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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 79 - Containment Isolation Function - RAI Numbers 6.2-111 S01 and 6.2-129 S01**

Enclosure 1 contains GE's response to the subject NRC RAIs originally transmitted via the Reference 1 letter and supplemented by NRC requests for clarification.

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

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

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Reference:

1. MFN 06-393, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 79 Related to ESBWR Design Certification Application*, October 11, 2006

Enclosure:

1. MFN 06-461 Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 79 - Related to ESBWR Design Certification Application - Containment Isolation Function - RAI Numbers 6.2-111 S01 and 6.2-129 S01

cc:
AE Cubbage	USNRC (with enclosures)
BE Brown	GE/Wilmington (with enclosures)
GB Stramback	GE/San Jose (with enclosures)
eDRF	0000-0067-6665

Enclosure 1

MFN 06-461 Supplement 1

Response to Portion of NRC Request for

Additional Information Letter No. 79

Related to ESBWR Design Certification Application

Containment Isolation Function

RAI Numbers 6.2-111 S01 and 6.2-129 S01

NRC RAI 6.2-111 S01:

Staff's original RAI stated:

DCD Tier 2, Revision 1, Section 6.2.4.2.3, "Compliance with General Design Criteria and Regulatory Guides, "states, in part:

In general, all requirements of General Design Criteria 54, 55, 56, and Regulatory Guide 1.11 are met in the design of the containment isolation function.

Why were GDC 57 and RG 1.141 not addressed as part of this statement?

GE Response in MFN 06-461 stated:

DCD Tier 2, Subsections 6.2.4.2.3, 6.2.4.3.2.4 and Table 6.2-33 will be revised by addressing GDC 57 and RG 1.141 design requirements, as noted on the attached markup.

Staff's supplemental RAI:

The proposed revisions to DCD Tier 2, Subsection 6.2.4.2.3 are acceptable; however, the proposed revisions to DCD Tier 2, Subsection 6.2.4.3.2.4 and Table 6.2-33 are not. The proposed revisions seem to reflect a belief that GDC 57 covers closed systems outside of containment. It does not. It only covers closed systems inside containment.

GDC 55, Reactor coolant pressure boundary penetrating containment, begins: Each line that is part of the reactor coolant pressure boundary and that penetrates primary reactor containment...

GDC 56, Primary containment isolation, begins: Each line that connects directly to the containment atmosphere and penetrates primary reactor containment...

GDC 57, Closed system isolation valves. begins: Each line that penetrates primary reactor containment and is neither part of the reactor coolant pressure boundary nor connected directly to the containment atmosphere...

As a set, these three GDC cover all possible categories of lines that may penetrate primary reactor containment: 1) those connected to the reactor coolant pressure boundary (GDC 55); 2) those open to the containment atmosphere (GDC 56); and 3) everything else (GDC 57). By definition, a line which penetrates through and into the primary reactor containment and which does not connect to either the reactor coolant pressure boundary (inside containment) or the containment atmosphere (i.e., category 3) is a system which is closed inside the containment. The presence or absence of closed or open systems outside of the containment have nothing to do with these GDC.

In light of this, the first paragraph of the proposed revisions to DCD Tier 2, Subsection 6.2.4.3.2.4 should be revised. The first sentence begins: Criterion 57 which is applicable to a closed system, requires that. This should be changed to Criterion 57 which is applicable to a closed system inside containment, requires that.... The sentence goes on to say that the line must have at least one containment isolation valve (CIV), but it neglects to say that the CIV must be outside of the containment, which is required by GDC 57. An appropriate change, such as inserting outside containment after containment isolation valve, should be made. Further, Subsection 6.2.4.3.2.4.1, under the heading Fuel and Auxiliary Pools Cooling System Suction Lines, describes the system as being closed outside containment and open inside containment. This clearly does not fall under GDC 57 and should not be included in Subsection 6.2.4.3.2.4.1.

Finally, proposed DCD Tier 2, Table 6.2-33, Containment Isolation Valve Information for the Fuel and Auxiliary Pools Cooling System, should not cite GDC 57 as the applicable basis for CIV F321. Please revise the DCD in conformance with this discussion.

GE Response:

GE understands the scope of 10 CFR 50, Appendix A, General Design Criteria (GDC) 55, 56, and 57. In DCD Tier 2, Revision 2, GDC 57 was used to address containment isolation for the Fuel and Auxiliary Pools Cooling System (FAPCS) line taking suction from the suppression pool. Subsequently, GE determined that this design was not feasible (see the response to RAI 6.2-125). In DCD Tier 2, Revision 3, containment isolation for this line was switched to the scope of GDC 56, and a second isolation valve was added in series with the original single isolation valve. The ESBWR design no longer has any closed-system lines penetrating containment for which GDC 57 is credited.

