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MFN 06-331, Supplement 2

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U.S. Nuclear Regulatory Commission
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Washington, D.C. 20555-0001

Subject: **Response to NRC Request for Additional Information Letter No. 172 Related to the ESBWR Design Certification – Safety Analyses – RAI Number 15.0-2S02**

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 NRC letter dated March 26, 2008. GEH response to RAI Number 15.0-2S02 is addressed in Enclosure 1. DCD Markups related to this response are provided in Enclosure 2.

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

Sincerely,

James C. Kinsey

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 08-309, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 172 Related To ESBWR Design Certification Application*, dated March 26, 2008

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 172 Related to ESBWR Design Certification Application – Safety Analyses – RAI Number 15.0-2S02
2. Response to Portion of NRC Request for Additional Information Letter No. 172 Related to ESBWR Design Certification Application – Safety Analyses – RAI Number 15.0-2S02 – DCD Markups

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GEH/San Jose (with enclosures)
RE Brown GEH/Wilmington (with enclosures)
DH Hinds GEH/Wilmington (with enclosures)
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Enclosure 1

MFN 06-331, Supplement 2

Response to Portion of NRC Request for Additional Information Letter No. 172 Related to ESBWR Design Certification Application

Safety Analyses

RAI Number 15.0-2 S02

NRC RAI 15.0-2 S02:

Confirm that all non-safety grade equipment which is credited in Chapter 15 analyses and identified in Tables 15.1-5 and 15.1-6 is included in the technical specifications with appropriate surveillance requirements.

(a) In Table 15.1-5, Note 1 is not added for the ATWS Feedwater Flow runback item. If this feature is not safety grade, add a Note 1.

(b) It is our understanding that credit is taken for Rod Worth Minimizer (RWM) in Chapter 15 analyses.

Add RWM to Table 15.1-6 and add a Note 1.

GEH Response:

Confirmation of what is included in the Technical Specifications and how limiting conditions for operation are chosen, will be addressed as part of the response to RAI 16.0-1 S01, which will be provided separately.

(a) The initiating signal for Feedwater Runback is safety-related and originates from the Anticipated Transient Without Scram (ATWS)/ Standby Liquid Control (SLC) logic. The feedwater runback signal is transmitted to the nonsafety-related feedwater control system via Diverse Protection System (DPS). This is also described in response to RAI 7.1-32 in GEH letter MFN 06-482 dated December 12, 2006.

Although the signal is safety-related, the feedwater control system is not; therefore, Note 1 is also added for this feature in Table 15.1-5.

(b) The Rod Worth Minimizer (RWM) is credited in the control rod withdrawal error during a refueling event. The RWM is also credited in the Rod drop accident event. Table 15.1-6 is updated to include the RWM for both of these events.

DCD Impact:

DCD Tier 2, Table 15.1-5, Table 15.1-6 and Figure 15.1-23 will be revised as noted on the attached markup.

Enclosure 2

MFN 06-331, Supplement 2

Response to Portion of NRC Request for Additional Information Letter No. 172 Related to ESBWR Design Certification Application

