters versus time. The DAS line printer operated during the test program at the print rate listed below:

<u>Print Rate</u>	<u>Test Time (approx.)</u>	<u>Comments</u>
10 seconds	7 minutes	Initiate ramp
1 minute	22 hours 45 min.	
10 minutes	2 hours 40 min.	End chem. spray
10 seconds	5 minutes	
10 minutes	4 hours 30 min.	To end of test
15 minutes	525 hours 30 min.	

2.0 **PROCEDURES (Continued)**

2.2 **Pre-Test Wet Insulation Resistance Measurements**

2.2.1 **Initial Test**

The test specimens were subjected to insulation resistance measurements while submerged in the test chamber. The measurements were taken by applying 500 VDC for 1 minute before the reading of the resistance between each conductor (specimen, splice, and test lead out of the chamber) and chamber ground. During the insulation resistance measurements, the test chamber was flooded with tap water to a level which assured that the test specimens, splices, and test leads were submerged.

2.2.2 **Additional Tests**

Insulation resistance measurement readings were repeated on the test specimens, splices, and test leads after the accident chamber had been drained. At the Customer's request, the test specimens were left in the accident chamber and insulation resistance measurement readings were repeated approximately 48 hours after draining the chamber.

The test specimens were subjected to an additional Insulation Resistance Test before opening the accident chamber. The test occurred approximately 72 hours after draining the chamber. At the Customer's request, the test chamber was opened and Cable Tray C (RWC Watts Bar 40-year specimens) was removed. Upon removal of the cable tray, the test chamber was sealed and flooded. Insulation resistance measurements were then repeated for the test specimens mounted in Cable Trays A and E.

2.3 **Accident Exposure**

The test specimens of Cable Trays A and E were powered with the required voltage and current and were subjected to steam to stabilize at 104°F for a minimum of 30 minutes. Upon stabilization, the test specimens were subjected to the accident profile as specified in Figure 2 of Section VII. The peak conditions of 342°F at 15 PSIG were achieved within 30 seconds and the chamber temperature and pressure were varied as necessary to envelope the required profile. The specimens were subjected to chemical spray at approximately 75 minutes into the Accident Simulation and remained on for 24 hours and 22 minutes from that point. The chemical spray flow rate requirement of 7.0 gallons per minute (GPM) was determined from the 0.3 GPM per square foot test requirement specified in Paragraph 3.10.7 of Section VII. The area of chemical spray coverage was determined to be approximately 23 ft².

Intermittent voltage level fluctuations in the test facility power supply caused out-of-specification voltage and temperature/pressure levels. These out-of-specification conditions were accounted for by extending the total test time by 5 hours and 30 minutes.

2.0 **PROCEDURES (Continued)**

2.4 **Post-Test Functional Test**

Upon completion of the Accident Simulation Test, the test specimens of Cable Tray A and E were subjected to a Post-Test Functional Test. The Functional Test was performed as described in Paragraph 2.2.1 of this Section.

Upon completion of the Post-Test Functional Test, the test specimens were removed from the accident chamber and subjected to a visual inspection. The Post-Test Functional Test visual inspection was performed as specified in Paragraph 3.3.1 of Section VII.

3.0 **RESULTS**

The test specimens were subjected to the specimen preparation and the pre-test insulation resistance measurements of Paragraph 2.0. The test specimens of Cable Trays A and E were subjected to the Accident Simulation and Post-Test Functional Test of Paragraph 2.0. Results of the test specimens' performance are presented in the following paragraphs.

3.1 **Test Setup**

3.1.1 **Chamber Calibration**

Computer-generated plots of the environmental data recorded during the "trial run" are presented in the Appendices of this Section.

3.1.2 **Test Specimen Preparation**

The test leads, butt splices, and heatshrink tubing provided by TVA were received by Wyle Laboratories and documented on a Test Inspection Sheet. The descriptions of the equipment provided by TVA are presented in the appendices of this Section.

3.1.3 **Electrical Powering and Monitoring**

The test specimens of Cable Trays A and E were connected to typical circuits as presented in the appendices of this Section.

3.2 **Pre-Test Wet Insulation Resistance Measurements**

Notice of Anomaly Number 2 documents the low resistance values recorded during the pre-test wet insulation resistance measurements. The low resistance values were recorded for Test Specimens RWC-W-C.40 and RWC-W-D.40 of Cable Tray C. The accident chamber was drained and the insulation resistance measurements were repeated immediately after draining and at specified intervals. At the Customer's request, Cable Tray C was removed from the Accident Chamber and discontinued from the test program. The pre-test wet insulation resistance measurements were repeated on the test specimens of Cable Trays A and E, and testing was continued.

3.0 **RESULTS (Continued)**

3.2 **Pre-Test Wet Insulation Resistance Measurements (Continued)**

Notice of Anomaly Number 2 is presented in the Appendices of this Section. The Data Sheets generated during the insulation resistance measurements are also presented in the Appendices of this Section.

3.3 **Accident Exposure**

All of the test specimens of Cable Trays A and E successfully maintained the applied voltage and current throughout the Accident Test. Leakage currents remained within monitoring equipment tolerance levels on all specimen circuits except Circuit No. 1 (RWC-S-A.40) which reached a maximum recorded peak leakage of 9 milliamps. A plot of the recorded leakage currents for Circuit Nos. 1 through 5 and 11 through 15, inclusive, are presented in the Appendices of this Section.

Data Sheets indicating the chemical spray solution PH and flow were generated during the 24-hour period of chemical spray. The chemical spray PH, Flow Data Sheets, and a typical printout of the data monitored by the DAS are presented in the Appendices of this Section.

Notice of Anomaly Number 3 documents the extension of the post-DBE aging period. As a result of power supply line voltage fluctuations and power losses, the test specimens experienced out-of-specification conditions. A conservative estimate of the test time expended was determined to be 5 hours and 30 minutes. The test profile was extended by 5 hours and 30 minutes at the post-DBE aging temperature of 150°F (+9, -0) deg F. The test specimens remained powered during the additional test time.

Notice of Anomaly Number 4 documents the out-of-specification PH level of the chemical spray solution during the Accident Simulation (LOCA). The PH level of the solution was increased above the specification (plus tolerance) near the end of the chemical spray period. The PH level was not considered detrimental to the test specimens over the short period remaining in the chemical spray test.

Computer-generated plots of the Accident Simulation profiles (required and actual), including the Post-DBE Aging period, are presented in the Appendices of this Section.

Photographs of the specimen preparation, accident test setup, test equipment, and thermocouple locations are presented in the Appendices of this Section.

3.4 **Post-Test Functional Test**

The Data Sheet generated during the Insulation Resistance Measurement Tests is presented in the Appendices of this Section. Photographs of the test specimens in the cable trays upon completion of the Post-Test Functional Test Visual Inspection are also presented in the Appendices of this Section.

3.0 **RESULTS (Continued)**

3.4 **Post-Test Functional Test (Continued)**

Observations recorded during the Post-Test Functional Test visual inspection, with the test specimens mounted in the cable trays, are presented in the following paragraphs.

Cable Tray A was noted to have test specimens in a degraded condition. Ash coloring was most prevalent on the asbestos braided jacket material of Test Specimen B. Test Specimens C and D showed indications of rust having impregnated the jacket material near the metal surface of the cable tray. The Wyle-supplied metal identification tags on the test specimens were degraded and partially destroyed due to the chemical spray during the test. The asbestos braided jacket materials showed no indication of expanding or loosening around the silicone rubber insulation of the test specimens.

Cable Tray E was noted to have test specimens in good condition. Ash coloring was very uniform on the top side of the asbestos braided jacket material for Test Specimens B, C, D, and E. Test Specimen A was noted to have a dark black jacket material. TVA identification tags were not legible on Test Specimens C, D, and E. The Wyle-supplied metal identification tags on the test specimens were degraded and partially destroyed due to chemical spray during the test. The asbestos braided jacket material showed indications of having absorbed moisture during the Accident Test. The fibers of the jacket material were swollen and tight around the silicone rubber insulation of the test specimens.

3.5 **Appendices**

The data recorded during this phase of the test program is presented in Appendices I through VII of this section as noted below:

- Appendix I contains Notices of Anomaly Nos. 2, 3, and 4. Notice of Anomaly No. 2 documents removal of Cable Tray C from the test program. Notice of Anomaly No. 3 documents additional test time added to the post-DBE aging period of the Accident Simulation Test. Notice of Anomaly No. 4 documents an out-of-specification PH level of the chemical spray solution during the Accident Simulation Test.
- Appendix II contains Equipment Inspection Sheets for the TVA-supplied components used during test specimen preparation.
- Appendix III contains a typical wiring diagram for each of the test specimen circuits of Cable Trays A and E.
- Appendix IV contains Computer Plots V-1 through V-6 for the "trial run" and V-7 through V-26 for the Accident Simulation (LOCA). Typical line printer outputs and chemical spray PH and Flow Data Sheets are also presented.

3.0 **RESULTS (Continued)**

3.5 **Appendices (Continued)**

- Appendix V contains Photographs V-1 and V-2 of the "trial run" test setup. Photographs V-3 through V-8 show the test specimens of Cable Trays A, C, and E during the specimen preparation. Photographs V-9 through V-15 show the test specimens and equipment during various stages of the Accident Simulation Test Setup. Photographs V-16 through V-19 show the test specimens during the Post-Test Functional Test Visual Inspection.
- Appendix VI contains Data Sheets generated during Insulation Resistance Measurement Tests.
- Appendix VII contains the Instrumentation Equipment Sheets required for the Accident Simulation (LOCA) Test and the Insulation Resistance Measurement Tests.

APPENDIX I
NOTICES OF ANOMALY

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NOTICE OF ANOMALY

DATE:
December 12, 1988

NO. / CASE NO: 2 P.O. NUMBER: N/A CONTRACT NO: TV-73743A
 CUSTOMER: Tennessee Valley Authority WYLE JOB NO: 18056
 NOTIFICATION MADE TO: Kent Brown NOTIFICATION DATE: 12/07/88
 NOTIFICATION MADE BY: T. Walter VIA: In person

CATEGORY: SPECIMEN PROCEDURE TEST EQUIPMENT DATE OF ANOMALY: 12-03-88
 PART NAME: Silicone Rubber Insulated Cables PART NO. KS-500
 TEST: Accident Simulation (LOCA) I.D. NO. RWC-W 40-year
 SPECIFICATION: WLOP 18057, IPR 01 PARA. NO. 3.10

REQUIREMENTS:

After placing the test specimens, mounted in their respective cable trays, in the Accident Simulation Chamber, wet insulation resistance measurements shall be performed while the specimens are submerged.

DESCRIPTION OF ANOMALY:

During the wet insulation resistance measurement test, Cable Specimens RWC-W-C.40 and RWC-W-D.40 exhibited low resistance values, the test chamber was drained and additional insulation resistance tests were conducted. The data recorded for insulation resistance testing of the specimens is as presented in the table on the following page.

