



**TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT**

**EXTENDED POWER UPRATE
CREDIT FOR CONTAINMENT OVERPRESSURE**

Rockville, Maryland

July 18, 2007



COP CREDIT

- History
 - Current credit for Containment Overpressure for Units 2 and 3
 - IEB 96-03 for LOCA
 - Currently 3 PSI for Residual Heat Removal (RHR) short-term (< 10 Min.)
 - Currently 1 PSI for Core Spray long-term (> 10 Min.)
 - Credit for Containment overpressure requested for the first time for Unit 1

- Containment Overpressure Credit for EPU
 - 3 PSI for RHR short-term LOCA
 - 3 PSI for Core Spray long-term LOCA
 - 10 PSI for RHR Appendix R
 - 7 PSI for RHR ATWS
 - 2 PSI for RHR Station Blackout

COP EVENTS

- **LOCA short term <10 Min**
 - 4 Core Spray pumps at system flow
 - 2 RHR pumps at design LPCI flow
 - 2 RHR pumps to broken loop
 - Debris loading on strainers
 - Strainers/suction header is common
 - RHR and Core Spray pumps need COP

- **LOCA long term >10 Min**
 - Minimum required ECCS
 - 2 Core Spray pumps at design flow
 - 2 RHR pumps at containment cooling flow
 - Debris loading on strainers
 - BFN approval not dependent on generic approval of LTR
 - Core Spray pumps need COP



COP EVENTS

- **Special Events**

- Not addressed by RG 1.82
- Appendix R
 - 1 RHR pump injecting to vessel
 - No strainer debris
 - RHR pump needs COP
- ATWS
 - 4 RHR pumps at containment cooling flow
 - No strainer debris
 - RHR pumps need COP
- Station Blackout
 - HPCI suction from CST for 4 Hr coping duration
 - 2 RHR pumps at containment cooling flow after 4 Hrs.
 - No strainer debris
 - RHR pumps need COP

RISK EVALUATIONS



- Regulatory Guide 1.174 risk informed evaluation for LOCA
 - Incorporates insights from Vermont Yankee ACRS
 - Probability Distribution for Realistic Parameters
 - Suppression pool temperature
 - Suppression pool level
 - Heat exchanger K value
 - Ultimate heat sink temperature
 - RHR single failures
 - LOCA, ATWS and SBO
 - Δ CDF 2.4E-8/yr
 - Δ LERF 2.4E-8/yr
 - PSA MODELS DO NOT INCLUDE FIRE EVENTS
 - Qualitative risk assessment

