

## ENCLOSURE 2

M190034

TRACG Biases, Uncertainties and Statistical Adders

Non-Proprietary Information

### **IMPORTANT NOTICE**

This is a non-proprietary version of Enclosure 1 to M190034, which has the proprietary information removed. Portions of the document that have been removed are indicated by an open and closed bracket as shown here [[            ]].

### TRACG Biases, Uncertainties and Statistical Adders

BWR category or plant specific statistical adders may be used in accordance with the approved methodology, NEDC-32906P Supplement 3-A: *Migration to TRACG04 / PANAC11 from TRACG02 / PANAC10 for TRACG AOO and ATWS Overpressure Transients*, Revision 1, April 2010. As statistical adders are generated, they will be provided to the NRC for information.

The following tables provide the biases, uncertainties, and pressure adders to be applied to several plants using GNF2 or GNF3 fuel when transient analyses are performed with TRACG methods for licensing applications. The biases and uncertainties are used to determine the minimum critical power ratio (MCPR) operating limit (OLMCPR). Statistical analyses were performed for all transients listed and a bounding value was selected and applied to all transients for each plant.

Plant Type / Plant	Fuel	Transient Event <sup>1</sup>	$\Delta$ CPR/ICPR Bias <sup>2</sup> (%)	$\Delta$ CPR/ICPR Uncertainty (%)	Notes
BWR/4 / Fermi 2	GNF3	TTNBP	[[		
		LRNBP			
		FWCF			
		PRFDS			
BWR/5 / Columbia	GNF2	TTNBP			
		LRNBP			
		FWCF			
		PRFDS		]]	

**Notes:**

- <sup>1</sup> LRNBP = Load Rejection with No Bypass  
TTNBP = Turbine Trip with No Bypass  
FWCF = Feedwater Controller Failure  
PRFDS = Pressure Regulator Failure – Downscale
- <sup>2</sup> CPR = Critical Power Ratio  
ICPR = Initial Critical Power Ratio

The following table provides the peak vessel pressure adder to be applied when transient analyses are performed with TRACG methods for licensing applications. The adder is used to modify the limiting MSIVF case for comparison to the acceptance criterion. This will ensure at least a 95% probability with 95% confidence that the ASME vessel overpressure limit will be met.

Plant Type / Plant	Fuel	Transient Event <sup>3</sup>	Peak Vessel Bottom Pressure Adder <sup>4</sup> (psi)	Notes
BWR/4 / Fermi 2	GNF3	MSIVF	[[    ]]	

**Notes:**

<sup>3</sup> MSIVF = Main Steam Isolation Valve Closure with Average Power Range Monitor (APRM) Flux Scram

<sup>4</sup> One Sided Upper Tolerance Limit with 95% Content at a 95% Confidence Level (OSUTL<sub>95/95</sub>)