DISPOSITION · COMMENTS · RECOMMENDATIONS:

At the Customer's request, the Accident Chamber was opened on December 07, 1988 and Cable Tray C was removed. Cable Tray C contains Rockbestos (RWC) cable specimens, identified as representative for Watts Bar Power Plant, at an equivalent age of 40 years.

Upon removal of the Watts Bar cable specimens, the remaining cable specimens will be subjected to a repeat submerged insulation resistance test and the test program continued.

NOTE: IT IS THE CUSTOMER'S RESPONSIBILITY TO ANALYZE ANOMALIES AND COMPLY WITH 10 CFR PART 21.

VERIFICATION:

TEST WITNESS: Kent Brown/Don Arp
 REPRESENTING: TVA
 QUALITY ASSURANCE: Burn M Turner 12-13-88

PROJECT ENGINEER: R. J. H. [Signature] 12-13-88
 PROJECT MANAGER: [Signature] 12/13/88
 INTERDEPARTMENTAL COORDINATION: [Signature]

Notice of Anomaly No. 2
 J/N 18056
 Page 2

<u>Date</u>	<u>Functional Test</u>	<u>Medium</u>	<u>Specimen</u>	<u>Recorded Data</u>
11/30/88	Post-Specimen Preparation (prior to installation in test chamber)	Water	RWC-W-C.40 RWC-W-D.40	4.0E10 ohms 1.4E12 ohms
12/03/88	Submerged IR (specimens mounted in flooded test chamber)	Water	RWC-W-C.40 RWC-W-D.40	1.1E7 ohms 9.5E5 ohms
12/03/88	Insulation Resistance (specimens mounted in test chamber - readings taken after draining chamber)	Air	RWC-W-C.40 RWC-W-D.40	2.0E7 ohms 1.8E6 ohms
12/05/88	Insulation Resistance (specimens mounted in test chamber - readings taken approximately 48 hours after draining chamber)	Air	RWC-W-C.40 RWC-W-D.40	1.4E5 ohms @ 10V 6.0E5 ohms
12/06/88	Insulation Resistance (specimens mounted in test chamber - readings taken prior to opening chamber to remove Cable Tray C)	Air	RWC-W-A.40 RWC-W-C.40 RWC-W-D.40 RWC-W-E.40	4.0E7 ohms 3.0E5 ohms @ 100V 1.0E6 ohms 1.1E8 ohms

All remaining 40-year cable specimens not listed above maintained insulation resistance values in excess of 1.0E11 ohms during all functional tests.

NOTICE OF ANOMALY

DATE:
December 30, 1988

NOTICE NO: 3 P.O. NUMBER: N/A CONTRACT NO: TV-73743A
 CUSTOMER: Tennessee Valley Authority WYLE JOB NO: 18056
 NOTIFICATION MADE TO: Kent Brown NOTIFICATION DATE: 12/28/88
 NOTIFICATION MADE BY: T. Walter VIA: Telephone

CATEGORY: SPECIMEN PROCEDURE TEST EQUIPMENT DATE OF ANOMALY: 12/28/88
 PART NAME: Silicone Rubber Insulated Cables PART NO. KS-500 & CC-2193 Nuclezil
 TEST: Accident Simulation (LOCA) I.D. NO. RWC-S & ANA-S 40-year
 SPECIFICATION: WLQP 18057, IPR 01 PARA. NO. 3.10.4

REQUIREMENTS:

The test specimens shall be powered continuously throughout the Accident Simulation with an applied voltage of 305 (+10, -0) VAC. Individual specimen circuits shall be powered at 15 or 20 Amps (+10%, -0%), as applicable.

DESCRIPTION OF ANOMALY:

Review of the Accident Simulation data printout sheets indicated that the test specimens experienced out-of-specification voltages and chamber temperature/pressure. The out-of-specification conditions were determined to be the result of power supply line voltage fluctuations at the test facility and power losses.

DISPOSITION - COMMENTS - RECOMMENDATIONS:

A conservative estimate of test time expended during low voltage levels and out-of-specification chamber temperature/pressure was determined to be 5 hours 30 minutes.

The test profile shall be extended by 5 hours 30 minutes at the post-DBE aging temperature of 150°F (+9, -0) deg F. The test specimens shall remain powered during the extended test profile.

NOTE: IT IS THE CUSTOMER'S RESPONSIBILITY TO ANALYZE ANOMALIES AND COMPLY WITH 10 CFR PART 21.

VERIFICATION: PROJECT ENGINEER: Robert Smith 12-30-88
 TEST WITNESS: N/A PROJECT MANAGER: Don Smith 12/30/88
 REPRESENTING: N/A INTERDEPARTMENTAL COORDINATION: 230
 QUALITY ASSURANCE: Gill Smith 1/3/89

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(Eastern Operations)

NOTICE OF ANOMALY

DATE:
January 26, 1989

NOTICE NO: 4 P.O. NUMBER: N/A CONTRACT NO: EV-73743A
CUSTOMER: Tennessee Valley Authority WYLE JOB NO: 18056
NOTIFICATION MADE TO: Kent Brown/Don Ard NOTIFICATION DATE: 01/25/89
NOTIFICATION MADE BY: T. Walter VIA: In person

CATEGORY: SPECIMEN PROCEDURE TEST EQUIPMENT DATE OF ANOMALY: 12/09/88
PART NAME: Silicone Rubber Insulated Cables PART NO. KS-500 & CC-2193 Nuclezil
TEST: Accident Simulation (LOCA) I.D. NO. RWC-S & ANA-S 40-year
SPECIFICATION: WLQP 18057, IPR 01 PARA. NO. 3.10.7

REQUIREMENTS:

The chemical spray PH requirement for the Accident Simulation shall be 8.35 (+1, -0) at 25°C.

DESCRIPTION OF ANOMALY:

At approximately 22 hours into the 24-hour chemical spray requirement, caustic was added to the chemical spray solution in order to increase the PH level. The resulting PH level was measured to be 9.5.

DISPOSITION - COMMENTS - RECOMMENDATIONS:

The out-of-specification PH level was considered to be nominal compared to the chemical spray PH requirement. The remaining period of chemical spray at the elevated PH level did not appear to cause adverse effects upon the test specimens.

NOTE: IT IS THE CUSTOMER'S RESPONSIBILITY TO ANALYZE ANOMALIES AND COMPLY WITH 10 CFR PART 21.

VERIFICATION: PROJECT ENGINEER: Robert L. Walter 01-26-89
TEST WITNESS: N/A PROJECT MANAGER: Don Smith 1/27/89
REPRESENTING: N/A INTERDEPARTMENTAL COORDINATION: SM
QUALITY ASSURANCE: Kevin M. Turner 2-2-89

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APPENDIX II
EQUIPMENT INSPECTION SHEET

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TEST SPECIMEN INSPECTION
RTW

Page No. V-19
Test Report No. 18056-1
CHECK AS APPROPRIATE

CUSTOMER TENNESSEE VALLEY AUTHORITY
JOB NO. 18056
SPECIFICATION WLQP 18057-00
DATE 10-24-88

CONDITION SATISFACTORY
SAME I.D. AS SPEC
PHOTO TAKEN

ITEM NO.	DESCRIPTION.	MANUF.	PART/MODEL NO.			
1.0	BUTT SPLICES - 90 EACH 10-12 AWG	AMP	330369	N/A	YES	No
	PACKAGE TAG AS FOLLOWS:					
	ANP-717N 90 EA					
	QA II BRN LG-349138					
	TT#5 10-20-87					
	P/N 330369 C199-CL6					
	DEDICATED MATERIAL					
	PLG No. 5192					
	T/A 19586 (SNP-1-87)					
2.0	REDUCING BUTT SPLICES					
	20 EACH COATED BLUE	N/A	N/A	N/A	YES	No
	SHIPPING TICKET NO.					
	SSB-8A08 DESCRIBES THE					
	ITEMS AS FOLLOWS:					
	ADAPTER FOR BUTT SPLICE					
	CONN. FOR ADAPTING SIZE					
	12-10 AWG TO 16-14 AWG					
	AMP CAT No. 327637					
	ARC-6608					
	C197-D1					
	269738					

NOTES: - NOT TEST SPECIMENS -

Specimen Failed NONE
Specimen Passed N/A
NOA Written NONE

Inspected By Robert L. ... Date: 10-21-88
Witness N/A Date: _____
Sheet No. 1 of 2
Approved Holly Carr 1/23/89

