



PERRY NUCLEAR POWER PLANT

10 CENTER ROAD
PERRY, OHIO 44081
(216) 259-3737

Mail Address:
P.O. BOX 97
PERRY, OHIO 44081

Donald C. Shelton
SENIOR VICE PRESIDENT
NUCLEAR

May 1, 1995
PY-CEI/NRR-1932L

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
Request to Revise Technical Specifications:
Response Time Testing

Gentlemen:

Enclosed is an application for amendment of the Facility Operating License (NFP-58) Appendix A Technical Specifications for the Perry Nuclear Power Plant (PNPP).

The proposed changes involve incorporation of the results of work performed by the Boiling Water Reactor Owners' Group (BWROG) concerning elimination of selected response time testing requirements, and incorporation of the guidance provided by Generic Letter 93-08 concerning relocation of Technical Specification Tables dealing with instrument response time limits.

A Summary, Description of Proposed Changes, Safety Assessment and an Environmental Consideration are provided in Attachment 1. Attachment 2 provides a copy of the marked up pages from the current Technical Specifications. Attachment 3 provides the Significant Hazards Consideration. Also provided for information are Attachments 4 and 5, which provide copies of marked up pages from the current Technical Specification Bases, and from the draft Improved Technical Specifications, respectively.

The proposed changes dealing with elimination of selected response time test requirements are supported by an analysis performed by the BWROG in NEDO-32291, "System Analyses for the Elimination of Selected Response Time Testing Requirements" dated January 1994, and the letter which was submitted to the NRC staff from T. Green to P. Loeser dated April 15, 1994.

Operating Companies
Cleveland Electric Illuminating
Toledo Edison

9505050102 950501
PDR ADDCK 05000440
P PDR

ADD 1

PY-CEI/NRR-1932L

May 1, 1995

Page 2 of 2

This analysis demonstrated that other periodic tests required by Technical Specifications, such as channel calibrations, channel checks, channel functional tests, and logic system functional tests, ensure that instrument response times are within acceptable limits. The NRC staff has completed their review and issued a Safety Evaluation Report (SER) via a letter to R. A. Pinelli, dated December 28, 1994. The applicability of this analysis to the Perry Nuclear Power Plant has been verified.

The proposed changes dealing with the relocation of the instrument response time limit tables is consistent with the guidance of Generic Letter 93-08, dated December 29, 1993. This Generic Letter does not result in any reduction of response time testing requirements. The Generic Letter provides guidance on relocating the response time test limits to the Updated Safety Analysis Report (USAR). Future changes to these time limits would then be handled under 10CFR50.59 restrictions.

Since the elimination of the selected response time testing requirements will reduce the scope of the fifth refuel outage, it is requested that this change be processed by November 1, 1995.

If you have questions or require additional information, please contact Mr. James D. Kloosterman, Manager - Regulatory Affairs at (216) 280-5833.

Very truly yours,



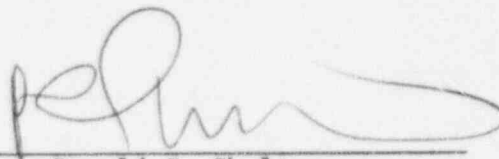
GGR:sc

Enclosure

Attachments

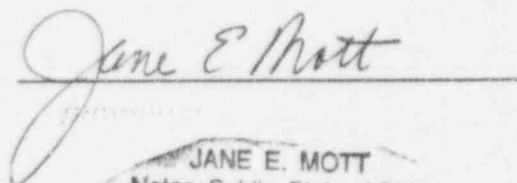
cc: NRC Project Manager
NRC Resident Inspector Office
NRC Region III
State of Ohio

I, Donald C. Shelton, being duly sworn state that (1) I am Senior Vice President, Nuclear of the Centerior Service Company, (2) I am duly authorized to execute and file this certification on behalf of The Cleveland Electric Illuminating Company and Toledo Edison Company, and as the duly authorized agent for Duquesne Light Company, Ohio Edison Company, and Pennsylvania Power Company, and (3) the statements set forth herein are true and correct to the best of my knowledge, information and belief.



