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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 134 Related to ESBWR Design Certification Application – Technical Specifications – RAI Numbers 16.2-157 and 16.2-158**

Enclosures 1 and 2 contain the GE Hitachi Nuclear Energy (GEH) responses to the subject NRC RAIs transmitted via the Reference 1 letter.

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

Sincerely,

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 08-033, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 134 Related to ESBWR Design Certification Application*, January 14, 2008

Enclosures:

1. MFN 08-190 – Response to Portion of NRC Request for Additional Information Letter No. 134 Related to ESBWR Design Certification Application – Technical Specifications – RAI Numbers 16.2-157 and 16.2-158
2. MFN 08-162 - DCD Tier 2, Chapter 16B, Draft Revisions for RAIs 16.2-157 and 16.2-158

cc:

AE Cubbage	USNRC (with enclosures)
DH Hinds	GEH (with enclosures)
RE Brown	GEH (with enclosures)
eDRFs	0080-6251

Enclosure 1

MFN 08-190

Response to Portion of NRC Request for

Additional Information Letter No. 134

Related to ESBWR Design Certification Application

- Technical Specifications -

RAI Numbers 16.2-157 and 16.2-158

NRC RAI 16.2-157

In Revisions 3 and 4 of DCD Tier 2, Chapter 16, the generic technical specifications (GTS) bases for the RPS, ECCS, and isolation system instrumentation response time testing surveillance requirements (SRs) describe conditions for excluding selected components from response time testing, and refer to two licensing topical reports (LTRs), which are enclosed in curly brackets, ({NEDO-32291-A, "System Analyses for the Elimination of Selected Response Time Testing Requirements," October 1995} and {NEDO-32291-A, Supplement 1, "System Analyses for the Elimination of Selected Response Time Testing Requirements," October 1999}). Please provide information that describes and justifies application of these LTRs to ESBWR instrumentation functions, for each selected component.

GE Response

Presentation of "{NEDO-32291-A, "System Analyses for the Elimination of Selected Response Time Testing Requirements," October 1995} and {NEDO-32291-A, Supplement 1, "System Analyses for the Elimination of Selected Response Time Testing Requirements," October 1999}," as references for elimination of certain response time tests in DCD Revision 3 and Revision 4 was intended to provide example topical reports to support elimination of certain response time tests in the ESBWR. The Chapter 16B Bases associated with response time testing will be revised to provide a bracketed discussion and a Reviewer's Note detailing the actions that must be taken in order to eliminate response time testing for portions of the specified instrumentation loops. With this presentation, applicants would delete the bracketed discussion without the appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating sensor and instrumentation loop response time requirements. In addition, this presentation provides a template Bases discussion when a licensee implements a methodology evaluating sensor and instrumentation loop response time requirements that has received NRC approval.

DCD Impact

DCD Chapter 16B will be revised as described above and shown in the Enclosure 2 markups in Revision 5.

NRC RAI 16.2-158

In Revisions 3 and 4 of DCD Tier 2, Chapter 16, the various acceptance criteria for RPS, ECCS, and isolation system response time tests in the generic technical specifications (GTS) are based on curly-bracketed references in the GTS bases for RPS, ECCS, and isolation system response time SRs. Please provide justification for the GTS acceptance criteria for response time testing of RPS, ECCS, and isolation system instrumentation and actuation functions. Replace the bracketed reference in the GTS Bases with an NRC-approved reference, or remove the reference and include justification in the GTS Bases for each response time test surveillance requirement.

GE Response

DCD Chapter 16B, Bases, associated with response time testing will be revised to reference the appropriate response time testing acceptance criteria that will be provided in DCD Chapter 15. DCD Chapter 15 will be revised in Revision 5 to include a table providing the appropriate response time acceptance criteria.

DCD Impact

DCD Chapter 16B will be revised as described above and as shown in the attached markups in Revision 5. DCD Chapter 15 will be revised in Revision 5, as described above.

Enclosure 2

MFN 08-190

DCD Tier 2, Chapter 16B

Draft Revisions for RAIs 16.2-157 and 16.2-158

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SURVEILLANCE REQUIREMENTS (continued)

3.3.6.3, LCO 3.6.1.3, and LCO 3.6.3.1 overlaps this Surveillance to provide complete testing of the assumed safety function.