TEST SPECIMEN INSPECTION

Page No. V-20
Test Report No. 18056-1
CHECK AS APPROPRIATE

CUSTOMER TENNESSEE VALLEY AUTHORITY
 JOB NO. 18056
 SPECIFICATION WLQP 18057-00
 DATE 10-24-88

CONDITION SATISFACTORY SAME I.D. AS SPEC	PHOTO TAKEN	
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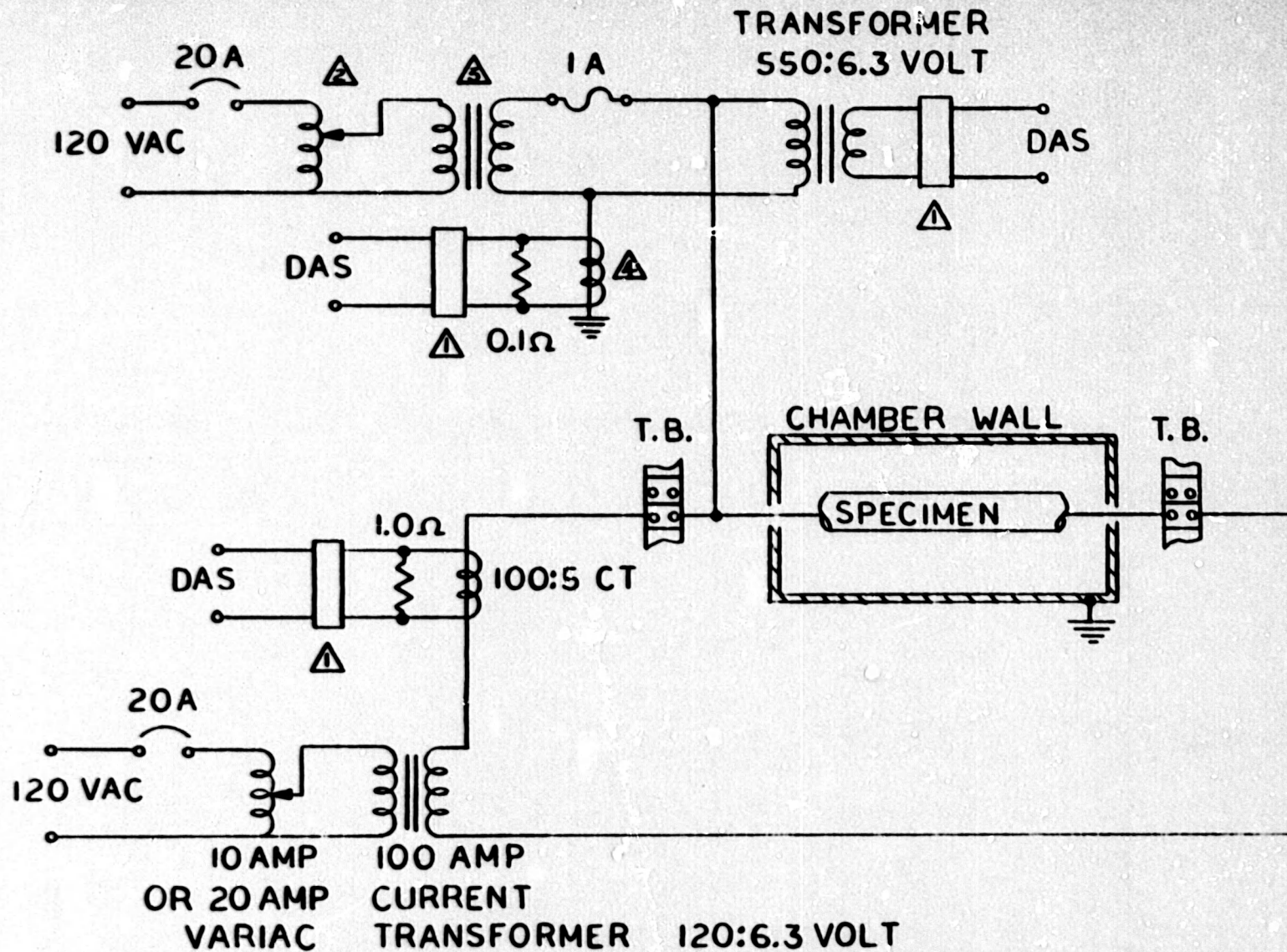
ITEM NO.	DESCRIPTION	MANUF.	PART/MODEL NO.			
3.0	HEAT SHRINK SLEEVING 1/2" LONG PIECES - 90 EA ADDITIONALLY, SHIPPING TICKET NO. 558-8408 DESCRIBES THE ITEMS AS FOLLOWS: BBI-554F R27-5 RD059618	RANHEM	WCSF 115-N	N/A	YES	NO
4.0	3 X 500 FT REELS OF 1/2" #10 AWG FWL SIF CABLE SHIPPING ORDER NO. 093/7505 IDENTIFIES CUSTOMER'S ORDER NO. AS BBNLK-74953A AND LOC TO BSS-4-002	RKKBESTOS	AB3-0116	N/A	YES	NO

NOTES: — NOT TEST SPECIMENS —

Specimen Failed <u>NONE</u>	Inspected By <u>[Signature]</u> Date: <u>10-24-88</u>
Specimen Passed <u>N/A</u>	Witness <u>N/A</u> Date: _____
NOA Written <u>NONE</u>	Sheet No. <u>2</u> of <u>2</u>
	Approved <u>[Signature]</u> <u>1/23/89</u>

APPENDIX III
TYPICAL ACCIDENT TEST SETUP

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- ▲ AC/DC CONVERTER
- ▲ 10 OR 20 AMP VARIAC PER 5 ISOLATION TRANSFORMERS
- ▲ ISOLATION TRANSFORMER — 120:600 VOLT
- ▲ MULTI-TAP CURRENT TRANSFORMER 5:20 OR 5:25

TYPICAL TEST SETUP

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APPENDIX IV
COMPUTER PLOTS AND ACCIDENT DATA

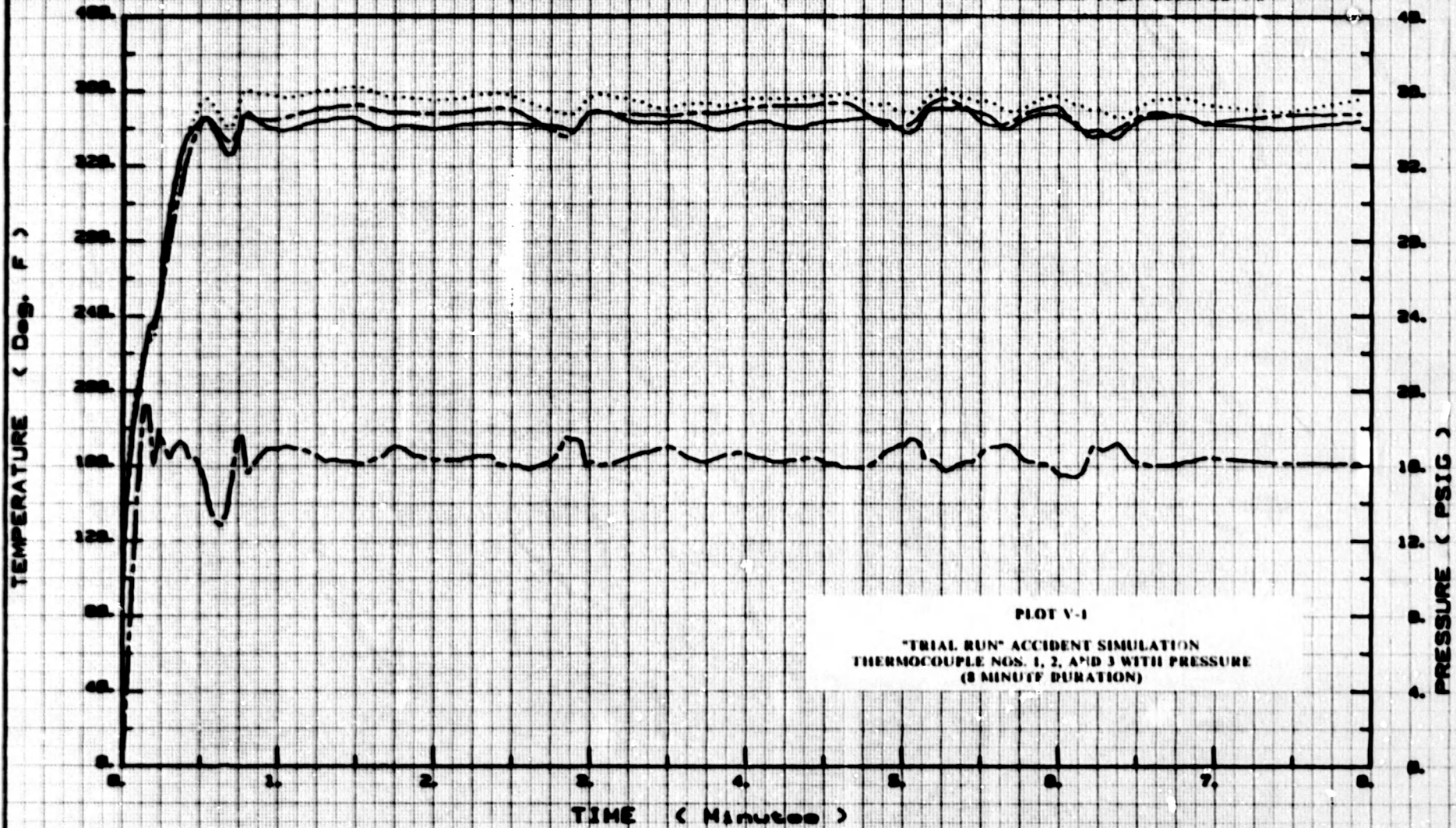
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TRIAL RUN COMPUTER PLOTS

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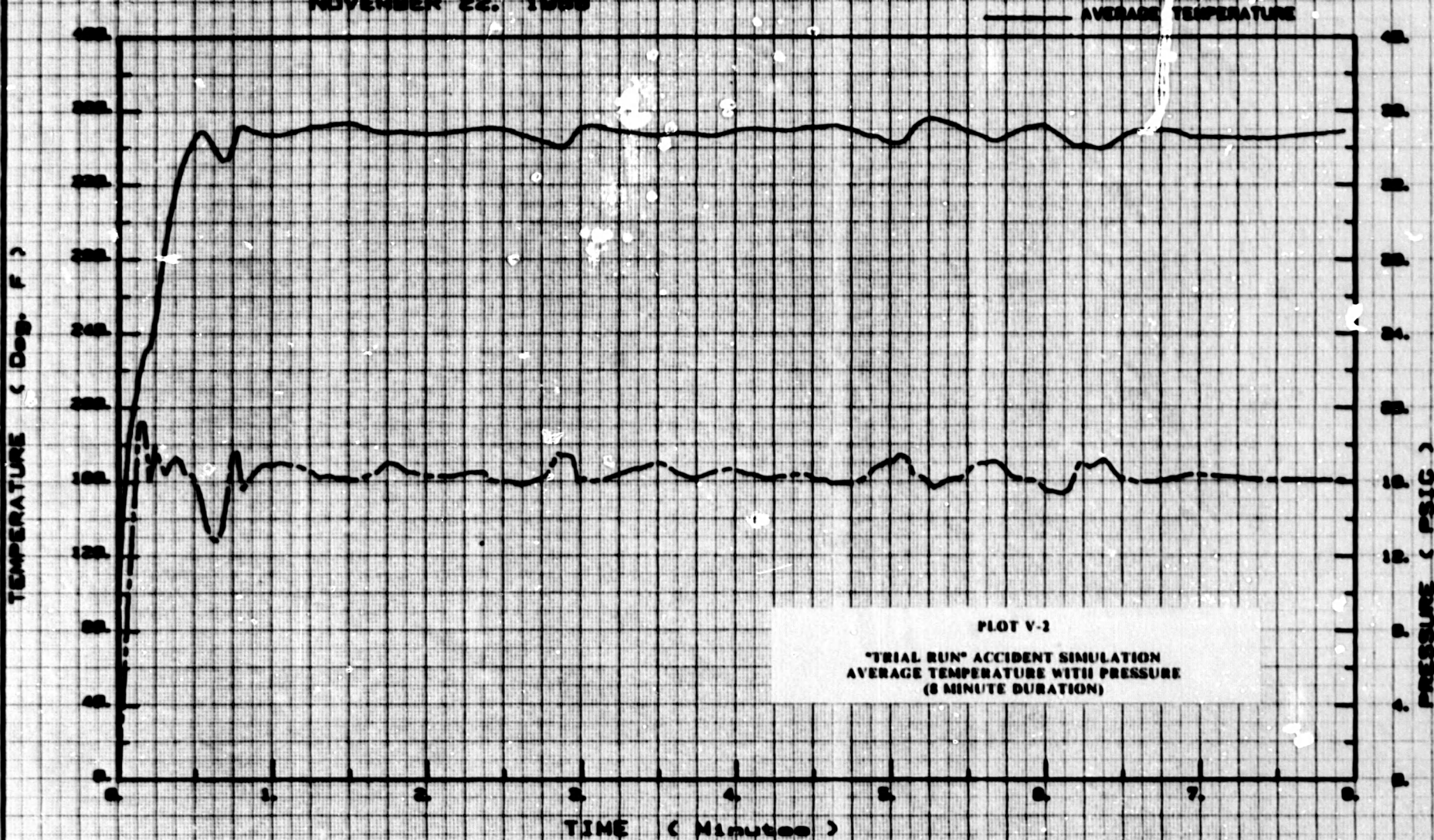
TVA 18056
TRIAL RUN
NOVEMBER 22, 1960

