

**COMPARISON OF BEST-ESTIMATE  
PLUS UNCERTAINTY AND  
APPENDIX K LBLOCA ANALYSES**

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## **RECENT LOCA MARGIN EXPERIENCE**

**ON SEVERAL OCCASIONS WESTINGHOUSE HAS BEEN UNABLE TO DELIVER TARGETED PEAKING FACTORS USING APPENDIX K METHODS**

**FOR ONE OF THESE PLANTS, ANOTHER VENDOR PREVIOUSLY SUPPORTED PEAKING FACTORS OF  $FQ=2.5$ ,  $FdH=1.67$  USING APPENDIX K METHODS**

- WESTINGHOUSE NEEDS TO USE BEST-ESTIMATE PLUS UNCERTAINTY METHODS TO ACHIEVE SAME PEAKING FACTORS, ANALYSIS IN PROGRESS**
- PREVIOUS BEST-ESTIMATE PLUS UNCERTAINTY ANALYSIS HAS BEEN PERFORMED FOR A SIMILAR PLANT WITH SIMILAR PEAKING FACTORS**
  - ⇒  $PCT^{50\%} = 1562F$ ,  $PCT^{95\%} = 1892F$**
  - ⇒ ANALYSIS USING NRC-APPROVED BEST ESTIMATE METHOD GENERATED ABOUT 300F MARGIN WHEN UNCERTAINTIES WERE CONSIDERED**

**RELAXED DECAY HEAT MODEL WORTH ABOUT 250-450F IN BASH EM, RELAXED METAL-WATER MODEL WORTH ABOUT 50F**

## **OBSERVATIONS REGARDING THE "PLUS UNCERTAINTIES" REQUIREMENT**

**"BEST-ESTIMATE" CALCULATIONS PERFORMED IN THE 1980s FREQUENTLY USED ASSUMPTIONS NOT ALLOWED FOR DESIGN BASIS CALCULATIONS, e.g.**

- NO SINGLE FAILURE**
- PEAKING FACTORS UNDER BASELOAD CONDITIONS**
- NO TREATMENT OF UNCERTAINTIES**

**⇒ PEAK CLADDING TEMPERATURES WERE QUITE LOW (~1000F)**

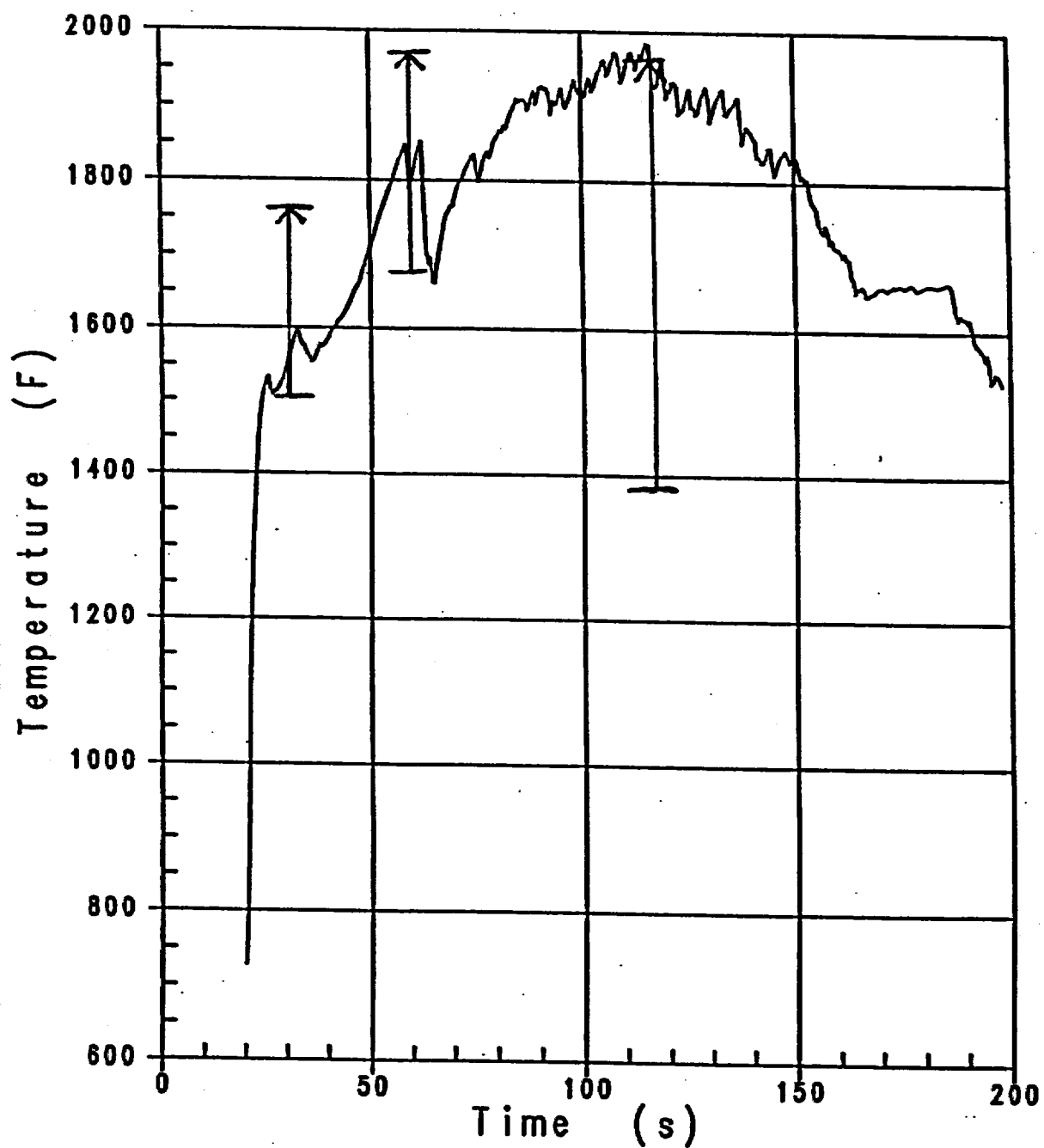
**CSAU DEMONSTRATION ANALYSIS CONTINUED THIS PRACTICE TO SOME EXTENT (e.g., FQ = 1.68), BUT DID ADDRESS UNCERTAINTIES (NUREG/CR-5249)**