Donald C. Shelton

Sworn to and subscribed before me, the 1st day of May,
1995.



JANE E. MOTT
Notary Public, State of Ohio
My Commission Expires Feb. 20, 2000
(Recorded in Lake County)

CODED/8838/SC

SUMMARY

The proposed changes involve incorporating the results of work performed by the Boiling Water Reactor Owners' Group (BWROG) concerning elimination of selected response time testing requirements, and incorporating the guidance given by Generic Letter 93-08 concerning relocation of Technical Specification Tables dealing with instrument response time limits.

The changes dealing with elimination of selected response time test requirements are supported by an analysis performed by the BWROG in NEDO-32291, "System Analyses for the Elimination of Selected Response Time Testing Requirements" dated January 1994, and the letter submitted to the NRC staff from T. Green to P. Loeser dated April 15, 1994. The NRC documented completion of their review and approval of this analysis in a letter to R. A. Pinelli dated December 28, 1994. The analysis demonstrated that other periodic tests required by Technical Specifications, such as channel calibrations, channel checks, channel functional tests, and logic system functional tests ensure that instrument response times are within acceptable limits. In the interests of the Perry Nuclear Power Plant, the Cleveland Electric Illuminating Company was a participating utility in this effort, as noted in Appendix A to NEDO-32291. Appendix H to NEDO-32291 includes marked up pages of the Perry Nuclear Power Plant, Unit 1, Technical Specifications. It has been confirmed that NEDO-32291 is applicable to the Perry Nuclear Power Plant.

This portion of the proposed changes eliminates selected response time testing requirements from Technical Specifications. Specifically, the response time testing requirements to be eliminated include sensors and specified loop instrumentation for the 1) Reactor Protection System (RPS), 2) Isolation System, and 3) Emergency Core Cooling System (ECCS). The BWROG evaluation confirms that response time tests are of no safety significance and cause unnecessary personnel exposure, reduce availability of safety systems during shutdown and are a significant burden to utility resources.

As part of the elimination of the selected components from response time testing, it is proposed that the ECCS RESPONSE TIME test requirement be moved from the ECCS actuation instrumentation Limiting Condition for Operation (LCO 3/4.3.3) to the ECCS LCO (LCO 3.5.1). This change is appropriate since the ECCS actuation instrumentation loops have been eliminated from the ECCS RESPONSE TIME testing requirements per NEDO-32291. This proposal will also change the Frequency for the Surveillance from 18 months on a STAGGERED TEST BASIS to 18 months in order to relate the appropriate frequency for testing the associated ECCS subsystem rather than the instrument channel. Moving the surveillance requirement from the instrumentation section to the systems section of the Technical Specifications also changes the Applicability for the surveillance requirement.

The proposed changes dealing with relocation of the instrument response time limit tables from the Technical Specifications are consistent with the guidance provided by Generic Letter 93-08 dated December 29, 1993. This Generic Letter does not result in any reduction of response time testing requirements. The Generic Letter provides guidance on relocating the response time test limits to the Updated Safety Analysis Report (USAR). In this manner, future changes to these time limits would be handled under the provisions of 10CFR50.59. The

tables being relocated include tables for instrumentation in the Reactor Protection System, Isolation System, Emergency Core Cooling System, and End of Cycle Recirculation pump trip system.

Due to requesting the relocation of the response time test tables, many of the response time testing requirements that would have been proposed for elimination will not be apparent in the proposed mark up of the Technical Specification pages. The intent is to utilize all of the flexibility provided in NEDO-32291 for the Perry Nuclear Power Plant.