The 24-month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power and has been shown to be acceptable by Reference 3. Operating experience has shown that these components usually pass the Surveillance when performed at the 24 month Frequency.

SR 3.3.6.4.2

This SR ensures that the individual required division response times are less than or equal to the maximum values assumed in the accident analysis. The instrument response times must be added to the associated closure times to obtain the ISOLATION SYSTEM RESPONSE TIME. ISOLATION SYSTEM RESPONSE TIME acceptance criteria are included in Reference 4.

ISOLATION SYSTEM RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. This test encompasses the isolation actuation circuitry consisting of timers, VLUs, and load drivers. This test overlaps the testing required by SR 3.3.6.3.4 to ensure complete testing of instrumentation channels and actuation divisions.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating sensor and instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some portions of the isolation actuation circuitry are allowed to be excluded from specific ISOLATION SYSTEM RESPONSE TIME measurement if the conditions of Reference XX are satisfied. Furthermore, measurement of the instrument loops response time for some Functions is not required if the conditions of Reference XX are satisfied.]

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ISOLATION SYSTEM RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four divisions. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that the channels associated with each division are alternately tested. The 24 month test Frequency is consistent with the refueling cycle and has been shown to be acceptable by Reference 3.

SR 3.3.6.4.3

A system functional test is performed to verify that the mechanical portions of the actuation function operate as designed when demanded. This includes verifying that RWCU/SDC isolation valves and feedwater isolation valves automatically close and that feedwater pump breakers automatically trip. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.4.1 overlaps this SR to provide complete testing of the safety function.

SURVEILLANCE REQUIREMENTS (continued)

The 24-month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power and has been shown to be acceptable by Reference 3.

REFERENCES

1. Section 6.3.
2. Chapter 15.
3. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}
4. ~~{Reference for ISOLATION SYSTEM RESPONSE TIME acceptance criteria}~~Chapter 15.

SURVEILLANCE REQUIREMENTS (continued)

cannot be returned to a setting within the "leave alone" tolerance, then the instrument channel shall be declared inoperable. TS 5.5.11.a requires that the NTSP and the methodology for calculating the "leave alone" and the "as-found" tolerances be in the SCP.

SR 3.3.1.1.4

This SR ensures that the individual required channel response times are less than or equal to the maximum values assumed in the accident analysis. The RPS RESPONSE TIME acceptance criteria are included in Reference 14.

RPS RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. This test encompasses the sensor channels up through the DTMs and overlaps the testing required by SR 3.3.1.2.2 to ensure complete testing of instrument channels and actuation circuitry.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating sensor and instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some sensors for Functions are allowed to be excluded from specific RPS RESPONSE TIME measurement if the conditions of Reference ~~15~~ XX are satisfied. If these conditions are satisfied, sensor response time may be allocated based on either assumed design sensor response time or the manufacturer's stated design response time. When the requirements of Reference ~~15~~ XX are not satisfied, sensor response time must be measured. Furthermore, measurement of the instrument loops response times is not required if the conditions of Reference ~~16~~ XX are satisfied.]

RPS RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four channels. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that the channels associated with each division are alternately tested. The 24 month test Frequency is consistent with the refueling cycle and has been shown to be acceptable by Reference 13.

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REFERENCES

1. Chapter 7, Figure 7.2-1.
2. Chapter 15.
3. Subsection 7.7.2.

REFERENCES (continued)

4. Subsection 15.3.8.
5. Subsection 15.3.2.
6. Subsection 5.2.2.
7. Subsection 15.3.3.
8. Subsection 15.2.2.7.
9. Subsection 15.3.13.
10. Subsection 15.2.2.5.
11. Subsection 15.2.2.3.
12. Subsection 15.2.2.8.
13. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}
14. ~~{Reference for RPS RESPONSE TIME acceptance criteria}~~Chapter 15.

~~15.{NEDO-32291-A, "System Analyses For the Elimination of Selected Response Time Testing Requirements," October 1995.~~

~~16.NEDO-32291-A, Supplement 1, "System Analyses for The Elimination of Selected Response Time Testing Requirements," October 1999.}~~

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SURVEILLANCE REQUIREMENTS (continued)

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some portions of the RPS actuation circuitry are allowed to be excluded from specific RPS RESPONSE TIME measurement if the conditions of Reference XX are satisfied. Furthermore, measurement of the instrument loops response times is not required if the conditions of Reference XX are satisfied.]

