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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 67 Related to ESBWR Design Certification Application – Mechanical Components – RAI Number 3.9-15**

Enclosure 1 contains GE's response to the subject NRC RAI transmitted via the Reference 1 letter.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

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Reference:

1. MFN 06-378, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 67 Related to ESBWR Design Certification Application,* October 10, 2006

Enclosure:

1. MFN 07-275 – Response to Portion of NRC Request for Additional Information Letter No. 67 Related to ESBWR Design Certification Application – Mechanical Components – RAI Number 3.9-15

cc:	AE Cubbage	USNRC (with enclosures)
	DH Hinds	GE (with enclosures)
	RE Brown	GE (w/o enclosures)
	eDRF	0000-0067-8639

Enclosure 1

MFN 07-275

Response to Portion of NRC Request for

Additional Information Letter No. 67

Related to ESBWR Design Certification Application

Mechanical Components – RAI Number 3.9-15

NRC RAI 3.9-15

Provide a description of the application of inelastic analysis in DCD Tier 2, Section 3.9.1.4 to demonstrate the acceptability of a postulated blowout of a control rod drive housing caused by a weld failure.

GE Response

An analysis was performed to demonstrate the adequacy of the CRGT (Control Rod Guide Tube) to restrain a hypothetical blowout of the FMCRD (Fine Motion Control Rod Drive) and the attached control rod as described in DCD Tier 2 Subsection 4.6.1.2.2 FMCRD Components "Integral Internal Blowout Support". The blowout event inelastic evaluation occurs during failure scenarios: (1) where the postulated failure in the CRDH (Control Rod Drive Housing) is just below the weld to stub tube and (2) at the weld interface between the CRDH and stub tube, see figure 1.

The normal functions of the CRGT and CRDH are to act as a core support structure or reactor coolant pressure boundary. After the CRDH failure, the CRGT and CRDH act to restrain the control rod and the FMCRD to mitigate accident consequences. When pressure and weight cause the small gaps to close, the impact load's energy is absorbed by the austenitic stainless steel components. A system analysis determines the impact load taking credit for elastic-plastic deformation of the CRGT base, the FMCRD outer tube and FMCRD upper guide (labeled as Internal CRD Blowout Support in figure 1).

A limit load analysis method is used to analyze the CRGT base. This method is chosen due the level of plastic bending deformation. A model is created in ANSYS and the material model uses an elastic-plastic relationship, and where the stress-strain relationship in the plastic region uses a power law. The CRGT base coupling will deform downwards and radially inwards. The FMCRD upper guide deforms radially outwards, but only a short distance until it contacts the CRDH inner diameter. The maximum load capability of the CRGT is determined and compared to the component loads during the postulated blowout for acceptability.

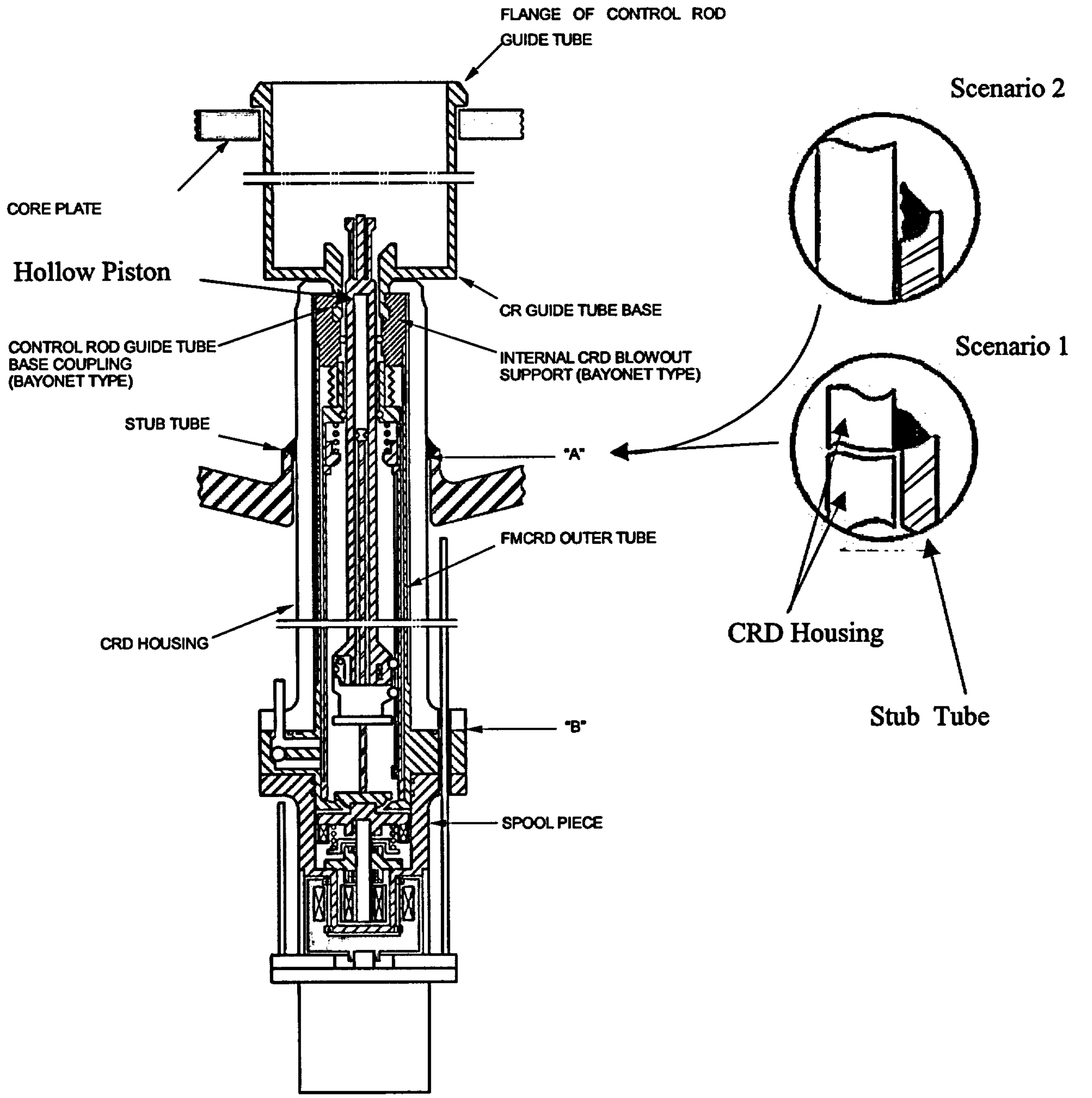

Figure 1: Internal CRD Blowout Support Schematic (from DCD Tier 2, figure 4.6-7 with additional information)

DCD Impact

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