DESCRIPTION OF PROPOSED CHANGES

The following is a description of the proposed changes:

1. Definition 1.13
(page 1-3)
Add a sentence which states "Exceptions are stated in the individual surveillance requirements." This is to clarify the definition with the changes that are being made consistent with NEDO-32291.
2. Definition 1.21
(page 1-4)
Add a sentence which states "Exceptions are stated in the individual surveillance requirements." This is to clarify the definition with the changes that are being made consistent with NEDO-32291.
3. Definition 1.37
(page 1-7)
Add a sentence which states "Exceptions are stated in the individual surveillance requirements." This is to clarify the definition with the changes that are being made consistent with NEDO-32291.
4. LCO 3.3.1
(page 3/4 3-1)
End the LCO sentence after the word "OPERABLE", and delete the remainder of the sentence. This is consistent with Generic Letter 93-08.
5. Surveillance Requirement
4.3.1.3 (page 3/4 3-1)
Delete the phrase "shown in Table 3.3.1.2". This is consistent with Generic Letter 93-08.

Add the following after the first sentence: "Neutron detectors are exempt from response time testing." This is consistent with Generic Letter 93-08.

5. (continued) Add a sentence following the sentence added above which states: "For Table 3.3.1-1 Functional Units 3, 4, and 5, the channel sensors are excluded from response time testing." This is consistent with NEDO-32291 as approved by the NRC SER.
6. Table 3.3.1-2
(page 3/4 3-6) Delete this Table. This is consistent with Generic Letter 93-08
7. LCO 3.3.2
(page 3/4 3-9) End LCO sentence after the words "Table 3.3.2-2", and delete remainder of sentence. This is consistent with Generic Letter 93-08.
8. Surveillance Requirement
4.3.2.3
(page 3/4 3-10) Delete phrase "shown in Table 3.3.2-3". This is consistent with Generic Letter 93-08.

Add following sentence after first sentence: "Channel sensors are excluded from response time testing." This is consistent with NEDO-32291 as approved by the NRC SER.
9. Table 3.3.2-3
(pages 3/4 3-21/22) Delete the Table. This is consistent with Generic Letter 93-08.
10. LCO 3.3.3
(page 3/4 3-27) End LCO sentence after "Table 3.3.3-2", and delete remainder of sentence. This is consistent with Generic Letter 93-08.
11. Surveillance Requirement
4.3.3.3 (page 3/4 3-27) Delete this Surveillance Requirement. NEDO-32291 deletes the requirement to include the ECCS actuation instrument loops in response time testing. The requirement to perform response time testing on the ECCS subsystems excluding the instrument loops will be added to the Surveillance Requirements for the ECCS systems(LCO 3.5.1). This is consistent with the intent of NEDO-32291, and with recently approved changes at Clinton Power Station.
12. Table 3.3.3-3
(pages 3/4 3-35/36) Delete the Table. This is consistent with Generic Letter 93-08.

13. LCO 3.3.4.2
(page 3/4 3-44) End LCO sentence after "Table 3.3.4.2-2", and delete remainder of sentence. This is consistent with Generic Letter 93-08.
14. Surveillance Requirement
4.3.4.2.3
(page 3/4 3-45) Delete phrase "shown in Table 3.3.4.2-3". This is consistent with Generic Letter 93-08.
15. Table 3.3.4.2-3
(page 3/4 3-48) Delete the Table. This is consistent with Generic Letter 93-08.
16. Surveillance Requirement
4.5.1.c (page 3/4 5-4) Add new Surveillance Requirement 4.5.1.c.3 which states the following: "Performing an ECCS RESPONSE TIME test for each ECCS injection/spray subsystem, and verify the ECCS RESPONSE TIME is within limits. ECCS Actuation instrumentation is excluded from this test." This test fulfills the present requirement to perform ECCS RESPONSE TIME testing after removing the requirement to include the ECCS Actuation instrumentation in the response time testing. This is consistent with the intent of NEDO-32291, and with recently approved changes at the Clinton Power Station.