RPS RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. This test encompasses the RPS actuation circuitry that consists of the Divisions of Trip Logic, and the Divisions of Trip Actuators and overlaps the testing required by SR 3.3.1.1.4 to ensure complete testing of instrument channels and actuation circuitry.

RPS RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four divisions. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that each division is alternately tested. The 24 month test Frequency is consistent with the refueling cycle and has been found to be acceptable by Reference 2.

REFERENCES

1. Chapter 15.
2. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}
3. ~~{Reference for RPS RESPONSE TIME acceptance criteria}~~Chapter 15.

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SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.4.7

This SR ensures that the individual required channel response times are less than or equal to the maximum values assumed in the accident analysis. The RPS RESPONSE TIME acceptance criteria are included in Reference 7. RPS RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. This test encompasses the SRNM channels from the sensors to the NMS Digital Trip Modules and up to each of the SRNM Trip Logic Units and the APRM and OPRM channels from the sensors (LPRMs) to the NMS Digital Trip Modules and up to each of the NMS Trip Logic Units, which house the APRM/OPRM logic. This test overlaps the testing required by SR 3.3.1.5.2 to ensure complete testing of instrument channels and actuation circuitry.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating sensor and instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some sensors are allowed to be excluded from specific RPS RESPONSE TIME measurement if the conditions of Reference ~~8~~ XX are satisfied. If these conditions are satisfied, sensor response time may be allocated based on either assumed design sensor response time or the manufacturer's stated design response time. When the requirements of Reference ~~8~~ XX are not satisfied, sensor response time must be measured. Furthermore, measurement of the instrument loops response times for some sensors is not required if the conditions of Reference ~~9~~ XX are satisfied.]

As noted, neutron detectors are excluded from RPS RESPONSE TIME testing because the principles of detector operation virtually ensure an instantaneous response time.

RPS RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four channels. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that the channels associated with each division are alternately tested. The 24 month test Frequency is consistent with the typical refueling cycle and has been shown to be acceptable by Reference 6.

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REFERENCES
1. Chapter 7, Figure 7.2-1.
2. Chapter 15.
3. Subsection 5.2.2.

REFERENCES (continued)

4. Subsection 15.3.8.
5. Subsection 15.3.4.
6. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}
7. ~~{Reference for RPS RESPONSE TIME acceptance criteria}~~Chapter 15.
8. ~~{NEDO-32291-A, "System Analyses For the Elimination of Selected Response Time Testing Requirements," October 1995.~~
9. ~~NEDO-32291-A, Supplement 1, "System Analyses for The Elimination of Selected Response Time Testing Requirements," October 1999.}~~

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SURVEILLANCE REQUIREMENTS (continued)

components usually pass the Surveillance when performed at the 24 month Frequency and has been shown to be acceptable by Reference 2.

SR 3.3.1.5.2

This SR ensures that the individual required division response times are less than or equal to the maximum values assumed in the accident analysis. The RPS RESPONSE TIME acceptance criteria are included in Reference 3.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some portions of the NMS actuation circuitry are allowed to be excluded from specific RPS RESPONSE TIME measurement if the conditions of Reference XX are satisfied. Furthermore, measurement of the instrument loops response times is not required if the conditions of Reference XX are satisfied.]

RPS RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. This test encompasses the NMS automatic actuation divisions that include the SRNM Trip Logic Units, the APRM Trip Logic Units, which house the OPRM logic, and the associated output to RPS. This test overlaps the testing required by SR 3.3.1.4.7 to ensure complete testing of instrument channels and actuation circuitry.

RPS RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four divisions. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that each division is alternately tested. The 24 month test Frequency is consistent with the refueling cycle and has been found to be acceptable by Reference 2.

REFERENCES 1. Chapter 15.

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2. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}

3. ~~{Reference for RPS RESPONSE TIME acceptance criteria}~~Chapter 15.

SURVEILLANCE REQUIREMENTS (continued)

the NTSP is used in plant surveillance procedures, the "leave alone" and "as-found" tolerances, as applicable, will be applied to the surveillance procedure setpoint. This will ensure that sufficient margin to the Analytical / Design Limit is maintained. If the as-left instrument setting cannot be returned to a setting within the "leave alone" tolerance, then the instrument channel shall be declared inoperable. TS 5.5.11.a requires that the NTSP and the methodology for calculating the "leave alone" and the "as-found" tolerances be in the SCP.

