ENCLOSURE 2

MFN 16-030

TRACG Biases, Uncertainties and Statistical Adders

Non-Proprietary Information – Class I (Public)

IMPORTANT NOTICE

This is a non-proprietary version of Enclosure 1 to MFN 16-030, 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 table provides the biases, uncertainties, and pressure adders to be applied to several plants using GE14 or GNF2 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[1]	ΔCPR/ICPR Bias[2] (%)	ΔCPR/ICPR Uncertainty (%)	Notes
BWR/3 / Monticello	GE14	TTNBP	[[		This information is copied from MFN 11-166 (Reference 2).
		LRNBP			
		TTWBP			
		FWCF			
		HPCIL8			
BWR/4 / Peach Bottom 2 & 3	GE14	TTNBP			This is applicable to Limerick 1 & 2 and Fermi.
		LRNBP			
		FWCF			
		HPCIL8			
	GNF2	TTNBP			This is applicable to Limerick 1 & 2.
		LRNBP			
		FWCF			
		HPCIL8			
BWR/4 / Limerick 1 & 2	GNF2	PRFDS			This is applicable to Peach Bottom 2 & 3.
BWR/4 / Hatch 1 & 2	GE14	TTNBP			
		LRNBP			
		FWCF			
	GNF2	TTNBP			
		LRNBP			
		FWCF			

Plant Type / Plant	Fuel	Transient Event[1]	ΔCPR/ICPR Bias[2] (%)	ΔCPR/ICPR Uncertainty (%)	Notes
BWR/4 / Fitzpatrick	GNF2	TTNBP			
		LRNBP			
		FWCF			
BWR/5 / Nine Mile Point 2	GE14	TTNBP			This information is copied from MFN 13-090 (Reference 3).
		LRNBP			
		FWCF			
	GNF2	FWCF			
		LRNBP			
		TTNBP			
		PRFDS			
BWR/5 / Columbia	GE14	FWCF			
		LRNBP			
		TTNBP			
		PRFDS			
	GNF2	FWCF			
		LRNBP			
		TTNBP			
		PRFDS			
BWR/5 / LaSalle 1 & 2	GNF2	FWCF			
		LRNBP			
		TTNBP			
		PRFDS		]]	

Notes:

1 LRNBP = Load Rejection with No Bypass
TTNBP = Turbine Trip with No Bypass
TTWBP = Turbine Trip with Bypass
FWCF = Feedwater Controller Failure
HPCIL8 = Inadvertent High Pressure Coolant Injection with Level 8 Turbine Trip
PRFDS = Pressure Regulator Failure – Downscale

2 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[1]	Peak Vessel Bottom Pressure Adder[2] (psi)	Notes
BWR/3 / Monticello	GE14	MSIVF	[[	This information is copied from MFN 11-166 (Reference 2).
BWR/4 / Peach Bottom 2 & 3	GE14 & GNF2	MSIVF		This is applicable to Limerick 1 & 2 and Fermi.
BWR/4 / Hatch 1 & 2	GE14 & GNF2	MSIVF		
BWR/4 / Fitzpatrick	GNF2	MSIVF		
BWR/5 / Nine Mile Point 2	GE14	MSIVF		This information is copied from MFN 13-090 (Reference 3).
BWR/5 / Nine Mile Point 2	GNF2	MSIVF		
BWR/5 / Columbia	GE14 & GNF2	MSIVF		
BWR/5 / LaSalle 1 & 2	GNF2	MSIVF	]]	

Notes:

1 MSIVF = Main Seam Isolation Valve Closure with Average Power Range Monitor (APRM) Flux Scram

2 One Sided Upper Tolerance Limit with 95% Content at a 95% Confidence Level ($OSUTL_{95/95}$)