UNIT 1 105% ACRS



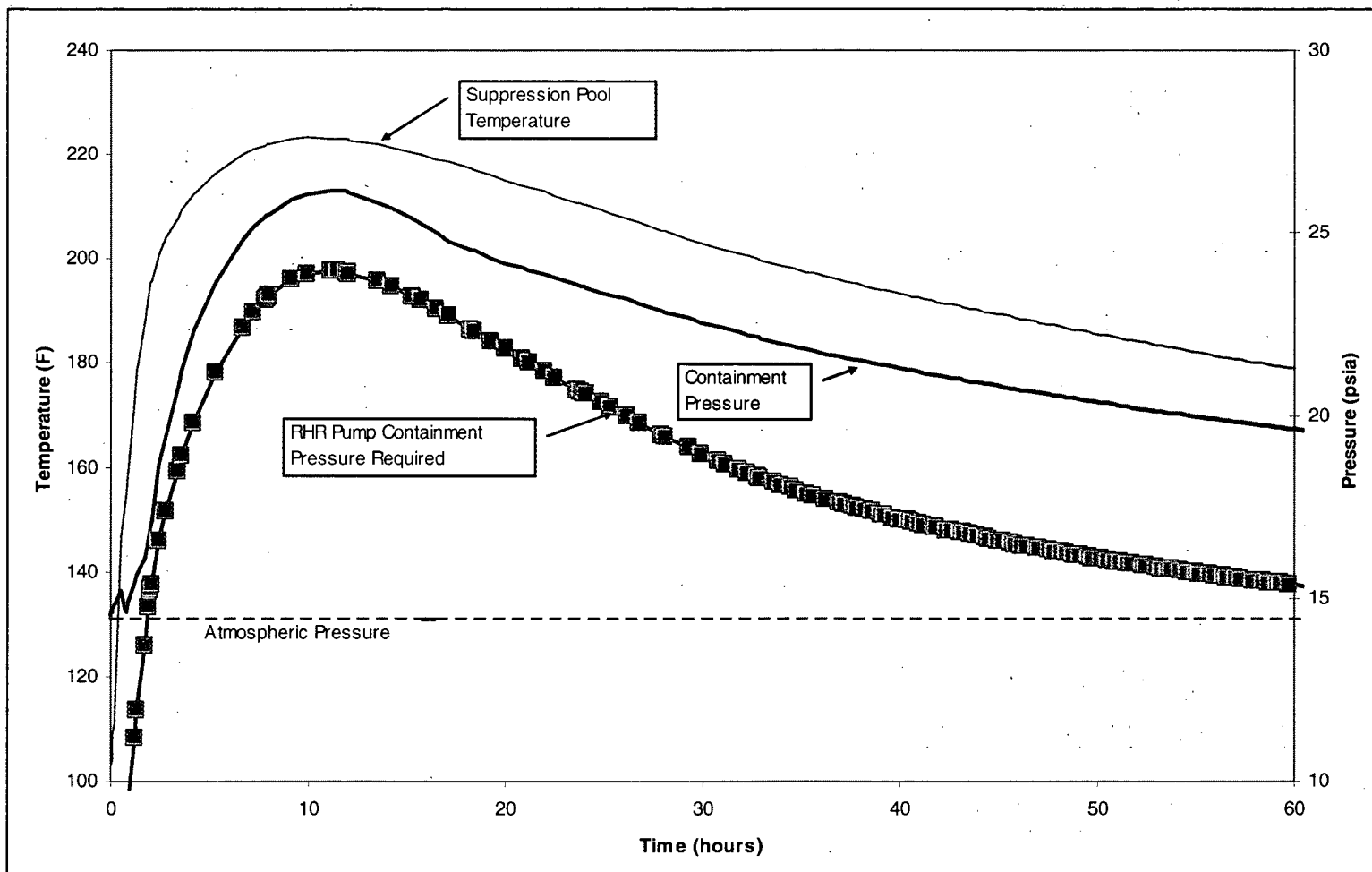
- ACRS LETTER 2/16/07
 - Agreed with COP for all but APPENDIX R event

Although the thermal-hydraulic evaluations for this scenario are intended to be realistic, the licensee argues that this is an overly conservative scenario, because more equipment is likely to be available than postulated in the scenario. If two or more RHR pumps are available, credit for containment overpressure is not needed.

Because of the plant configuration, the extent of modification required, and the worker dose that would be involved, we conclude that there are no practical design modifications that would preclude the need to consider the request for containment overpressure credit for most of the scenarios. However, for the Appendix R scenario, protecting a second RHR pump would eliminate the need for the credit and may be a feasible alternative.

Because of the amount of time for which credit is required and the amount of credit required, the Appendix R fire scenario is the limiting event for which containment overpressure credit is required. The staff presented a risk evaluation of containment overpressure credit for this scenario that showed that the contribution to core damage frequency associated with this scenario is small and represents a small fraction of the BFN1 core damage frequency. However, this assessment did not include fires initiated by external events, such as earthquakes and tornados. The inclusion of these initiators in the risk evaluation is likely to increase the risk associated with the Appendix R scenario. To use risk arguments to justify overpressure credit for this scenario, the licensee and the staff need to provide a more complete analysis including all initiators. Because of the smaller amount of credit required for operation at 105-percent power, this extensive analysis is not needed to support operation at that power level.

APPENDIX R



RAI 13



- 10 QUESTIONS
 - Discussion
 - Clarification