--- THERMOCOUPLE #1
..... THERMOCOUPLE #2
—— THERMOCOUPLE #3



PLOT V-1
"TRIAL RUN" ACCIDENT SIMULATION
THERMOCOUPLE NOS. 1, 2, AND 3 WITH PRESSURE
(8 MINUTE DURATION)

TVA 1955B
TRIAL RUN
NOVEMBER 22, 1955

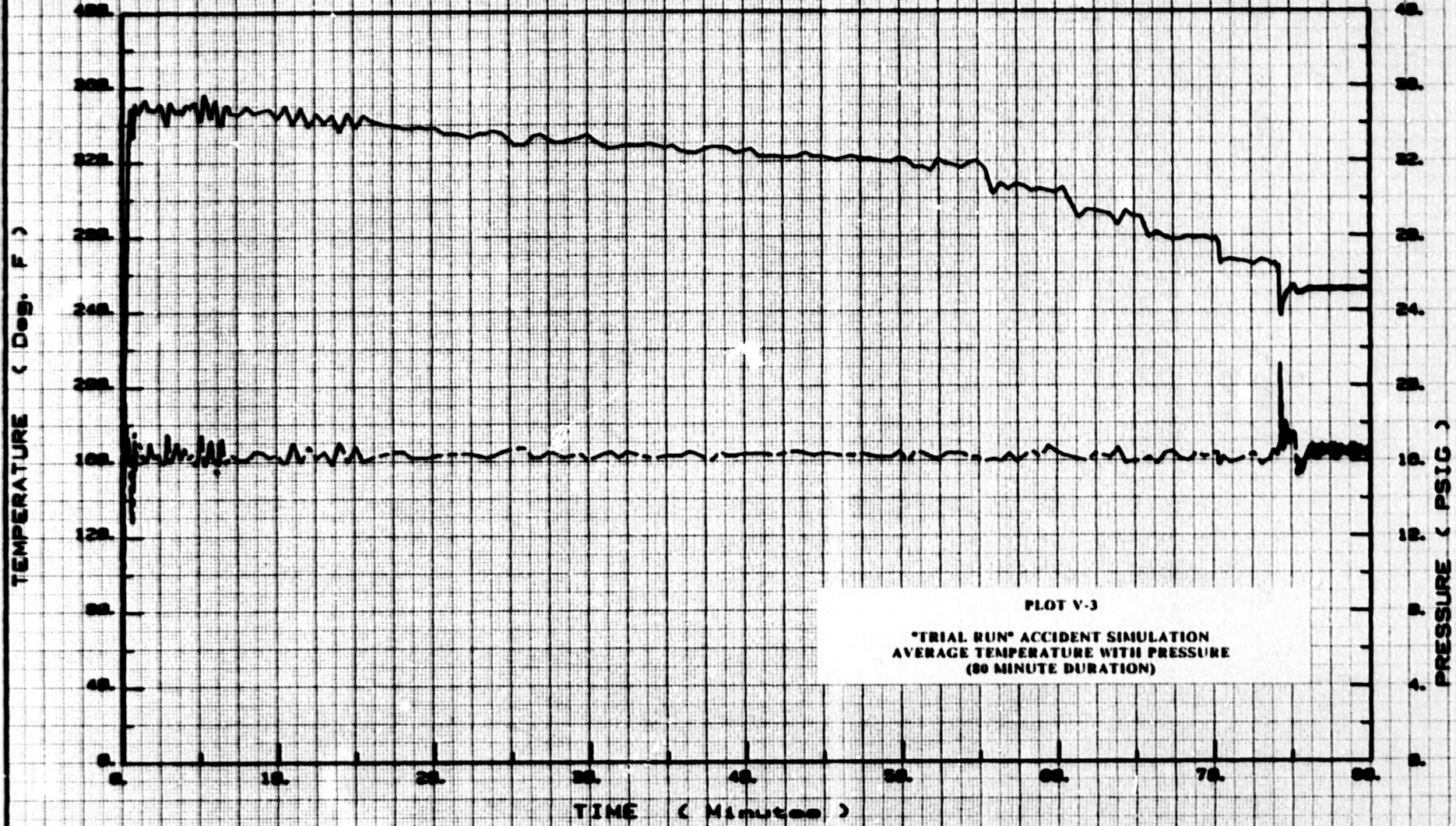


PLOT V-2
"TRIAL RUN" ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH PRESSURE
(8 MINUTE DURATION)

U.S. GOVERNMENT PRINTING OFFICE: 1955

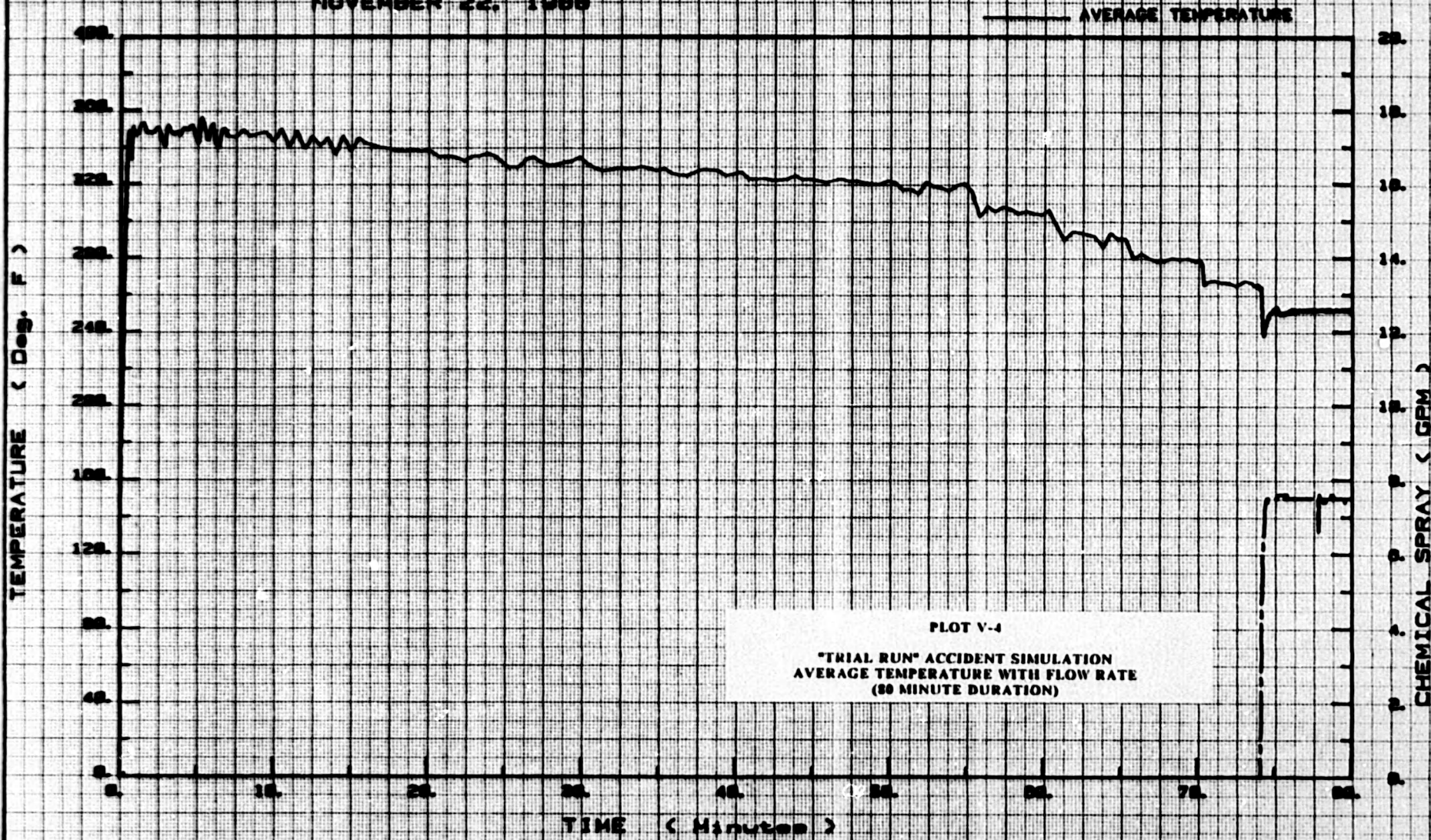
TVA 18050
TRIAL RUN
NOVEMBER 22, 1988

— AVERAGE TEMPERATURE



PLOT V-3
"TRIAL RUN" ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH PRESSURE
(80 MINUTE DURATION)