In MFN 07-009, GE submitted a revised response to RAI 6.2-111 noting that proposed changes to DCD Tier 2, Subsection 6.2.4.3.2.4 were not correct. Consequently, in DCD Tier 2, Revision 3, Subsection 6.2.4.3.2.4 was returned to the DCD Tier 2, Revision 1 wording:

"The ESBWR has no closed system lines penetrating the containment that require automatic isolation."

As discussed in MFN 07-009, it was also GE's intention to correct DCD Tier 2, Revision 3, Table 6.2-33a, such that it references GDC 56 instead of GDC 57. However, this was overlooked in the preparation of DCD Tier 2, Revision 3, and GDC 57 was still referenced. This item of DCD Tier 2, Table 6.2-33a, will be changed back to GDC 56 in DCD Tier 2, Revision 4.

Additionally, new DCD Tier 2, Tables 6.2-39, 6.2-39a, and 6.2-40 will be corrected in DCD Tier 2, Revision 4, such that they reference GDC 56 instead of GDC 57.

DCD Impact:

DCD Tier 2, Tables 6.2-33a, 6.2-39, 6.2-39a, and 6.2-40, will be revised in DCD Tier 2, Revision 4, as shown in the attached markup.

Table 6.2-33a

Containment Isolation Valve Information for the Fuel and Auxiliary Pools Cooling System

Penetration Identification	G21-MPEN-0005		G21-MPEN-0002	
Valve No.	F321A	F322A	F306A	F307A
Applicable Basis	GDC ~~57~~56	GDC ~~57~~56	GDC 56	GDC 56
Tier 2 Figure	9.1-1	9.1-1	9.1-1	9.1-1
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size	250 mm.	250 mm.	250 mm.	250 mm.
Type C Leakage Test	Yes	Yes	Yes	Yes
Pipe Length from Cont. to Outboard Isolation Valve	COL holder to provide	COL holder to provide	COL holder to provide	COL holder to provide
Leakage Through Packing[(a)]	(a_1)	(a_1)	(a_1)	N/A
Leakage Past Seat[(b)]	b6	b6	b6	b6
Location	Outboard	Outboard	Outboard	Inboard
Valve Type	GT, QT, AF	GT, QT, AF	GT, QT, AF	CK, AF
Operator[(c)]	NMO	NMO	NMO	N/A
Normal Position	Closed[1]	Closed[1]	Closed[1]	N/A
Shutdown Position	Closed[1]	Closed[1]	Closed[1]	N/A
Post-Acc Position	Closed[2]	Closed[2]	Closed[3]	N/A
Power Fail Position	As-is	As-is	As-is	N/A
Cont. Iso. Signal[(d)]	P	P	P	Q
Primary Actuation	Remote manual	Remote manual	Remote manual	Flow
Secondary Actuation	Local manual	Local manual	Local manual	N/A

[1]The valve is open occasionally for the suppression pool cooling and cleanup function.
[2]The valve is opened remote manually for performing LPCI, Drywell Spray, or Suppression Pool Cooling function if required.
[3]The valve is opened remote manually for performing Suppression Pool Cooling function if required.

Table 6.2-33a

Containment Isolation Valve Information for the Fuel and Auxiliary Pools Cooling System

Penetration Identification	G21-MPEN-0005		G21-MPEN-0002	
Valve No.	F321A	F322A	F306A	F307A
Closure Time (sec)	<30	<30	<30	N/A
Power Source	Div. 1, 3	Div. 1, 3	Div. 1, 3	N/A

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-39

Containment Isolation Valve Information for the Chilled Water System Train A

Penetration Identification	P25-MPEN-0001		P25-MPEN-0002	
Valve No.	F023A	F024A	F025A	F026A
Applicable Basis	GDC ~~57~~56	GDC ~~57~~56	GDC ~~57~~56	GDC ~~57~~56
Tier 2 Figure	9.2-3	9.2-3	9.2-3	9.2-3
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size	150 mm	150 mm	150 mm	150 mm
Type C Leakage Test	Yes	Yes	Yes	Yes
Pipe Length from Cont. to Outboard Isolation Valve	COL holder to provide	COL holder to provide	COL holder to provide	COL holder to provide
Leakage Through Packing[(a)]	(a1)	N/A	N/A	(a1)
Leakage Past Seat[(b)]	(b2)	(b2)	(b2)	(b2)
Location	Outboard	Inboard	Inboard	Outboard
Valve Type	GB, QT, GT	GB, QT, GT	GB, QT, GT	GB, QT, GT
Operator[(c)]	AO	NO	NO	AO
Normal Position	Open	Open	Open	Open
Shutdown Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	C,H	C,H	C,H	C,H
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec.)	< 30	< 30	< 30	< 30

Table 6.2-39

Containment Isolation Valve Information for the Chilled Water System Train A

Penetration Identification	**P25-MPEN-0001**		**P25-MPEN-0002**	
Valve No.	F023A	F024A	F025A	F026A
Power Source	Div. 2, 4	Div. 1, 3	Div. 1, 3	Div. 2, 4