SAFETY ASSESSMENT

Elimination of Selected Response Time Testing Requirements

Regulatory Guide 1.118, Revision 2 states:

"Response time testing of all safety related equipment, per se, is not required if, in lieu of response time testing, the response time of the safety equipment is verified by functional testing, calibration checks or other tests, or both. This is acceptable if it can be demonstrated that changes in response time beyond acceptable limits are accompanied by changes in performance characteristics which are detectable during routine periodic tests."

The analysis documented in NEDO-32291 includes the identification of potential failure modes of components in the affected instrumentation loops which could potentially impact the instrument loop response time. In addition, plant operating experiences were reviewed to identify response time failures and how they were detected. The failure modes identified were then evaluated to determine if the effect on response time would be detected by other testing requirements contained in Technical Specifications.

The results of the analysis demonstrate that other Technical Specification testing requirements (i.e., channel calibration, channel check, channel functional test, and logic system functional test) ensure that instrument response times are within acceptable limits.

These other tests are normally sufficient to identify failure modes or degradations in instrument response time and assure operation of the analyzed instrument loops within acceptance limits. Furthermore, there are no known failure modes that can be detected by response time testing that cannot also be detected by other Technical Specification tests.

A BWROG survey has concluded that instrument response time delays of 5 seconds can be reasonably detected by instrument technicians. A safety evaluation in NEDO-32291 confirmed that delays of individual specific trip functions of a few seconds have very low safety significance. This realistic bases evaluation showed that a good deal of margin exists in the licensing analysis. Within a trip function, redundancy exists in individual instrument channels (e.g., 1 out of 2 twice) and diversity exists in most safety trip functions (e.g., neutron flux, water level, drywell pressure). Also, for most of these instruments, the response times are insignificant compared to the safety system actuation times.

The NEDO-32291 evaluations demonstrate that response time testing can be eliminated for the following:

- 1) All Emergency Core Cooling System instrument loops;
- 2) All Isolation System actuation instrument loops except for main steam line isolation valves (MSIVs);
- 3) Sensors only for selected Reactor Protection System (RPS) actuation; and
- 4) Sensors only for selected MSIV closure actuation.

On December 28, 1994 the NRC Staff issued a Safety Evaluation Report (SER) documenting the NRC staff review of NEDO-32291. The SER documented that participating utilities could eliminate response time testing in the following systems:

1. All the ECCS actuation instrumentation loops (for Low Pressure Core Spray, Low Pressure Coolant Injection and High Pressure Core Spray systems).
2. All the Isolation System actuation instrument loops except for MSIVs (for Reactor Core Isolation Cooling, High Pressure Core Spray, Reactor Water Clean-up, Primary Containment, Secondary Containment and Residual Heat Removal (RHR) Shutdown Cooling/Head Spray).
3. Selected sensors in the RPS actuation logic (Reactor Vessel Steam Dome Pressure - High, Reactor Vessel Water Level - Low, Level 3, and Reactor Vessel Water Level - High, Level 8 sensors).
4. Selected MSIV Closure actuation logic (the Reactor Water Level, Main Steam Line Pressure - Low sensors). The Main Steam Line Flow - High sensors were inadvertently omitted from the NRC SER, but have been included as part of this submittal.

The cover letter accompanying the NRC's SER stated that when submitting plant-specific license amendment requests, licensees must:

1. Confirm the applicability of the generic analysis of NEDO-32291 to their plant;

As previously stated, Perry Nuclear Power Plant (PNPP) was a participating plant in the development of NEDO-32291 as documented in Appendix A and H of the NEDO document. NEDO-32291, Appendix G documents that the generic application of the document is applicable to PNPP.

2. Include a change request as shown in Appendix I of NEDO-32291;

NEDO-32291, Appendix I provided a sample Technical Specification change request letter for participating utilities to use for making the Technical Specification change request submittal. This submittal is consistent with the Appendix I sample except where modified to discuss plant specific information, to discuss the proposed changes dealing with relocating the response time table requirements, or to provide clarification of issues.