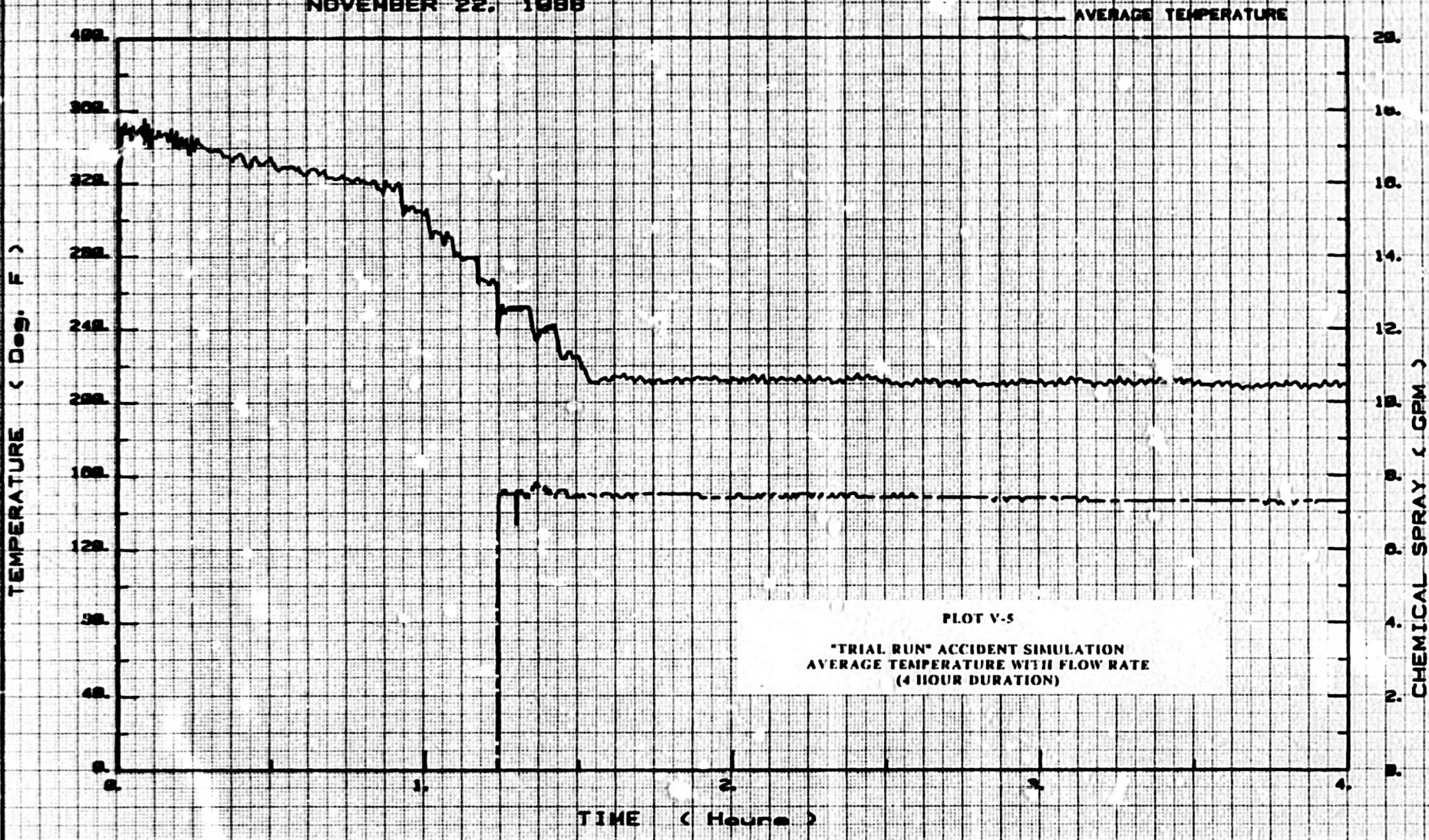
TVA 18050
TRIAL RUN
NOVEMBER 22, 1980



PLOT V-4
"TRIAL RUN" ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH FLOW RATE
(90 MINUTE DURATION)

10 X 10 TO THE CENTIMETERS 1/8" 20

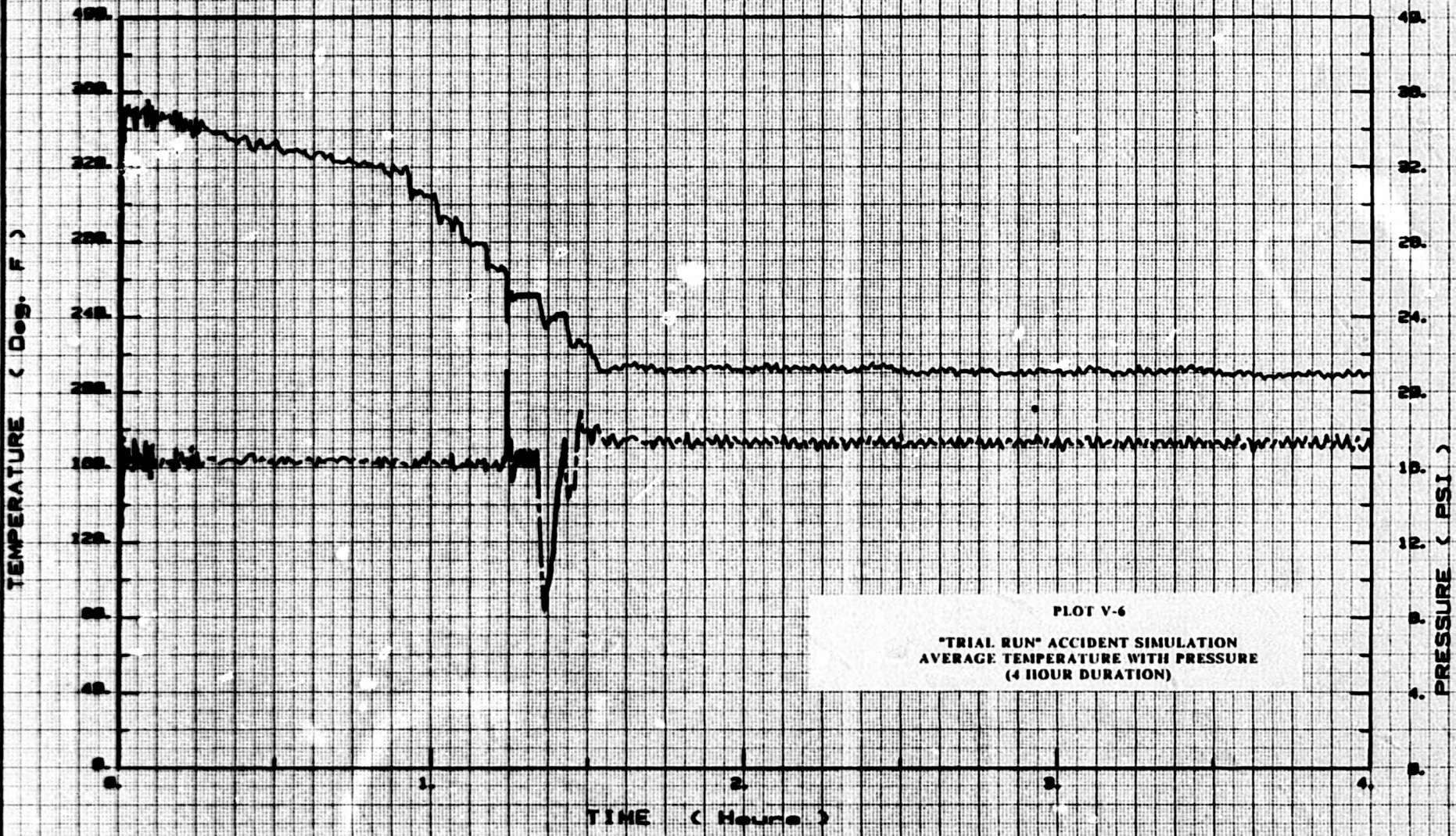
TVA 1805B
TRIAL RUN
NOVEMBER 22, 1988



PLOT V-5
"TRIAL RUN" ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH FLOW RATE
(4 HOUR DURATION)

TVA 18056
TRIAL RUN
NOVEMBER 22, 1988

AVERAGE TEMPERATURE



PLOT V-6
"TRIAL RUN" ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH PRESSURE
(4 HOUR DURATION)

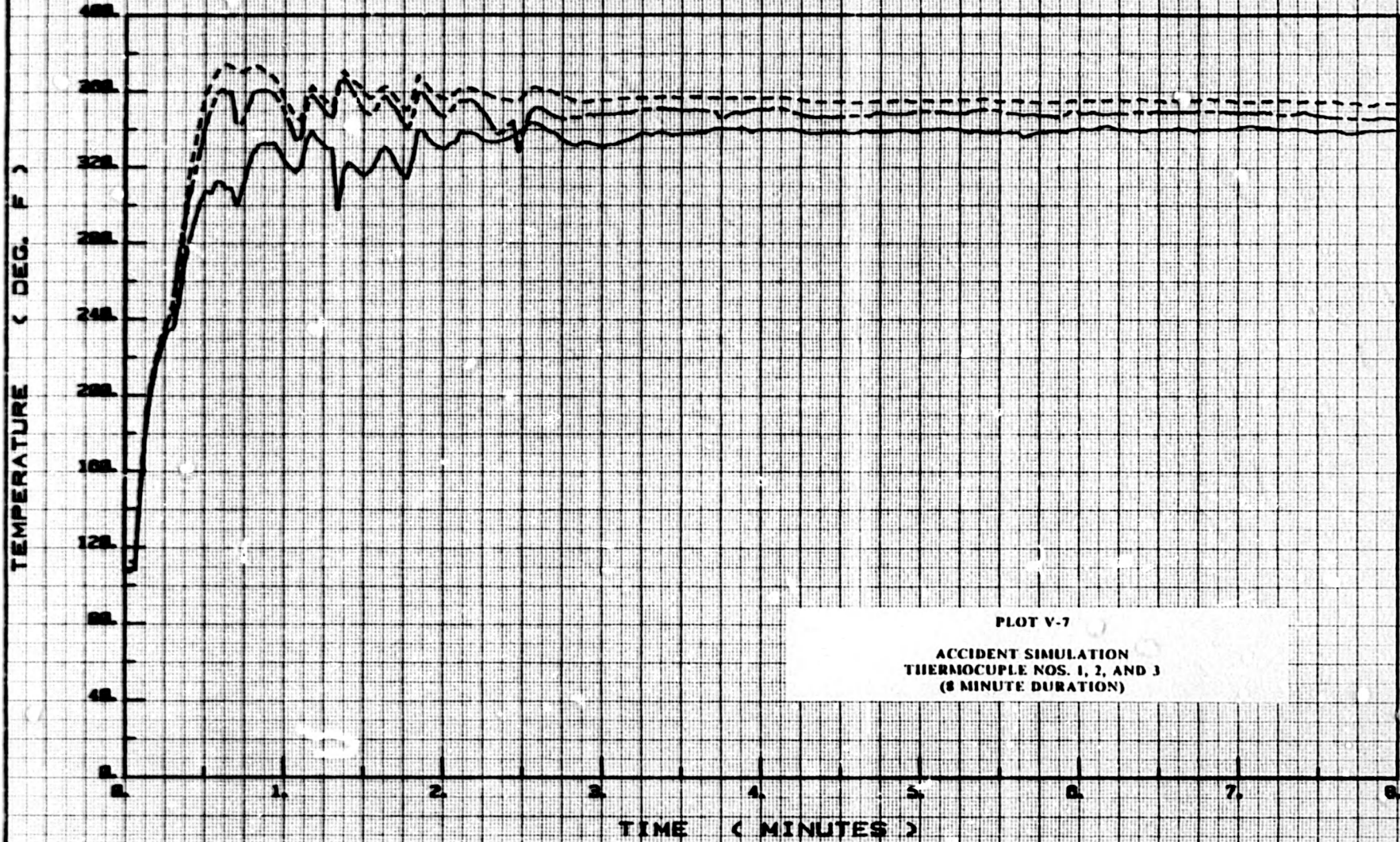
10. x 10 TO THE CENT/METER/INCH

**ACCIDENT SIMULATION (LOCA)
COMPUTER PLOTS**

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LOCA SIMULATION
TVA 18056
DECEMBER 8, 1988

