

S-83

STAFF QH #83
5/21/92

- ⊙ GE EB25 Phase II Sandia Test 1st exposure IR-A, TB-9, Used in APCo JCO
- ⊠ GE ED-25 Phase II Sandia Test 1st exposure IR-G, TB-9, Used in APCo Surrebuttal
- △ GE CR1513, Phase I Sandia Test 1st exposure TB-5 (Adjusted)
- ▽ GE CR1513, Phase I Sandia Test 2nd exposure TB-5 (Adjusted)

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DEFENSE

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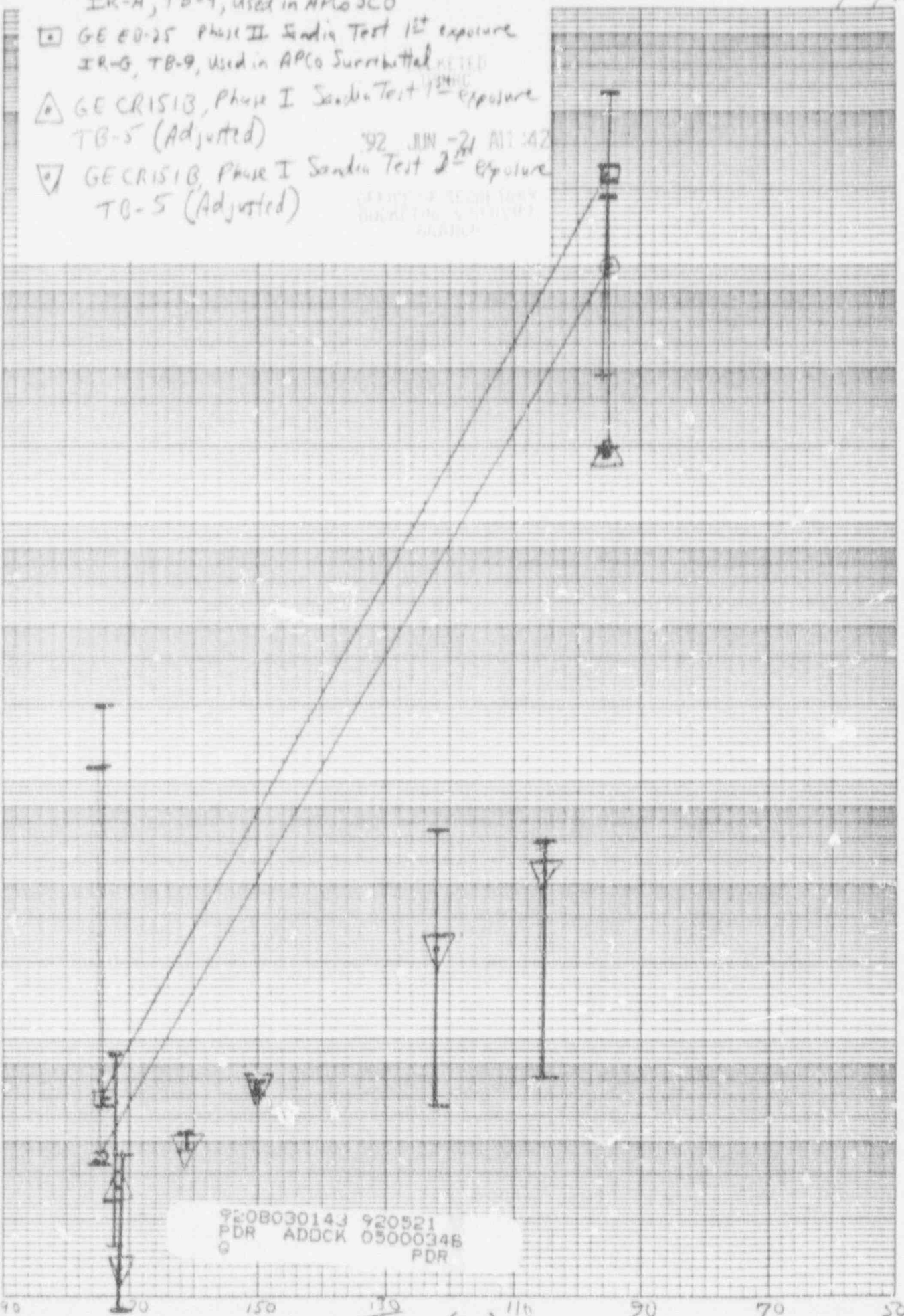
10⁷

IR(λ)