3. Include Technical Specification page markups as shown in Appendix H to NEDO-32291;

Attachment 2 provides a copy of the marked up Technical Specification pages indicating what the proposed changes should be. These changes are consistent with NEDO-32291, Appendix H as modified by the proposed relocation of the response time tables, the relocation of the ECCS RESPONSE TIME test requirement, and the clarifications added to the definitions for the various response times. Attachment 4 contains applicable Bases changes for the current Technical Specifications. Since PNPP has submitted a change request to convert the Technical Specification to the Improved Technical Specification format, Attachment 5 provides the changes in the Improved Technical Specification format. Attachment 5 is submitted for information only. Any necessary changes to the Improved Technical Specification submittal will be provided as part of the ongoing review of the Improved Technical Specifications.

4. Include a list of affected instrument loop components as shown in Appendix C to NEDO-32291;

Enclosure 1 provides a list of the affected instrument loop components for PNPP in the format listed in Appendix C to the NEDO document.

5. State that the plant is following the recommendations from EPRI NP-7243 "Investigation of Response Time Testing Requirements" and are therefore required to perform the following actions:

- (a) Prior to installation of a new transmitter/switch or following refurbishment of a transmitter/switch (e.g., sensor cell or variable damping components), a hydraulic response time test (RTT) shall be performed to determine an initial sensor-specific response time value, and

Presently at PNPP, Rosemount transmitters are used exclusively for the "transmitter/switch" channels described in NEDO-32291. The procedure used for Rosemount Transmitter replacement will be revised to include a step in the prerequisites requiring a transmitter bench test for response time to be performed on applicable transmitters, prior to installation. This testing would be required whether replacing the Rosemount transmitter with a new or refurbished transmitter. The procedure will be revised prior to the beginning of the fifth refueling outage. It should be noted that NEDO-32291 Appendix G also refers to Barksdale switches as included in the analyzed population of instruments. These switches are not presently used in any of the PNPP applications being requested for RTT elimination. If in the future these switches are used in such an application, the appropriate changes to the installation procedures for Barksdale switches will also be made.

- (b) For transmitters and switches that use capillary tubes, capillary tube testing shall be performed after initial installation and after any maintenance or modification activity that could damage the lines.

PNPP design does not incorporate capillary tubes for transmitters requiring response time testing. Therefore, this recommendation does not apply to PNPP.

As demonstrated by the answers above, the plant is following the recommendations of EPRI NP-7243.

In addition, the NRC's cover letter stated that licensee submittals must state the following in their requests:

- (a) That calibration is being done with equipment designed to provide a step function or fast ramp in the process variable,

All PNPP transmitters requiring response time testing are Rosemount 1153 transmitters. Existing Rosemount calibration instructions pressurize the transmitter to 125%, then depressurize the transmitter (fast ramp). During this excursion the transmitter/instrument loop is observed for sluggishness or erratic operation that would be indicative of degraded transmitter/instrument loop performance.

- (b) That provisions have been made to ensure that operators and technicians are aware of the consequences of instrument response time degradation, and that applicable procedures have been reviewed and revised as necessary to assure that technicians monitor for response time degradation during calibrations and functional tests,

As stated above, PNPP procedures already include ramp change testing requirements to check for sluggishness or erratic operation. Applicable personnel have been already employing these procedures in the plant. The administrative procedure which establishes the policy and administrative controls governing surveillance testing (calibrations and functional tests) at PNPP, will be revised to include statements describing the consequences of response time degradation and need to monitor for this condition during testing. Operators and technicians are trained to procedure changes via the required reading process. This revision will be incorporated by the time of implementation of this Technical Specification change.