----- THERMOCOUPLE #1
----- THERMOCOUPLE #2
----- THERMOCOUPLE #3

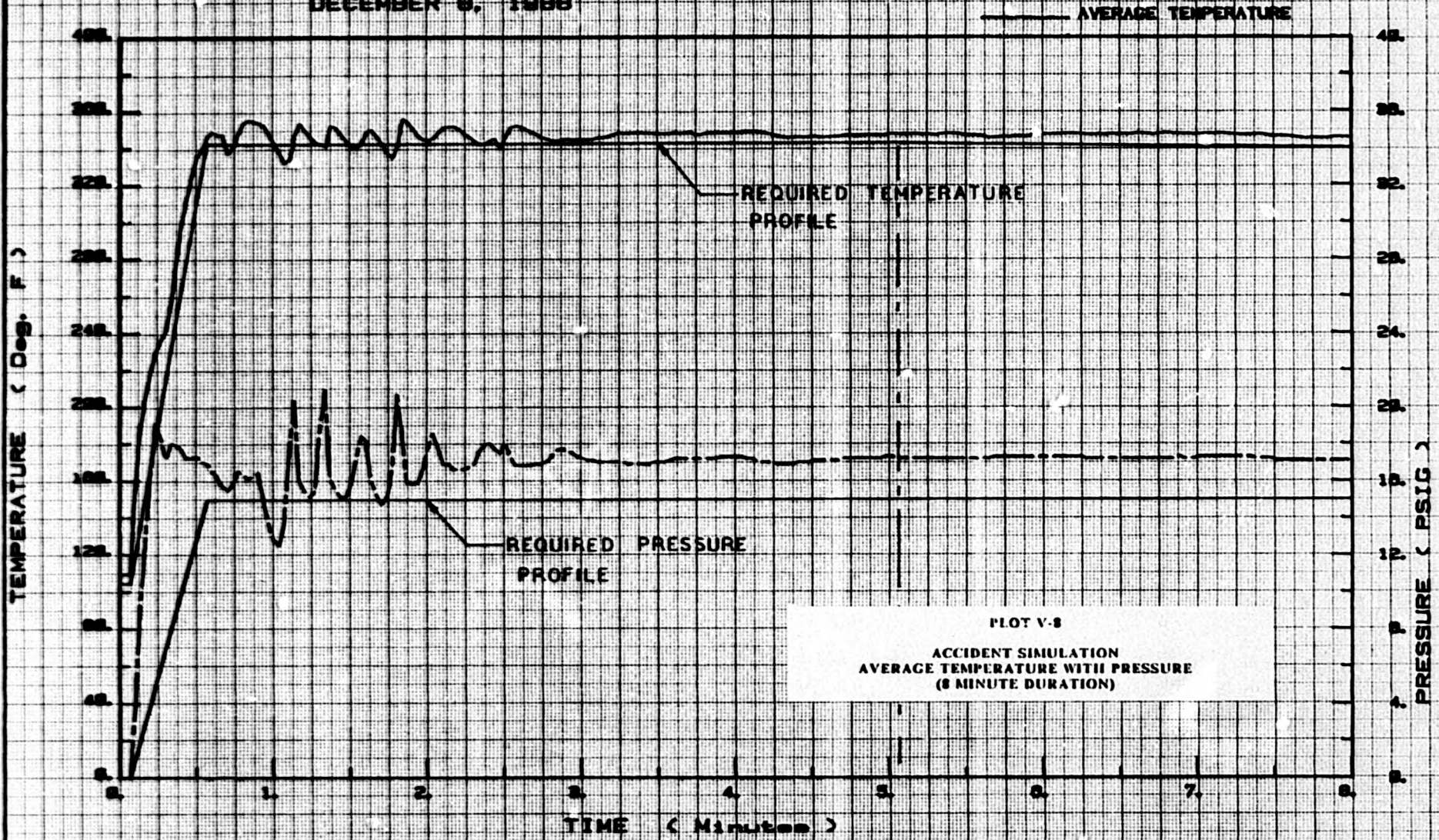


PLOT V-7
ACCIDENT SIMULATION
THERMOCOUPLE NOS. 1, 2, AND 3
(8 MINUTE DURATION)

WYLE

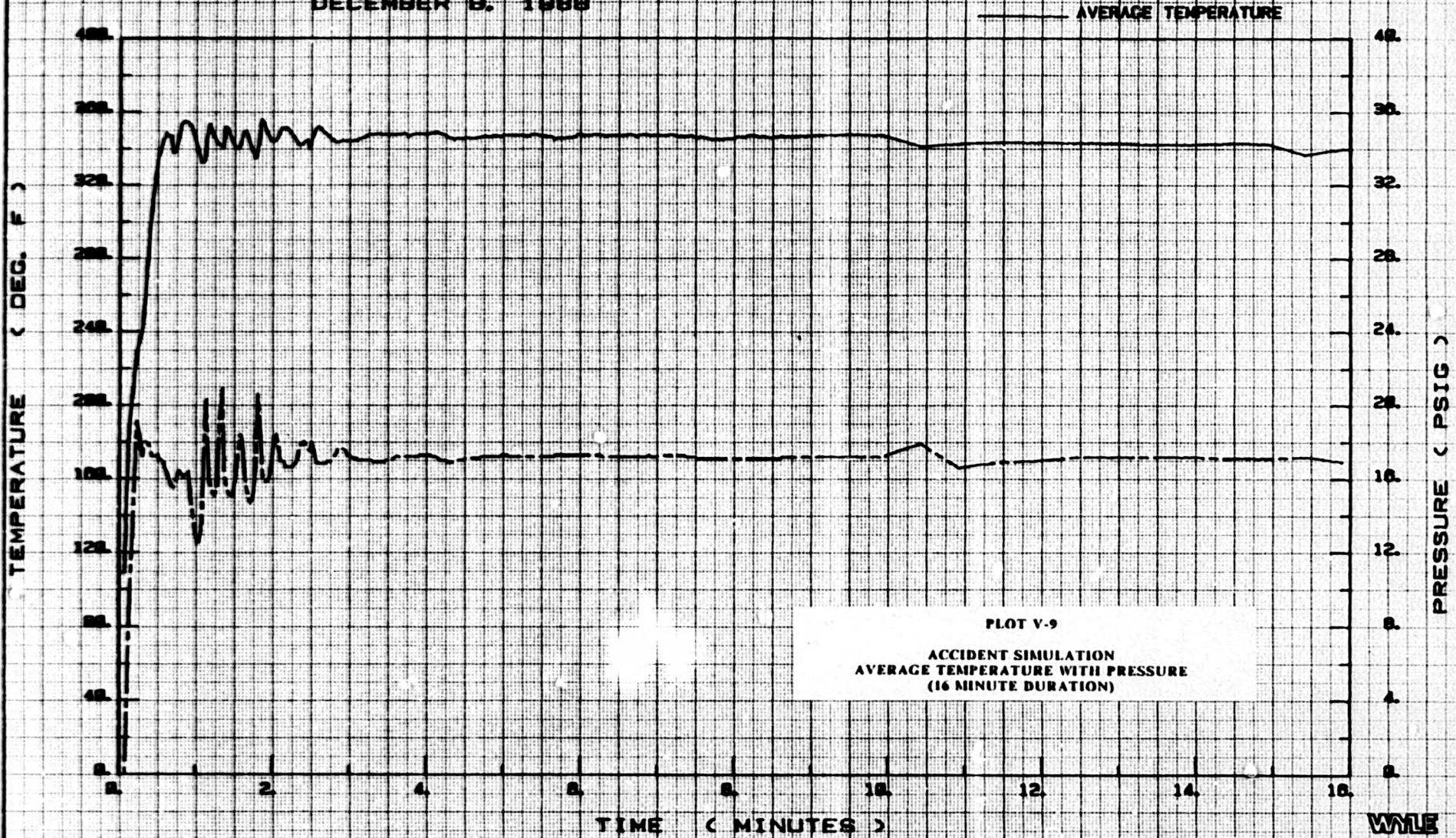
0.0 X 10 TO THE CENT. METER 0.0000

LOCA SIMULATION
TVA 18056
DECEMBER 8, 1988

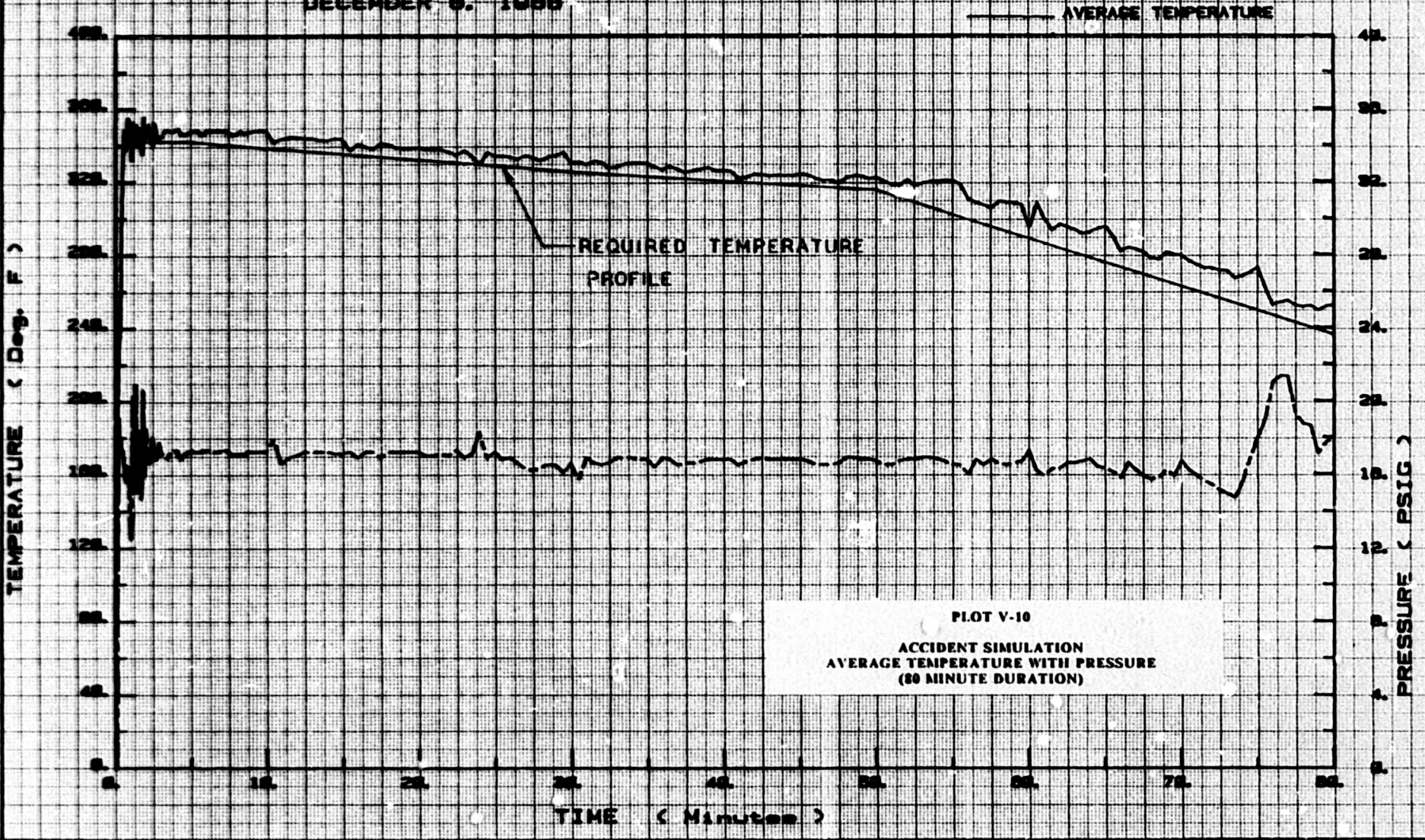


PLOT V-8
ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH PRESSURE
(8 MINUTE DURATION)