Safety Analyses

RAI Number 15.0-2 S02

DCD Markups

Table 15.1-5

NSOA System Event Matrix

	SRV – Safety Relief Mode	SRV – Power Actuated Mode (ADS)	DPV Actuation	ICS – MSIV Position	ICS – RPV High Dome Pressure (10-second delay)	ICS – RPV Low Water Level (L2 30-sec delay)	ICS – RPV Low Water Level (L1)	TBV Closure – Low-low condenser vacuum[1]	ICS – Loss of Power Generation Bus (Loss of Feedwater Flow)	TBV Initiation – TSV Closure[1]	TBV Initiation – TCV Fast Closure[1]	TSV Closure – RPV High Water Level (L8)[1]	TSV Closure – Low Condenser Vacuum[1]	TCV Fast Closure – Load Rejection[1]	MSIV Closure – RPV Low Water Level (L2 w/30 sec)	MSIV Closure – RPV Low Water Level (L1)	MSIV Closure – Low Turbine Inlet/Main Steamline Pressure	MSIV Closure – Low Main Condenser Vacuum	MSIV Closure - High Steamline Flow	FW Pump Runback – L8	CRD Makeup Water – RPV Low Water Level (L2)[1]	RWCU/SDC Operation	ATWS – Feedwater Flow Runback[1]	ATWS – ADS Inhibition	SLCS – RPV Dome High Pressure - APRM not downscale	SLCS – DPV Open	SLCS – RPV Low Water Level (L2) - APRM not downscale	FAPCS – High Suppression Pool Temperature[1]	SCRRI/SRI[1]	GDCS	GDCS Equilizing Lines	High Radiation MCR EFU Initiation	Passive Containment Cooling PCCS	Feedwater Feedback Level Controller[1]
Loss of Feedwater Heating																													X					
Closure of One Turbine Control Valve																																		
Generator Load Rejection with Bypass											X																		X					
Generator Load Rejection with a Single Failure in the Turbine Bypass System				X	X	X					X				X		X																	
Turbine Trip with Bypass										X																			X					
Turbine Trip with a Single Failure in the Turbine Bypass System				X	X	X				X					X		X																	
Closure of One Main Steamline Isolation Valve				X															X															
Closure of All Main Steamline Isolation Valves				X																														

Table 15.1-6

NSOA Automatic Instrument Trip/Event Matrix

	Scram – APRM High Neutron Flux	Scram – APRM High Simulated Thermal Power	Scram – RPV Low Water Level (L3)	Scram – RPV High Water Level (L8)	Scram – Loss of Power on Four Power Generation Buses	Scram – MSIV Position	Scram – High Suppression Pool Temperature	Scram – TSV Closure (with insufficient bypass available)	Scram – TCV Fast Closure (with insufficient bypass available)	Scram – Low Condenser VacuumM	Scram – (Loss of Power Generation Bus) – Loss of Feedwater Flow	Scram – SRNM Period	Scram – High Drywell Pressure	Rod Block – SRNM Period, ~~or~~ RWM, ATLM Parameter Exceeded, or MRBM Parameter Exceeded[1]
Loss of Feedwater Heating														
Closure of One Turbine Control Valve														
Generator Load Rejection with Bypass														
Generator Load Rejection with a Single Failure in the Turbine Bypass System									X					
Turbine Trip with Bypass														
Turbine Trip with a Single Failure in the Turbine Bypass System								X						

Table 15.1-6

NSOA Automatic Instrument Trip/Event Matrix

	Scram – APRM High Neutron Flux	Scram – APRM High Simulated Thermal Power	Scram – RPV Low Water Level (L3)	Scram – RPV High Water Level (L8)	Scram – Loss of Power on Four Power Generation Buses	Scram – MSIV Position	Scram – High Suppression Pool Temperature	Scram – TSV Closure (with insufficient bypass available)	Scram – TCV Fast Closure (with insufficient bypass available)	Scram – Low Condenser VacuumM	Scram – (Loss of Power Generation Bus) – Loss of Feedwater Flow	Scram – SRNM Period	Scram – High Drywell Pressure	Rod Block – SRNM Period, ~~or~~ RWM, ATLM Parameter Exceeded, or MRBM Parameter Exceeded[1]
Pressure Regulator Failure Opening of All Turbine Control and Bypass Valves						X								
Pressure Regulator Failure – Closure of All Turbine Control and Bypass Valves	X													
Generator Load Rejection with Total Turbine Bypass Failure (at High Power)									X					
Turbine Trip with Total Turbine Bypass Failure (at High Power)								X						
Control Rod Withdrawal Error During Refueling														X

