



HITACHI

GE Hitachi Nuclear Energy

James C. Kinsey
Vice President, ESBWR Licensing

PO Box 780 M/C A-55
Wilmington, NC 28402-0780
USA

T 910 675 5057
F 910 362 5057
jim.kinsey@ge.com

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U.S. Nuclear Regulatory Commission
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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 106 - Related to ESBWR Design Certification Application – RAI Number 21.6-65 Supplement 1**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by the Reference 1 NRC letter. GEH response to RAI Number 21.6-65 Supplement 1 is addressed in Enclosure 1.

If you have any questions or require additional information, please contact me.

Sincerely,

James C. Kinsey
Vice President, ESBWR Licensing

1068
NRC

Reference:

1. MFN 07-497, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 106 Related to the ESBWR Design Certification Application*, dated September 6, 2007

Enclosure:

1. MFN 08-340 – Response to Portion of NRC Request for Additional Information Letter No. 106 - Related to ESBWR Design Certification Application – RAI Number 21.6-65 S01

cc: AE Cabbage USNRC (with enclosure)
GB Stramback GEH/San Jose (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
eDRF 0000-0083-4409

Enclosure 1

MFN 08-340

Response to Portion of NRC Request for

Additional Information Letter No. 106

Related to ESBWR Design Certification Application

RAI Number 21.6-65 S01

NRC RAI 21.6-65 S01

The original RAI requested GEH to provide additional information about the TRACG nodalization used to model ESBWR anticipated operational occurrences (AOO) and infrequent events (IEs).

The staff requests the following additional information to complete its review of this portion of the ESBWR design certification:

How are the channels selected for evaluating the maximum deltaCPR/ICPR that is used to determine the OLMCPR? Do you use the hot channel every time? Or do you take the maximum of all the channel groups? The staff is concerned for cold water injection events where although the Ring 3 channels (peripheral channels) do not have a hot channel, it is possible that these channel groups may experience the highest deltaCPR/ICPR.

GEH Response

The process for determining the OLMCPR (Operating Limit Minimum Critical Power Ratio) in the ESBWR AOO and IE events is identical to that approved for the operating plants in Ref. [1]. Subsections 7.3.1 and 7.3.2 in Ref. [2] describe this process in detail.

The licensing criterion to be satisfied is that less than 0.1% of the fuel rods are expected to experience a boiling transition for the most severe AOO. Since the core MCPR always occurs in the hottest channels, the Δ CPR/ICPR of the hot channels are selected for the determination of OLMCPR.

TRACG calculation comparisons in Table 1 show that although the decrease in Δ CPR/ICPR of the peripheral channel (#341) in Ring 3 is greater than the hottest bundle (#2400) in Ring 2 for an IICI (Inadvertent Isolation Condenser Initiation) event in DCD Tier 2 Chapter 15 and in Ref. [2]; the Minimum Critical Power Ratio (MCPR) of the hot channel is much lower than the peripheral channel (Figures 1 and 2).

Therefore, the method for calculating OLMCPR is not affected by the fact that the Δ CPR/ICPR of the peripheral channel is higher than the interior channel in the cold water injection events, because the MCPR of the hot channel is substantially lower than that of the peripheral channel.

Table 1. MCPR and Δ CPR/ICPR Comparisons

Bundle/Channel	ICPR⁽¹⁾	MCPR	ΔCPR⁽²⁾	ΔCPR/ICPR
#2400 (Ring 2)	1.4149	1.3137	-0.1012	-0.0715
#341 (Ring 3)	2.0823	1.8961	-0.1862	-0.0894

⁽¹⁾CPR at time~10 sec.

⁽²⁾ Δ CPR= MCPR - ICPR

Hot Bundle #2400 CPR

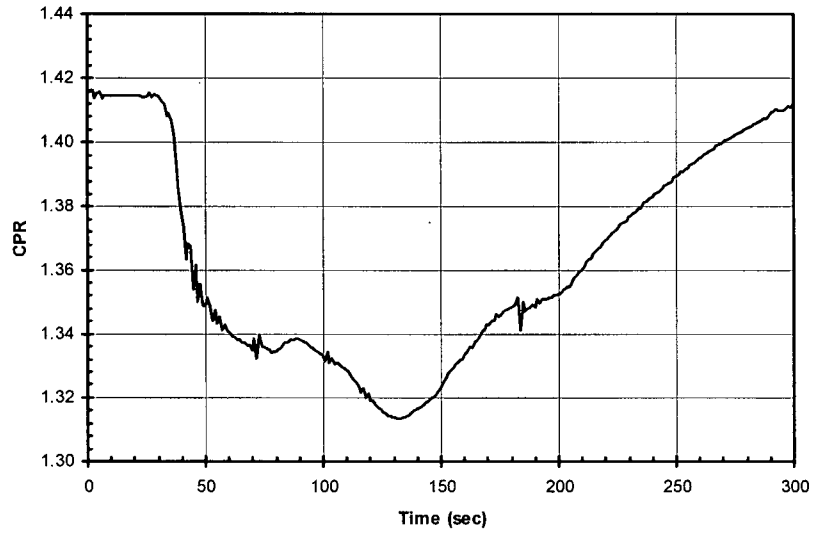


Figure 1. IICI Hot Bundle #2400 CPR

Channel #341 CPR

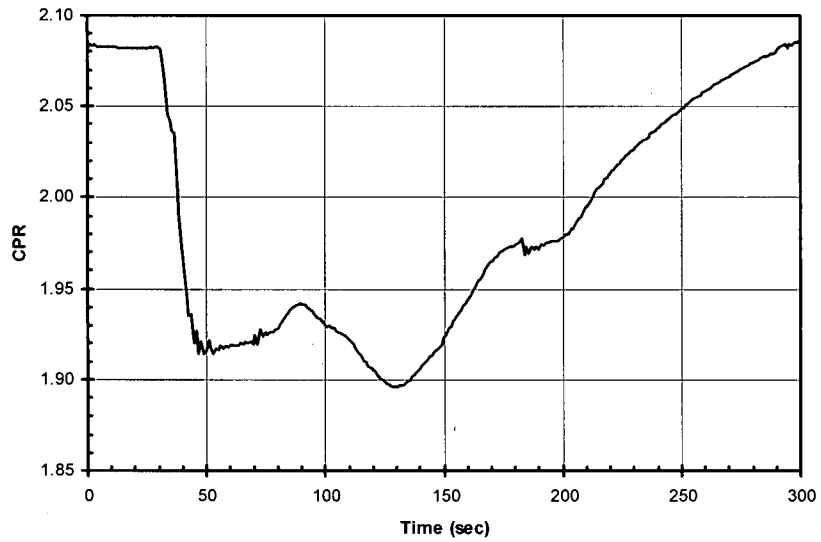


Figure 2. IICI Peripheral Channel #341 CPR

References

- [1] GEH, Licensing Topical Report, NEDE-32906P-A, Rev. 3, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analysis," September 2006.
- [2] GEH, Licensing Topical Report, NEDE-33083P, Supp. 3, "TRACG Application for ESBWR Transient Analysis," December 2007.

DCD Impact

No DCD changes will be made in response to this RAI.

No changes to the subject LTR will be made in response to this RAI.