SR 3.3.5.1.4

This SR ensures that the individual required channel response times are less than or equal to the maximum values assumed in the accident analysis. The ECCS RESPONSE TIME acceptance criteria are included in Reference 5.

ECCS RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. This test encompasses the ECCS instrumentation from the input variable sensors through the DTM function. This test overlaps the testing required by SR 3.3.5.2.2 to ensure complete testing of instrument channels and actuation circuitry. ~~However, the measurement of instrument loop response times may be excluded if the conditions of Reference 6 are satisfied.~~

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating sensor and instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some sensors for Functions are allowed to be excluded from specific ECCS RESPONSE TIME measurement if the conditions of Reference XX are satisfied. If these conditions are satisfied, sensor response time may be allocated based on either assumed design sensor response time or the manufacturer's stated design response time. When the requirements of Reference XX are not satisfied, sensor response time must be measured. Furthermore, measurement of the instrument loops response times is not required if the conditions of Reference XX are satisfied.]

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ECCS RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four channels. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that the channels associated with each division are alternately tested.

The 24 month test Frequency is consistent with the typical industry refueling cycle and has been shown to be acceptable by Reference 4.

REFERENCES

1. Chapter 7.
2. Chapter 15.
3. Chapter 6.
4. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}

REFERENCES (continued)

5. ~~{Reference for ECCS RESPONSE TIME acceptance criteria to be entered}~~Chapter 15.
6. ~~{NEDO-32291-A, "System Analyses For the Elimination of Selected Response Time Testing Requirements," October 1995.}~~

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SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.2.2

This SR ensures that the individual required division response times are less than or equal to the maximum values assumed in the accident analysis. The ECCS RESPONSE TIME acceptance criteria are included in Reference 4.

ECCS RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total division measurements. This test encompasses the ECCS actuation circuitry from the outputs of the DTMs through the LDs that consists of VLUs, the timers, and the LDs associated with the ADS SRVs, the ADS DPVs, the GDCS injection valves, the GDCS equalizing line valves, and the SLC squib-actuated valves. This test overlaps the testing required by SR 3.3.5.1.4 to ensure complete testing of instrument channels and actuation circuitry.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some portions of the ECCS actuation circuitry are allowed to be excluded from specific ECCS RESPONSE TIME measurement if the conditions of Reference XX are satisfied. Furthermore, measurement of the instrument loops response times is not required if the conditions of Reference XX are satisfied.]

ECCS RESPONSE TIME tests are conducted on a 24 month on a STAGGERED TEST BASIS for four divisions. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that each division is alternately tested.

The 24 month test Frequency is consistent with the typical industry refueling cycle and has been shown to be acceptable by Reference 3.

REFERENCES

1. Chapter 15.

2. Chapter 6.

3. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}

4. ~~{Reference for ECCS RESPONSE TIME acceptance criteria.}~~Chapter 15.

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SURVEILLANCE REQUIREMENTS (continued)

instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. These channels will also be identified in the Corrective Action Program.

Entry into the Corrective Action Program will ensure required review and documentation of the condition for OPERABILITY. TS 5.5.11.a requires that the Allowable Values and the methodology for calculating the "as-found" tolerances be in the SCP. As indicated in TS 5.5.11.c.2, the as-left setting for the instrument is required to be returned to within the "leave alone" tolerance of the NTSP. Where a setpoint more conservative than the NTSP is used in plant surveillance procedures, the "leave alone" and "as-found" tolerances, as applicable, will be applied to the surveillance procedure setpoint. This will ensure that sufficient margin to the Analytical / Design Limit is maintained. If the as-left instrument setting cannot be returned to a setting within the "leave alone" tolerance, then the instrument channel shall be declared inoperable. TS 5.5.11.a requires that the NTSP and the methodology for calculating the "leave alone" and the "as-found" tolerances be in the SCP.

SR 3.3.5.3.4

This SR ensures that the individual required channel response times are less than or equal to the maximum values assumed in the accident analysis. The ICS RESPONSE TIME acceptance criteria are included in Reference 3.