LOCA SIMULATION
TVA 18056
DECEMBER 8, 1988



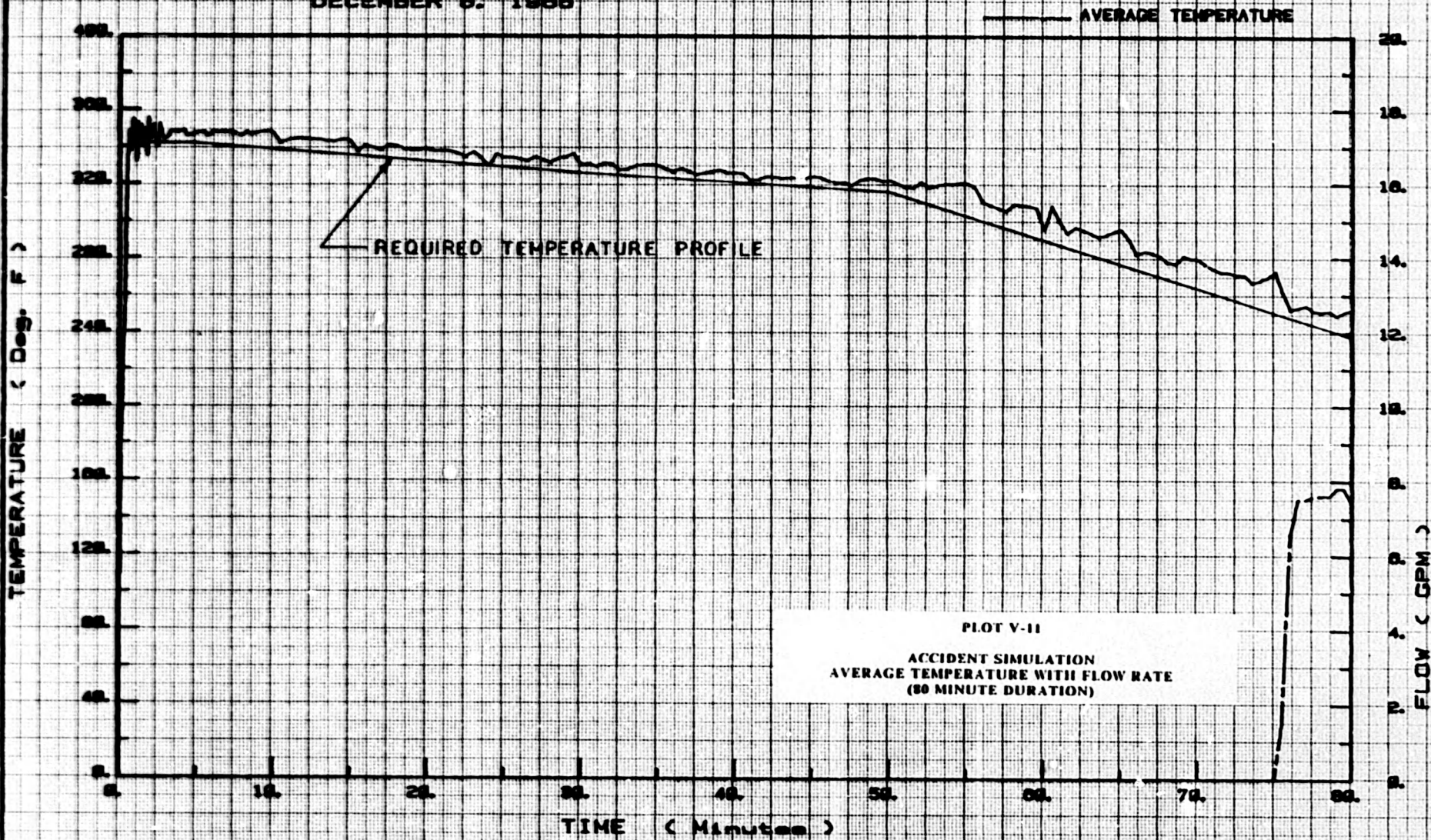
LOCA SIMULATION
TVA 18056
DECEMBER 9, 1988



PLOT V-10
ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH PRESSURE
(80 MINUTE DURATION)

10 X 10 TO THE CENTIMETERS X 20

LOCA SIMULATION
TVA 18058
DECEMBER 9, 1988

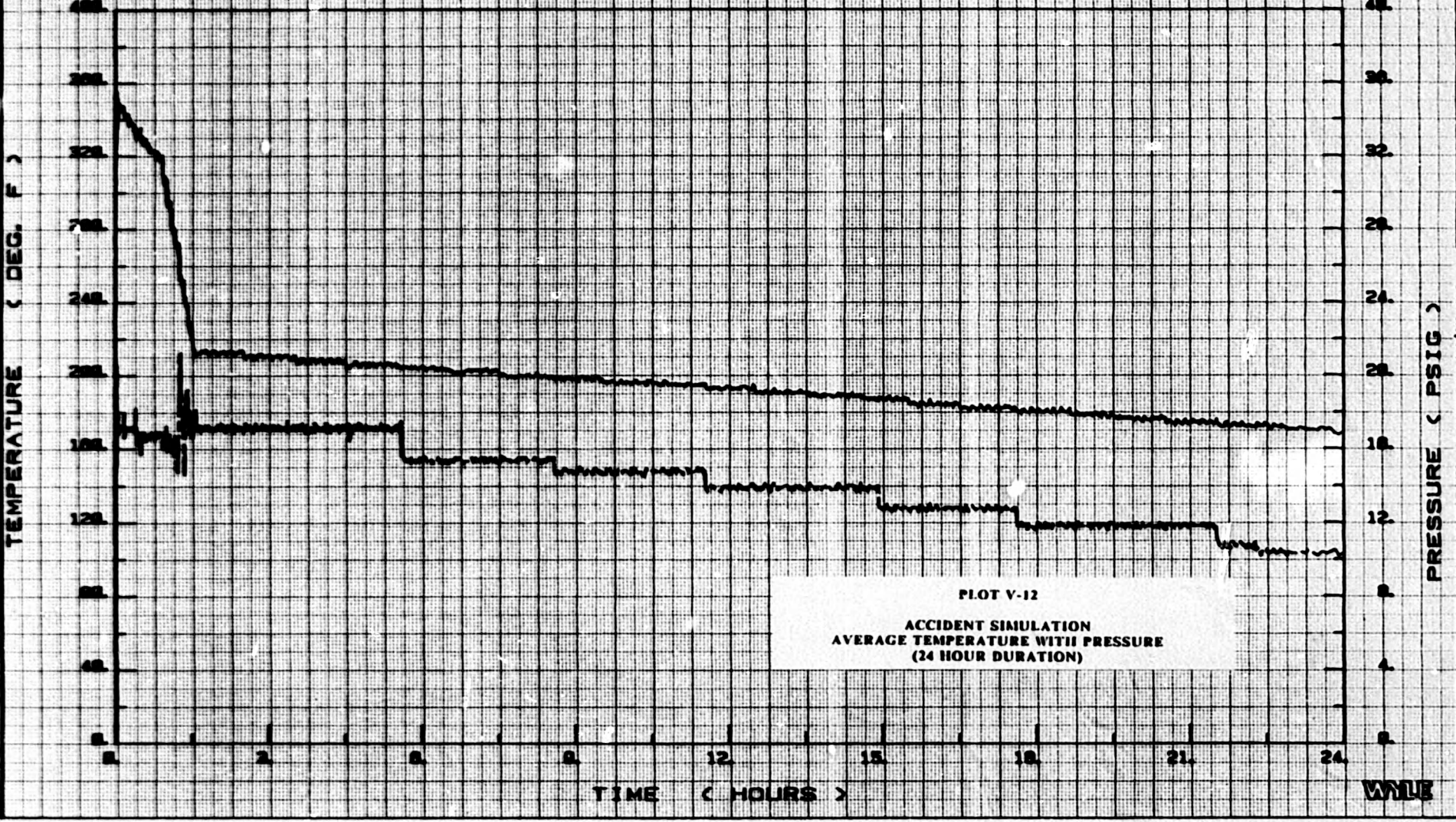


PLOT V-II
ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH FLOW RATE
(80 MINUTE DURATION)