- (c) That surveillance testing procedures have been reviewed and revised if necessary to ensure calibrations and functional tests are being performed in a manner that allows simultaneous monitoring of both the input and output response of units under test,

Technicians performing calibrations and functional tests are in a position to communicate information to one another. If the technicians are in separate locations head sets are used such that any observation by one technician can be communicated to the other. Existing procedures require that the technicians monitor for sluggish transmitter/instrument loop behavior while performing the ramp functions discussed above. Therefore, existing procedural requirements already meet the intent of this requirement to assure that the input and output responses are simultaneously monitored.

- (d) That for any request involving the elimination of RTT for Rosemount pressure transmitters, the licensee is in full compliance with the guidelines of Supplement 1 to Bulletin 90-09, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount," and

NRC letter to licensee dated December 1, 1994 and titled "Perry Response to NRC Bulletin 90-01, Supplement 1, Loss of Fill-Oil in Transmitters Manufactured by Rosemount (TAC NO. M85426)," states the NRC and its contractor have completed their review of the PNPP response to Bulletin 90-01, Supplement 1. This letter, along with enclosures (Safety Evaluation and Technical Evaluation Report EGG-DNSP-11516), documents NRC review and concurrence that PNPP response is acceptable and therefore in compliance with the guidelines of the Supplement.

- (e) That for those instruments where the manufacturer recommends periodic RTT as well as calibration to ensure correct function, the licensee has ensured that elimination of RTT is nevertheless acceptable for the particular application involved.

Vendor recommendations for the affected instruments listed in Enclosure 1 have been reviewed. None of the affected instruments require periodic RTT. Therefore this recommendation does not apply to PNPP.

As part of the elimination of the selected components from response time testing, it is proposed that the ECCS RESPONSE TIME test requirement be moved from the ECCS Actuation Instrumentation Limiting Condition for Operation (LCO 3/4.3.3) to the ECCS LCO (LCO 3.5.1). This change is appropriate since the ECCS actuation instrumentation loops has been eliminated from the ECCS RESPONSE TIME testing requirements per NEDO-32291. This proposal will also change the Frequency for the Surveillance from 18 months on a STAGGERED TEST BASIS to 18 months in order to relate the appropriate frequency for testing the associated ECCS subsystem rather than the instrument channel. Moving the surveillance requirement from the instrumentation section to the systems section of the Technical Specifications also changes the Applicability for the surveillance requirement. Presently the Applicability (and therefore the surveillance requirement) for the ECCS actuation instrumentation for Reactor Vessel Water Level instruments is all Operational Conditions when the associated ECCS system is required to be OPERABLE. This proposal changes that Applicability to OPERATIONAL CONDITIONS 1, 2, and 3. These changes are acceptable because there are no design basis events during OPERATIONAL CONDITIONS 4 and 5 where ECCS systems are relied upon and the response time tests, which are typically performed during shutdown conditions, would identify any operability problems that may exist. In addition, due to the pressure and temperature limitations of these OPERATIONAL CONDITIONS, the probability of accidents is reduced, as is the need for ECCS systems to respond within the times established for OPERATIONAL CONDITIONS 1, 2 and 3. This same change has been approved for the Clinton Power Station as part of their implementation of the NEDO-32291 recommendations.

Relocation of Technical Specification Tables of Instrument Response Time Limits

Generic Letter 93-08, "Relocation of Technical Specification Tables of Instrument Response Time Limits," provides guidance to licensees for deleting instrument response time limit tables from the Technical Specifications. Enclosure 1 provides guidance on the process to request an amendment to relocate the instrument response time tables from the Technical Specifications to the Updated Safety Analysis Report (USAR). The changes proposed in this submittal are consistent with Enclosure 1 to the Generic Letter.

In addition, Enclosure 1 stipulates that each licensee that wishes to implement this line item improvement should make the following commitments:

1. Licensees should confirm that the plant procedures for response time testing include acceptance criteria that reflect the response time limits in the tables being relocated.

Existing plant surveillance instructions presently include acceptance criteria that reflect the response time limits for the tables being relocated. Modifications to these instructions is performed under the provisions of 10CFR50.59.