10⁶

10⁵

10⁴



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PDR ADOCK 05000346
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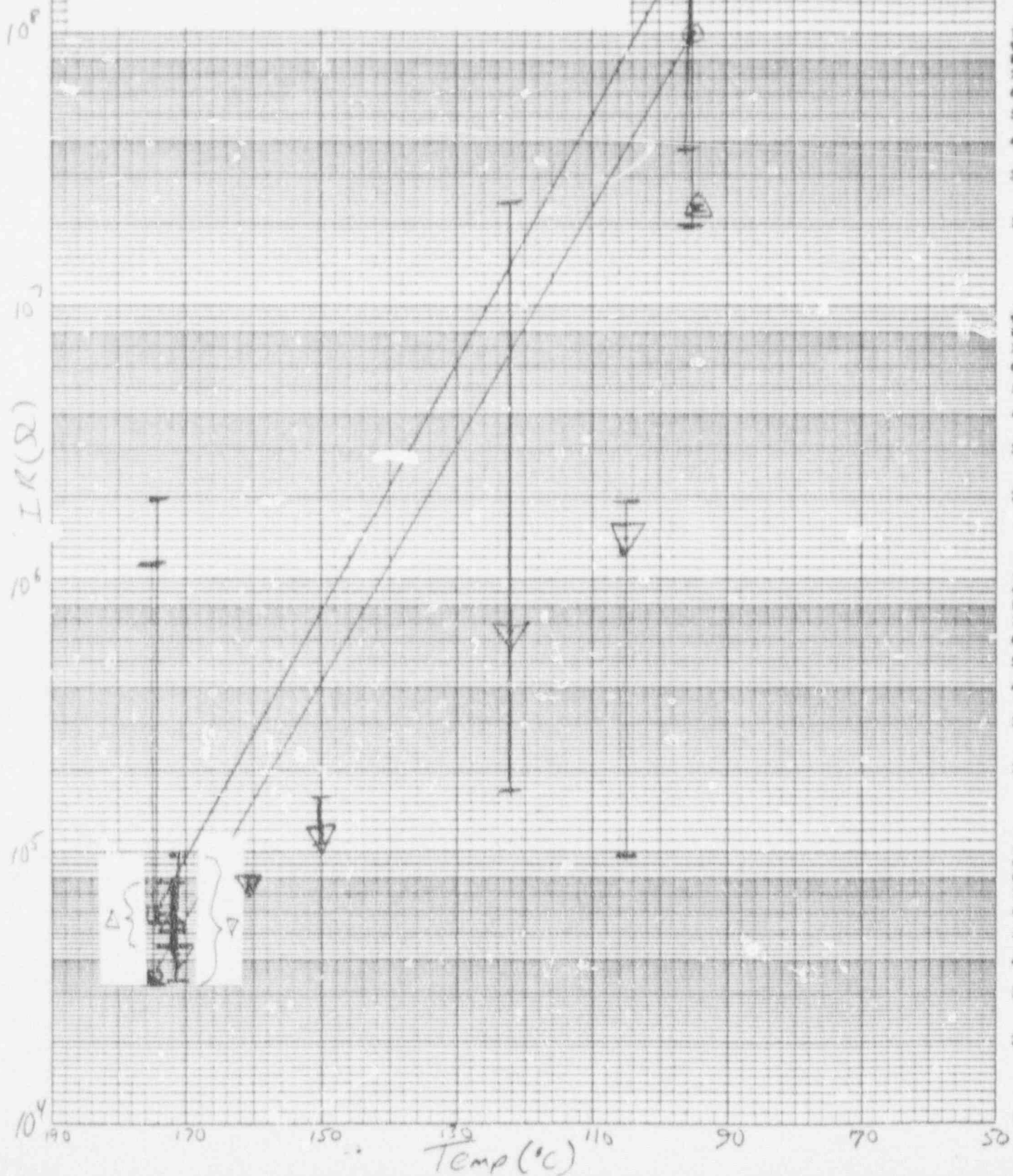
Temp (°C)