10 X 10 TO THE CENT. METERS - 8 1/2"

LCA SIMULATION
TVA 18056
DECEMBER 9, 1988

AVERAGE TEMPERATURE

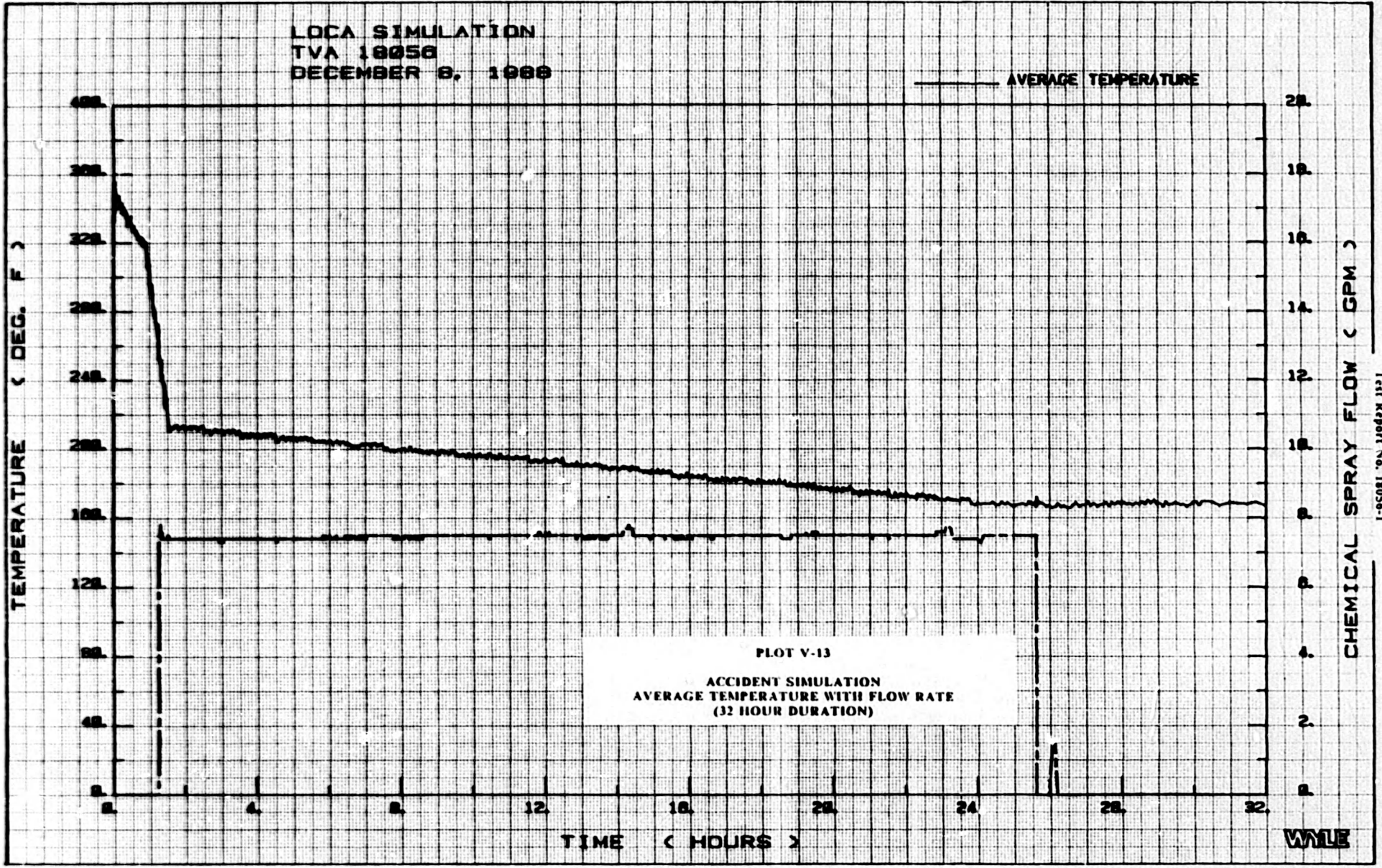


PLOT V-12
ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH PRESSURE
(24 HOUR DURATION)

Page No. V-43
Test Report No. 18056-1

USE TO THE CENT. CENTER: 180

LOCA SIMULATION
TVA 18056
DECEMBER 8, 1988



PLOT V-13
ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH FLOW RATE
(32 HOUR DURATION)

CHEMICAL SPRAY FLOW (GPM)

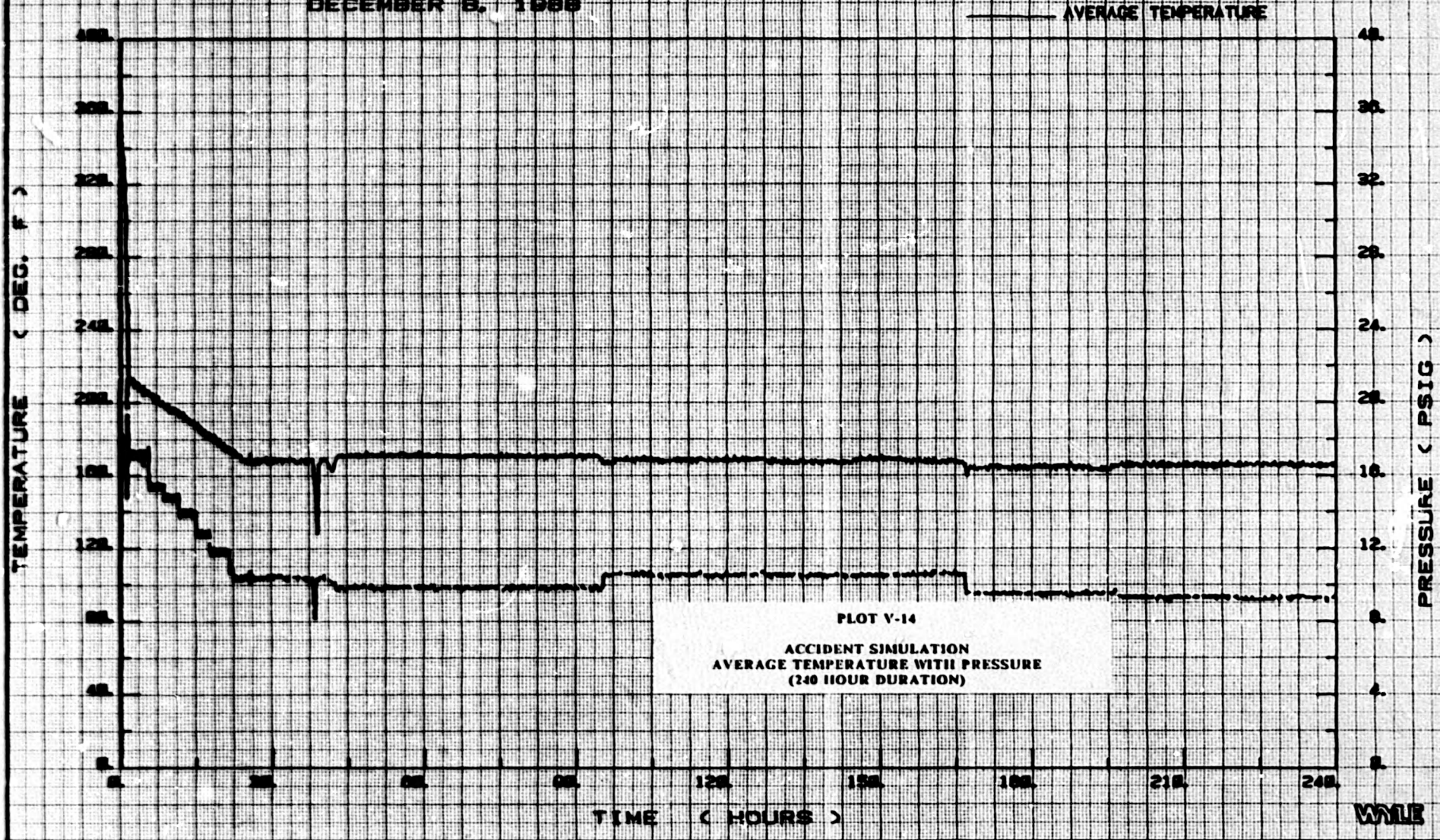
TEMPERATURE (DEG. F)

TIME (HOURS)

WYLE

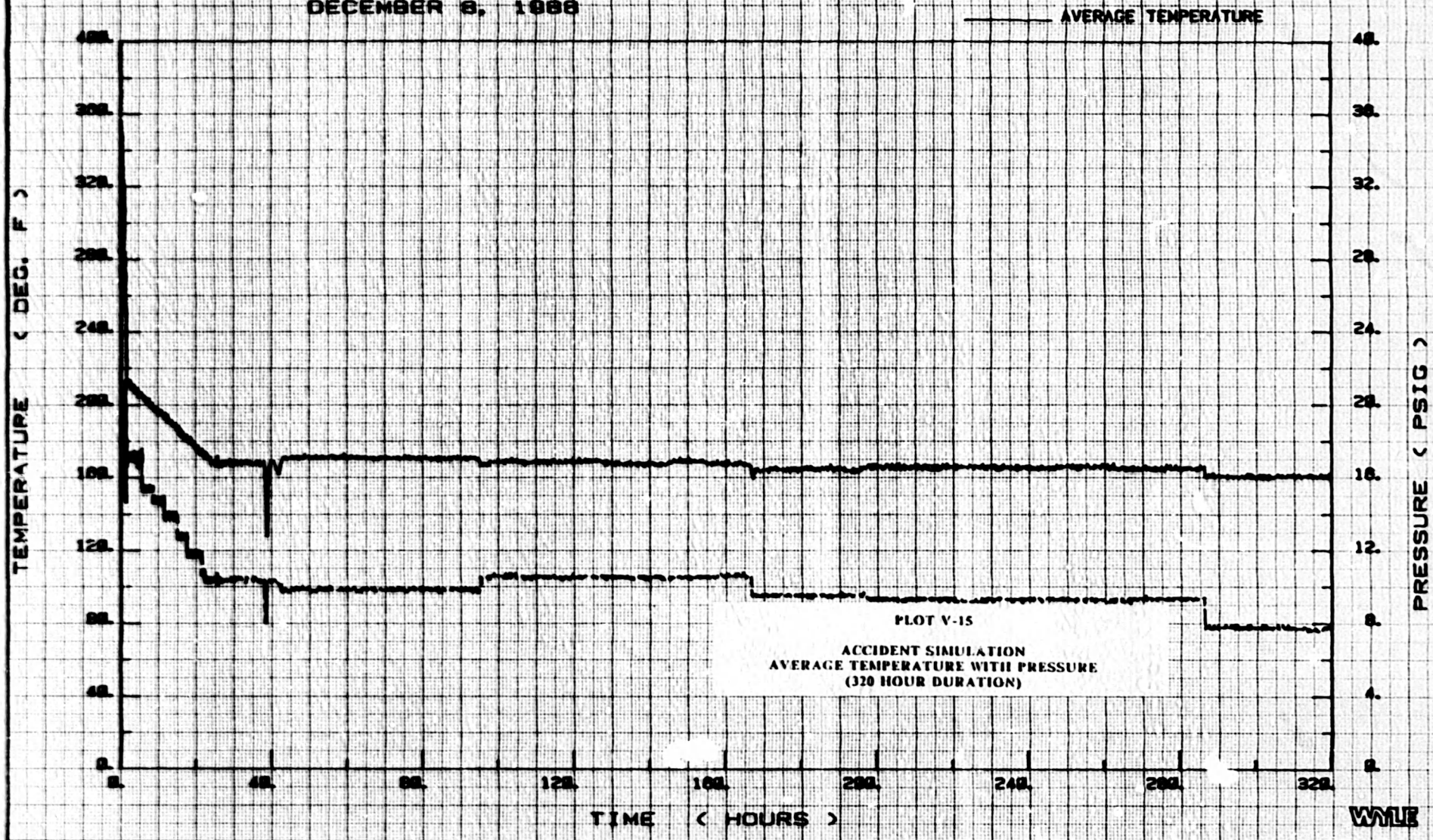
10 X 10 TO THE CENTIMETER (1 : 8.5)

LOCA SIMULATION
 TVA 18058
 DECEMBER 8, 1988



PLOT V-14
 ACCIDENT SIMULATION
 AVERAGE TEMPERATURE WITH PRESSURE
 (240 HOUR DURATION)

LOCA SIMULATION
TVA 18056
DECEMBER 8, 1988



PLOT V-15
ACCIDENT SIMULATION
AVERAGE TEMPERATURE WITH PRESSURE
(320 HOUR DURATION)

WYLE

LOCA SIMULATION
TVA 19056
DECEMBER 8, 1968