2. The response time limits being relocated will be included in the next update of the USAR.

The Tables being relocated will be included in the next update of the USAR.

Generic Letter 93-08, Enclosure 2, contains examples of proposed Technical Specification page mark ups to aid licensees in their submittals. This PNPP submittal is consistent with the intent of Enclosure 2.

ENVIRONMENTAL CONSIDERATION

The proposed Technical Specification change request has been reviewed against the criteria of 10CFR51.22 for environmental considerations. As shown above and in Attachment 3, the proposed change does not involve a significant hazards consideration, increase the types and amounts of effluents that may be released offsite, or significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, it has been concluded that the proposed Technical Specification change meets the criteria given in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.

PNPP REACTOR PROTECTION SYSTEM PNPP

DESCRIPTION: Reactor Protection System
 FUNCTION: Reactor Vessel Steam Dome Pressure - High
 INSTRUCTION: SVI-B21-T5363-A
 Response Time: ≤ 0.35 seconds

TABLE: 3.3.1-2
 ITEM: 3.0
 CHANNEL: RPS A

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N078A Rosemount 1153 a
MTU	Deenergizes MTU Output Relay (c) on RPV High Pressure	1B21-N678A Rosemount 510/710DU b
MTU Output Relay	Deenergizes Scram Contactors (d/e) on RPV High Pressure	1C71A-K5A Agastat EGPB c
Scram Contactor	Deenergizes Group 1A/4A Scram Pilot Solenoids on RPV High Pressure	1C71A-K14A GE CR205 d
Scram Contactor	Deenergizes Group 2A/3A Scram Pilot Solenoids on RPV High Pressure	1C71A-K14E GE CR205 e

REFERENCES:

B-208-040 SH: A02 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP	REACTOR PROTECTION SYSTEM	PNPP
DESCRIPTION:	Reactor Protection System	TABLE: 3.3.1-2
FUNCTION:	Reactor Vessel Steam Dome Pressure - High	ITEM: 3.0
INSTRUCTION:	SVI-B21-T5363-B	CHANNEL: RPS B

Response Time: ≤ 0.35 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N078B a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV High Pressure	1B21-N678B b Rosemount 510/710DU
MTU Output Relay	Deenergizes Scram Contactors (d/e) on RPV High Pressure	1C71A-K5B c Agastat EGPB
Scram Contactor	Deenergizes Group 1B/4B Scram Pilot Solenoids on RPV High Pressure	1C71A-K14B d GE CR205
Scram Contactor	Deenergizes Group 2B/3B Scram Pilot Solenoids on RPV High Pressure	1C71A-K14F e GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP	REACTOR PROTECTION SYSTEM	PNPP
DESCRIPTION:	Reactor Protection System	TABLE: 3.3.1-2
FUNCTION:	Reactor Vessel Steam Dome Pressure - High	ITEM: 3.0
INSTRUCTION:	SVI-B21-T5363-C	CHANNEL: RPS C

Response Time: ≤ 0.35 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N078C a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV High Pressure	1B21-N678C b Rosemount 510/710DU
MTU Output Relay	Deenergizes Scram Contactors (d/e) on RPV High Pressure	1C71A-K5C c Agastat EGPB
Scram Contactor	Deenergizes Group 1A/4A Scram Pilot Solenoids on RPV High Pressure	1C71A-K14C d GE CR205
Scram Contactor	Deenergizes Group 2A/3A Scram Pilot Solenoids on RPV High Pressure	1C71A-K14G e GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP	REACTOR PROTECTION SYSTEM	PNPP
DESCRIPTION:	Reactor Protection System	TABLE: 3.3.1-2
FUNCTION:	Reactor Vessel Steam Dome Pressure - High	ITEM: 3.0
INSTRUCTION:	SVI-B21-T5363-D	CHANNEL: RPS D