Table 15.1-6

NSOA Automatic Instrument Trip/Event Matrix

	Scram – APRM High Neutron Flux	Scram – APRM High Simulated Thermal Power	Scram – RPV Low Water Level (L3)	Scram – RPV High Water Level (L8)	Scram – Loss of Power on Four Power Generation Buses	Scram – MSIV Position	Scram – High Suppression Pool Temperature	Scram – TSV Closure (with insufficient bypass available)	Scram – TCV Fast Closure (with insufficient bypass available)	Scram – Low Condenser VacuumM	Scram – (Loss of Power Generation Bus) – Loss of Feedwater Flow	Scram – SRNM Period	Scram – High Drywell Pressure	Rod Block – SRNM Period, ~~or~~ RWM, ATLM Parameter Exceeded, or MRBM Parameter Exceeded[1]
Control Rod Drop Accident Note: Safety Related features of FMCRD System prevent Rod Drop.														X
Feedwater Line Break Outside Containment			X			X					X			
Failure of Small Line Outside Containment			X			X					X			
RWCU/SDC System Line Failure Outside Containment			X			X					X			
Spent Fuel Cask Drop Accident														
MSIV Closure Flux Scram (Overpressure Protection)	X													

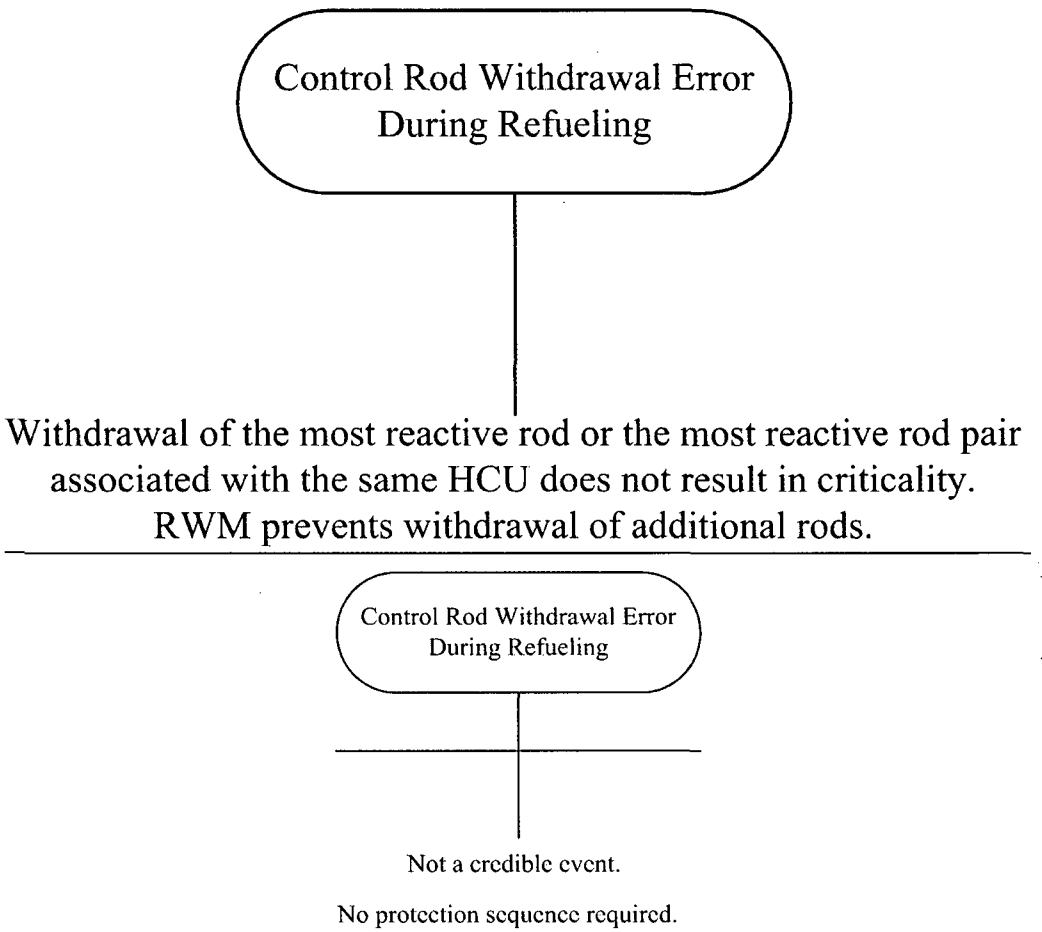

Figure 15.1-23. Event Diagram – Control Rod Withdrawal Error During Refueling