⊙ GE EB25 Phase II Sandia Test 1st exposure
IR-A, TB-9, Used in APCo JCO

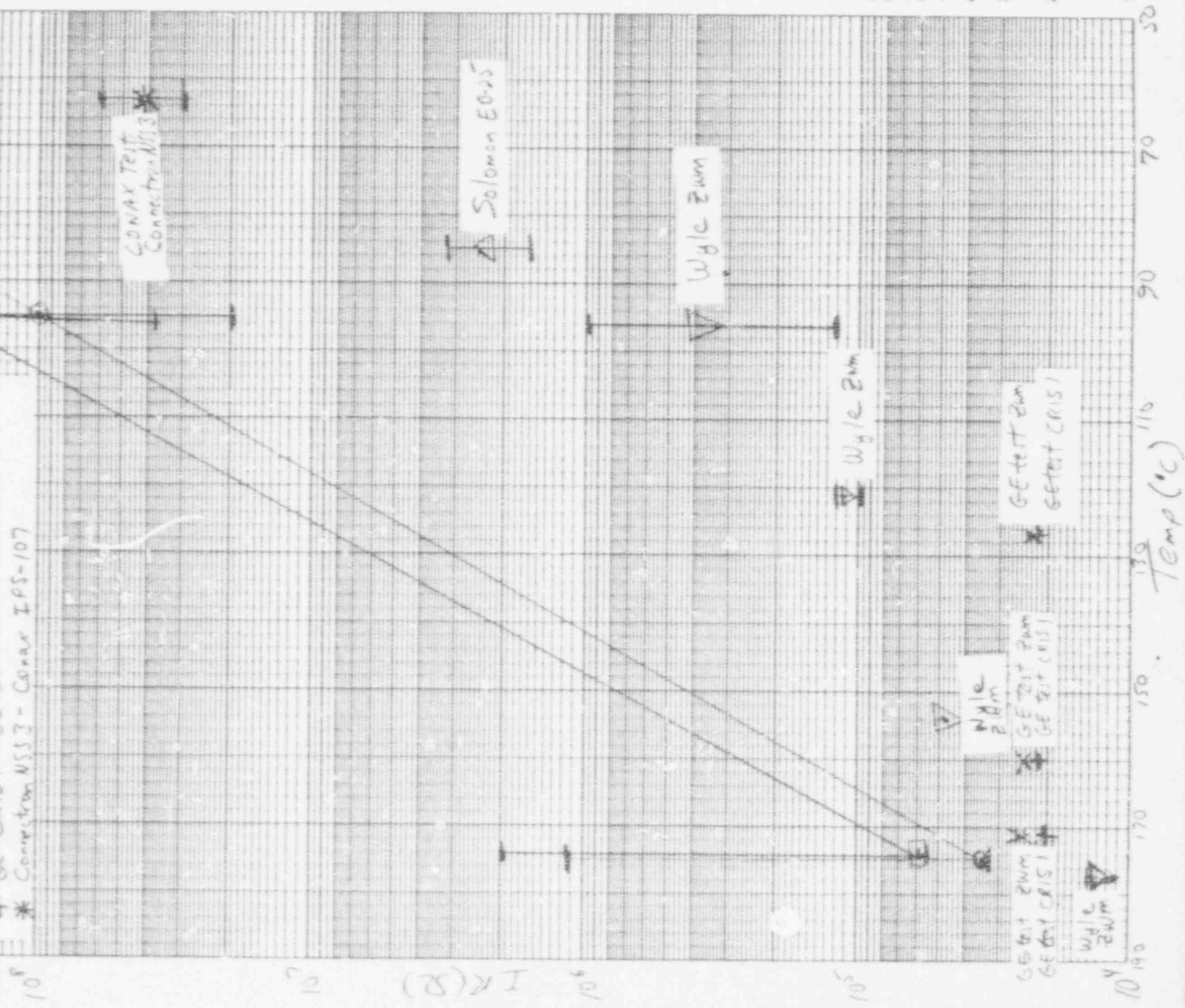
⊠ GE EB-25 Phase II Sandia Test 1st exposure
IR-G, TB-9, Used in APCo Surributtal

△ Stats 2mm, Phase I Sandia Test 1st exposure
TO-6 (Adjusted)

▽ Stats 2mm, Phase I Sandia Test 2nd exposure
TO-6 (Adjusted)



- ⊙ GE E025 Phase II Endia Test 1st exposure
IR-A, TB-9, Used in APCo JCO
- GE E025 Phase II Endia Test 1st exposure
IR-G, TB-9, Used in APCo Surrebital
- △ GE E025, SAND80-0422 (data taken by
Solomon at Temple University)
- ▽ States ZWM - Wyle Test
- X States ZWM - GE test 11-6-73
- + GE CRIS1 - GE test 11-6-73
- * Connection NSS3 - Conax IPS-107



Data Used for Plots

Data from Wyle test 48842-1 (Reference Data Module 28 in Staff Exhibit 47) for a States ZWM terminal block:

Profile: 250°F (121°C) from 30-150 seconds, rising to 350°F (177°C) by 5.5 minutes into test, held at 350°F (177°C) for 30 minutes, followed by cooldown over 40 minutes to 205°F (96°C), held at 205°F (96°C) for 85 hours. (Figures VI-3, VI-4, and VI-5)

Leakage Current data: Measured with an applied voltage of 24 Vdc. At beginning of accident test, from 30-150 seconds, the temperature was constant at 250°F (121°C) and the leakage current ranged from 200-250μA. This corresponds to an IR range from 9.6×10^4 - $1.2 \times 10^5 \Omega$ ($24/0.00025$ and $24/0.0002$).