**BLOWDOWN:  $PCT^{50\%} = 1162F$ ,  $PCT^{95\%} = 1447F$  ( $\Delta = 285F$ )**

**EARLY REFLOOD:  $PCT^{50\%} = 978F$ ,  $PCT^{95\%} = 1399F$  ( $\Delta = 421F$ )**

**LATE REFLOOD:  $PCT^{50\%} = 758F$ ,  $PCT^{95\%} = 1336F$  ( $\Delta = 578F$ )**

**REVIEW OF W BEST ESTIMATE PLUS UNCERTAINTY ANALYSES TO DATE INDICATE DIFFERENCES OF 300-600F BETWEEN  $PCT^{50\%}$  &  $PCT^{95\%}$  IN REFLOOD**



**50<sup>TH</sup> AND 95<sup>TH</sup> PERCENTILE PEAK CLADDING TEMPERATURES -  
BLOWDOWN, EARLY REFLOOD AND LATE REFLOOD**

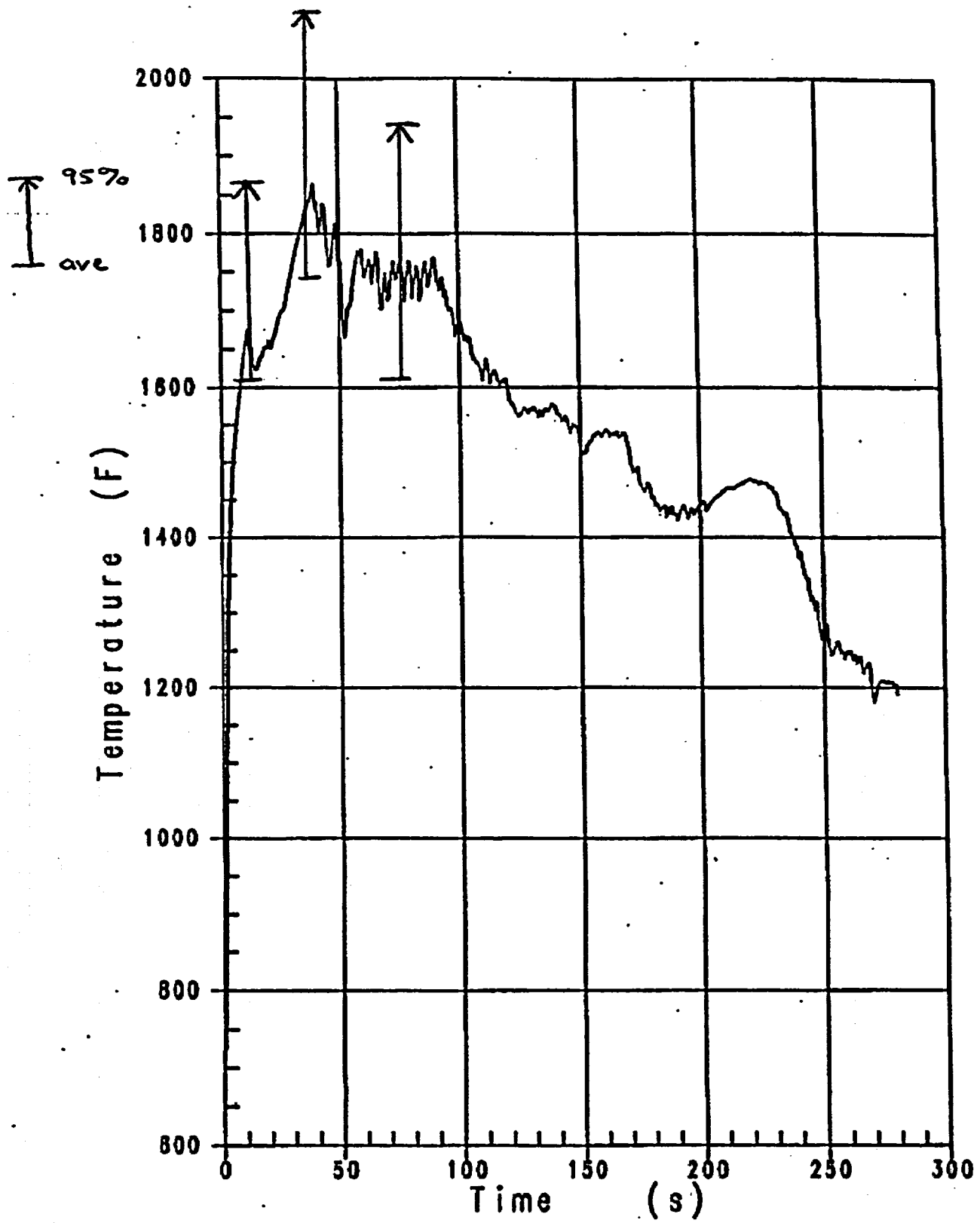


Figure 5-3-1. Peak Cladding Temperature for Reference Transient

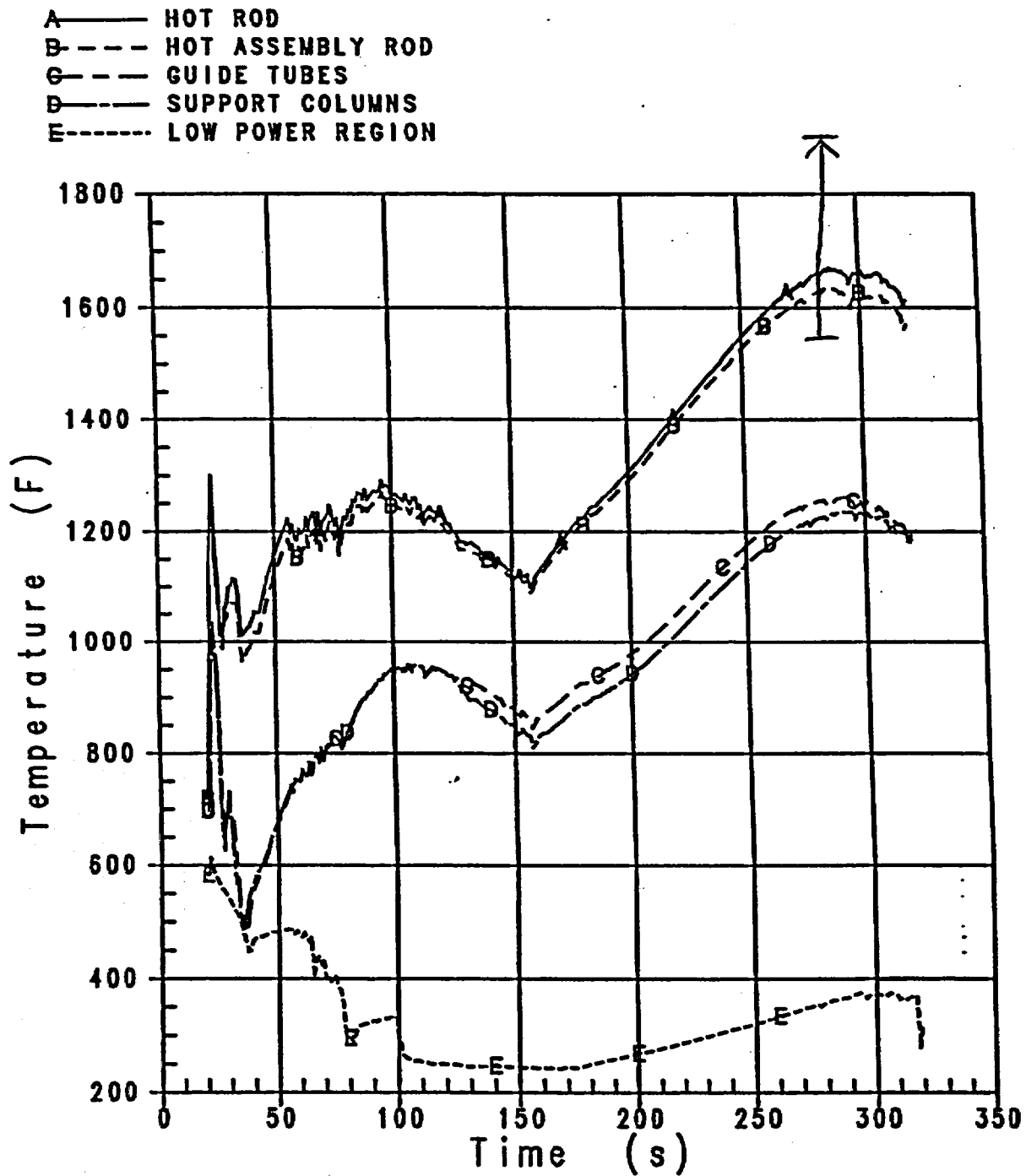


Figure 4-3-15. Peak Cladding Temperature Comparison for Five Rods for Initial Transient