ICS RESPONSE TIME may be verified by actual response time measurements or any series of sequential, overlapping, or total channel measurements. This test encompasses the ICS instrumentation from the input variable sensors through the DTM function. This test overlaps the testing required by SR 3.3.5.4.2 to ensure complete testing of instrumentation channels and actuation circuitry. ~~However, the measurement of instrument loop response times may be excluded if the conditions of Reference 4 are satisfied.~~

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[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating sensor and instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some sensors for Functions are allowed to be excluded from specific ICS RESPONSE TIME measurement if the conditions of Reference XX are satisfied. If these conditions are satisfied, sensor response time may be allocated based on either assumed design sensor response time or the manufacturer's stated design response time. When the requirements of Reference XX are not satisfied, sensor response time must be measured. Furthermore, measurement of the instrument loops response times is not required if the conditions of Reference XX are satisfied.]

ICS SYSTEM RESPONSE TIME tests are conducted on a 24 month on a STAGGERED TEST BASIS for four channels. The 24 month test Frequency is consistent with the typical refueling cycle and has been shown to be acceptable by Reference 2.

REFERENCES

1. Chapter 15.
2. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}

REFERENCES (continued)

3. ~~{Reference for ICS RESPONSE TIME acceptance criteria}~~Chapter 15.
4. ~~{NEDO-32291-A, "System Analyses For the Elimination of Selected Response Time Testing Requirements," October 1995.}~~

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SURVEILLANCE REQUIREMENTS

SR 3.3.5.4.1

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required ICS logic for a specific channel.

LOGIC SYSTEM FUNCTIONAL tests are conducted on a 24 month STAGGERED TEST BASIS for four divisions. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that each division is alternately tested.

The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power and has been shown to be acceptable by Reference 2. Operating experience has shown these components usually pass the Surveillance when performed at the 24 month Frequency.

SR 3.3.5.4.2

This SR ensures that the individual required division response times are less than or equal to the maximum values assumed in the accident analysis. The ICS RESPONSE TIME acceptance criteria are included in Reference 3.

ICS RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total division measurements. This test encompasses the ICS actuation circuitry from the outputs of the DTMs through the LDs that consists of VLUs, the timers and the LDs associated with the ICS. This test overlaps the testing required by SR 3.3.5.3.4 to ensure complete testing of instrument channels and actuation circuitry.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some portions of the ICS actuation circuitry are allowed to be excluded from specific ICS RESPONSE TIME measurement if the conditions of Reference XX are satisfied. Furthermore, measurement of

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the instrument loops response times is not required if the conditions of Reference XX are satisfied.]

ICS RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four divisions. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that each division is alternately tested.

The 24 month test Frequency is consistent with the typical industry refueling cycle and has been shown to be acceptable by Reference 2.

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REFERENCES

1. Chapter 15.

2. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}

3. ~~{Reference for ICS RESPONSE TIME acceptance criteria.}~~Chapter 15.

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SURVEILLANCE REQUIREMENTS (continued)

TIME. ISOLATION SYSTEM RESPONSE TIME acceptance criteria are included in Reference 10. ISOLATION SYSTEM RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. This test encompasses the MSIV isolation instrumentation from the input variable sensors through the DTM digital trip function. This test overlaps the testing required by SR 3.3.6.2.2 to ensure complete testing of instrumentation channels and actuation circuitry.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating sensor and instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some sensors are allowed to be excluded from specific ISOLATION SYSTEM RESPONSE TIME measurement if the conditions of Reference ~~11~~ XX are satisfied. If these conditions are satisfied, sensor response time may be allocated based on either assumed design sensor response time or the manufacturer's stated design response time. When the requirements of Reference ~~11~~ XX are not satisfied, sensor response time must be measured. Furthermore, measurement of the instrument loops response time for some Functions is not required if the conditions of Reference ~~12~~ are satisfied. ~~For all other Functions, the measurement of instrument loop response times may be excluded if the conditions of Reference 11 are satisfied.~~]

ISOLATION SYSTEM RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four channels. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that the channels associated with each division are alternately tested. The 24 month test Frequency is consistent with the refueling cycle and has been shown to be acceptable by Reference 9.

REFERENCES

1. Chapter 7, Figure 7.2-1.
2. Section 6.3.
3. Chapter 15.

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4. Subsection 15.4.4.

5. Subsection 15.3.3.

6. Subsection 15.4.5.

7. Subsection 15.2.5.2.

REFERENCES (continued)

8. Subsection 15.2.2.8.

9. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}

10. ~~{Reference for ISOLATION SYSTEM RESPONSE TIME acceptance criteria}~~Chapter 15.