At the peak accident simulation temperature of 350°F (177°C), from times 5.5-31 minutes into the test, the leakage current ranged from 1.6 mA to greater than 2.25 mA (the 2 mA fuse in the monitoring circuit opened during this time). This corresponds to an IR range from less than 1.1×10^4 to $1.5 \times 10^4 \Omega$ ($24/0.0225$ and $24/0.0016$).

During the cooldown, at 40 minutes into the test, the average chamber temperature (Figure VI-4) was 310°F (154°C) and the leakage current was 500μA. This corresponds to an IR of $4.8 \times 10^4 \Omega$ ($24/0.0005$).

During the steady state portion of the test at 205°F (96°C) for 85 hours, the leakage current ranged from 25-200μA. This corresponds to an IR range from 1.2×10^5 - $9.6 \times 10^5 \Omega$ ($24/0.0002$ and $24/0.000025$).

Data from GE test report dated 11-6-73 (Reference Data Module 16 and 17 in Staff Exhibit 47. This is the basis for the IR data in APCo Exhibit 58.)

Profile: 260°F (127°C) for 1.5 days, 320°F (160°C) for 1.5 hours, 340°F (171°C) for 3 hours, 320°F (160°C) for 4.5 hours, and 260°F (127°C) for 8 days.

IR data: For the GE CR151 and States ZWM terminal blocks, the IRs were $2.2 \times 10^4 \Omega$ and $2.4 \times 10^4 \Omega$, respectively, at 260°F (127°C) at 12 hours into the test (prior to exposure of the blocks to temperatures above 260°F).

The following summarizes the IRs at various temperatures above 250°F (121°C) throughout the rest of the test:

Temperature (°F)	Temperature (°C)	GE IR (Ω)	States IR (Ω)
320	160	2.2×10^4	2.4×10^4
340	171	1.9 - 2.2×10^4	2.4 - 2.6×10^4
320	160	1.9×10^4	2.4×10^4
260	127	2.2 - 2.4×10^4	2.4 - 2.5×10^4

Data from Sandia Report SAND 84-0422 (Staff Exhibit 74):

Profile: To 185°F (85°C) in 25 minutes, held at 185°F (85°C) for 35 minutes.

Leakage Current data: For GE E3-25 terminal block, leakage current ranged from 14-29 μ A at 45 Vdc. This corresponds to an IR range from 1.6×10^6 - 3.2×10^6 Ω ($45/0.000029$ and $45/0.000014$).

Data from Sandia Report SAND 83-1617 (Staff Exhibit 73):

Except as noted below, all of the data is taken from IRs measured between adjacent terminals. For data from Phase I of the Sandia testing, the raw IR data, which represents data from 5 parallel conducting paths, has been multiplied by a factor of 5 to appropriately account for this effect.

Profile: The test profile essentially conformed with the IEEE 323-1974 recommended PWR/BWR combined profile for both Phases of the test. See Staff Exhibit 73 for more detail.

IR data: Extensive IR data is presented for GE CR151B and States ZWM terminal blocks from Phase I data at various temperatures. For the plots, I have used data from States terminal block #6, which was energized at 45 Vdc and from GE CR151B terminal block #5, which was also energized at 45 Vdc. The data on pages 148-149 of SAND83-1617 contains all of the subject data. On the attached plots, the data from pages 148-149 has been multiplied by 5 to account for the parallel conducting paths on the blocks. All five values from the five number summaries are used so that all of the relevant data that was collected is represented on the plots. In addition, data for GE EB-25 terminal blocks from Phase II (TBs 9, 10, and 11, which were energized at 45 Vdc, are given on pages 158-161 (terminal to terminal), pages 166-169 (different terminal to terminal measurement), and pages 174-177 (terminal to ground). The terminal to ground measurements are only used since they were used by APCo in their Surrebuttal testimony.

Data from Conax Report IPS-107:

Profile: To 300°F (149°C) in 10 minutes, held at 293-300°F (145-149°C) for 20 minutes, then decreasing to 150°F (66°C) over 5 minutes, then held at 140-150°F (60-66°C) for 240 hours.

IR data: For aged Connectron terminal block at 140-150°F (60-66°C), IR ranged from $3-6 \times 10^7$.