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-39a

Containment Isolation Valve Information for the Chilled Water System Train B

Penetration Identification	P25-MPEN-0003		P25-MPEN-0004	
Valve No.	F023B	F024B	F025B	F026B
Applicable Basis	GDC ~~57~~56	GDC ~~57~~56	GDC ~~57~~56	GDC ~~57~~56
Tier 2 Figure	9.2-3	9.2-3	9.2-3	9.2-3
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size	150 mm	150 mm	150 mm	150 mm
Type C Leakage Test	Yes	Yes	Yes	Yes
Pipe Length from Cont. to Outboard Isolation Valve	COL holder to provide	COL holder to provide	COL holder to provide	COL holder to provide
Leakage Through Packing[(a)]	(a1)	N/A	N/A	(a1)
Leakage Past Seat[(b)]	(b2)	(b2)	(b2)	(b2)
Location	Outboard	Inboard	Inboard	Outboard
Valve Type	GB, QT, GT	GB, QT, GT	GB, QT, GT	GB, QT, GT
Operator[(c)]	AO	NO	NO	AO
Normal Position	Open	Open	Open	Open
Shutdown Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	C,H	C,H	C,H	C,H
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec.)	< 30	< 30	< 30	< 30
Power Source	Div. 2, 4	Div. 1, 3	Div. 1, 3	Div. 2, 4

Table 6.2-40

Containment Isolation Valve Information for the High Pressure Nitrogen Gas Supply System

Penetration Identification	P54-MPEN-0001		P54-MPEN-0002	
Valve No.	F0026	F027	F009	F010
Applicable Basis	GDC ~~57~~56	GDC ~~57~~56	GDC ~~57~~56	GDC ~~57~~56
Tier 2 Figure	N/A	N/A	N/A	N/A
ESF	No	No	No	No
Fluid	Air/N_2	Air/N_2	N_2	N_2
Line Size	50 mm	50 mm	50 mm	50 mm
Type C Leakage Test	Yes	Yes	Yes	Yes
Pipe Length from Cont. to Outboard Isolation Valve	COL holder to provide	COL holder to provide	COL holder to provide	COL holder to provide
Leakage Through Packing[(a)]	(a_1)	N/A	(a_1)	N/A
Leakage Past Seat[(b)]	(b_2)	(b_2)	(b_2)	(b_2)
Location	Outboard	Inboard	Outboard	Inboard
Valve Type	GB, QT	CK	GB, QT	CK
Operator[(c)]	AO	PM	AO	PM
Normal Position	Open	Open/Closed	Open	Open/Closed
Shutdown Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	C,H	Q	C,H	Q
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Process Actuated	Remote manual	Process Actuated
Closure Time (sec.)	< 30	N/A	< 30	N/A
Power Source	Div. 2, 4	N/A	Div. 2, 4	N/A

Note: For explanation of codes, see legend on Table 6.2-15.

NRC RAI 6.2-129 S01:

Staff's original RAI stated:

DCD Tier 2, Revision 1, Section 6.2.4.3.2.4, Evaluation Against General Design Criterion 57, states: The ESBWR has no closed system lines penetrating the containment that require automatic isolation. Considering that, generally, closed systems inside containment do not require automatic isolation (e.g., remote-manual isolation is allowed), this is not very informative. Are there any closed systems inside containment whose lines penetrate the containment? If so, describe their containment isolation provisions in the DCD. If not, clarify the DCD statement.

GE Response in MFN 06-461 stated:

DCD Tier 2, Subsection 6.2.4.3.2.4 is being revised by adding a closed system outside the containment. Please refer to the response to RAI 6.2-111. No DCD Tier 2 changes will be made in response to this RAI.

Staff's supplemental RAI:

Please refer to the RAI 6.2-111 supplement for comments on the proposed revision to DCD Tier 2, Subsection 6.2.4.3.2.4. The question remains, are there any closed systems inside containment whose lines penetrate the containment? If so, describe their containment isolation provisions in the DCD. In particular, if these closed systems are to be credited as containment isolation barriers, do they meet the guidelines for closed systems inside containment contained in SRP 6.2.4, Rev. 2, RG 1.141, and national standard ANS-56.2/ANSI N271-1976?

GE Response:

There are no closed systems inside containment whose lines penetrate containment. GE will revise DCD Tier 2, Subsection 6.2.4.3.2.4, in DCD Tier 2, Revision 4, to remove the exception for automatic isolation.

DCD Impact:

DCD Tier 2, Subsection 6.2.4.3.2.4, will be revised in DCD Tier 2, Revision 4, as shown in the attached markup.

6.2.4.3.2.4 Evaluation Against General Design Criterion 57

The ESBWR has no closed system lines penetrating the containment that ~~require automatic isolation~~are within the scope of GDC 57.