~~11. {NEDO-32291-A, "System Analyses For the Elimination of Selected Response Time Testing Requirements," October 1995.~~

~~12. NEDO-32291-A, Supplement 1, "System Analyses for The Elimination of Selected Response Time Testing Requirements," October 1999.}~~

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SURVEILLANCE REQUIREMENTS (continued)

usually pass the Surveillance when performed at the 24 month Frequency.

SR 3.3.6.2.2

This SR ensures that the individual required division response times are less than or equal to the maximum values assumed in the accident analysis. The instrument response times must be added to the associated closure times to obtain the ISOLATION SYSTEM RESPONSE TIME. ISOLATION SYSTEM RESPONSE TIME acceptance criteria are included in Reference 4. ISOLATION SYSTEM RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. This test encompasses the MSIV actuation circuitry consisting of the inputs to the TLUs through the OLUs through the LDs, and the associated timers. This test overlaps the testing required by SR 3.3.6.1.4 to ensure complete testing of instrumentation channels and actuation circuitry.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some portions of the MSIV actuation circuitry are allowed to be excluded from specific ISOLATION SYSTEM RESPONSE TIME measurement if the conditions of Reference XX are satisfied. Furthermore, measurement of the instrument loops response times is not required if the conditions of Reference XX are satisfied.]

ISOLATION SYSTEM RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for each four divisions. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that the channels associated with each division are alternately tested. The 24 month test Frequency is consistent with the refueling cycle and has been shown to be acceptable by Reference 3.

REFERENCES

1. Section 6.3.

2. Chapter 15.

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3. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment."}

4. ~~{Reference for ISOLATION SYSTEM RESPONSE TIME acceptance criteria}~~Chapter 15.

BASES

SURVEILLANCE REQUIREMENTS (continued)

This test overlaps the testing required by SR 3.3.6.4.2 to ensure complete testing of instrumentation channels and actuation circuitry.

A Note to the Surveillance states that the radiation detectors may be excluded from ISOLATION SYSTEM RESPONSE TIME testing. This Note is necessary because of the difficulty of generating an appropriate detector input signal and because the principles of detector operation virtually ensure an instantaneous response time. Response Time for radiation detection channels shall be measured from detector output or the input of the first electronic component in the channel.

[---------- **REVIEWER'S NOTE** ----------
Applicants or Licensees may adopt this provision by application of Specification 5.5.7, "Bases Control Program," after appropriate assessment and incorporation into the plant licensing basis of an NRC approved methodology evaluating sensor and instrumentation loop response time requirements. All implementation requirements of the NRC Safety Evaluation Report for the methodology must be addressed.
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[However, some sensors are allowed to be excluded from specific ISOLATION SYSTEM RESPONSE TIME measurement if the conditions of Reference ~~11~~ XX are satisfied. If these conditions are satisfied, sensor response time may be allocated based on either assumed design sensor response time or the manufacturer's stated design response time. When the requirements of Reference ~~11~~ XX are not satisfied, sensor response time must be measured. Furthermore, measurement of the instrument loops response time for some Functions is not required if the conditions of Reference ~~11~~ XX are satisfied. ~~For all other Functions, the measurement of instrument loop response times may be excluded if the conditions of Reference 12 are satisfied.~~]

ISOLATION SYSTEM RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS for four channels. The Frequency of 24 months on a STAGGERED TEST BASIS ensures that the channels associated with each division are alternately tested. The 24 month test Frequency is consistent with the refueling cycle and has been shown to be acceptable by Reference 3.

BASES

REFERENCES

1. Section 6.3.

2. Chapter 15.

3. {NEDO-33201, "ESBWR Design Certification Probabilistic Risk Assessment }.

4. Subsection 15.4.4.

5. Subsection 15.3.3.

6. Subsection 15.4.5.

REFERENCES (continued)

7. Subsection 15.2.5.2.

8. Subsection 15.2.2.8.

9 Subsection 15.4.9.

10. ~~{Reference for ISOLATION SYSTEM RESPONSE TIME acceptance criteria}~~Chapter 15.

~~11. {NEDO-32291-A, "System Analyses For the Elimination of Selected Response Time Testing Requirements," October 1995.~~

~~12. NEDO-32291-A, Supplement 1, "System Analyses for The Elimination of Selected Response Time Testing Requirements," October 1999.}~~