Response Time: ≤ 0.35 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N078D a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV High Pressure	1B21-N678D b Rosemount 510/710DU
MTU Output Relay	Deenergizes Scram Contactors (d/e) on RPV High Pressure	1C71A-K5D c Agastat EGPB
Scram Contactor	Deenergizes Group 1B/4B Scram Pilot Solenoids on RPV High Pressure	1C71A-K14D d GE CR205
Scram Contactor	Deenergizes Group 2B/3B Scram Pilot Solenoids on RPV High Pressure	1C71A-K14H e GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP	REACTOR PROTECTION SYSTEM	PNPP
DESCRIPTION:	Reactor Protection System	TABLE: 3.3.1-2
FUNCTION:	Reactor Vessel Water Level - Low, Level 3	ITEM: 4.0
INSTRUCTION:	SVI-B21-T0252-A	CHANNEL: RPS A

Response Time: ≤ 1.05 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N080A a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV Low Water Level	1B21-N680A b Rosemount 510/710DU
MTU Output Relay	Deenergizes Scram Contactors (d/e) on RPV Low Water Level	1C71A-K6A c Agastat EGPB
Scram Contactor	Deenergizes Group 1A/4A Scram Pilot Solenoids on RPV Low Water Level	1C71A-K14A d GE CR205
Scram Contactor	Deenergizes Group 2A/3A Scram Pilot Solenoids on RPV Low Water Level	1C71A-K14E e GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP	REACTOR PROTECTION SYSTEM	PNPP
DESCRIPTION:	Reactor Protection System	TABLE: 3.3.1-2
FUNCTION:	Reactor Vessel Water Level - Low, Level 3	ITEM: 4.0
INSTRUCTION:	SVI-B21-T0252-B	CHANNEL: RPS B

Response Time: ≤ 1.05 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N080B a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV Low Water Level	1B21-N680B b Rosemount 510/710DU
MTU Output Relay	Deenergizes Scram Contactors (d/e) on RPV Low Water Level	1C71A-K6B c Agastat EGPB
Scram Contactor	Deenergizes Group 1B/4B Scram Pilot Solenoids on RPV Low Water Level	1C71A-K14B d GE CR205
Scram Contactor	Deenergizes Group 2B/3B Scram Pilot Solenoids on RPV Low Water Level	1C71A-K14F e GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP REACTOR PROTECTION SYSTEM PNPP

DESCRIPTION: Reactor Protection System
 FUNCTION: Reactor Vessel Water Level - Low, Level 3
 INSTRUCTION: SVI-B21-T0252-C

TABLE: 3.3.1-2
 ITEM: 4.0
 CHANNEL: RPS C

Response Time: ≤ 1.05 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N080C a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV Low Water Level	1B21-N680C b Rosemount 510/710DU
MTU Output Relay	Deenergizes Scram Contactors (d/e) on RPV Low Water Level	1C71A-K6C c Agastat EGPB
Scram Contactor	Deenergizes Group 1A/4A Scram Pilot Solenoids on RPV Low Water Level	1C71A-K14C d GE CR205
Scram Contactor	Deenergizes Group 2A/3A Scram Pilot Solenoids on RPV Low Water Level	1C71A-K14G e GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP	REACTOR PROTECTION SYSTEM	PNPP
DESCRIPTION:	Reactor Protection System	TABLE: 3.3.1-2
FUNCTION:	Reactor Vessel Water Level - Low, Level 3	ITEM: 4.0
INSTRUCTION:	SVI-B21-T0252-D	CHANNEL: RPS D

Response Time: \leq 1.05 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N080D a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV Low Water Level	1B21-N680D b Rosemount 510/710DU
MTU Output Relay	Deenergizes Scram Contactors (d/e) on RPV Low Water Level	1C71A-K6D c Agastat EGPB
Scram Contactor	Deenergizes Group 1B/4B Scram Pilot Solenoids on RPV Low Water Level	1C71A-K14D d GE CR205
Scram Contactor	Deenergizes Group 2B/3B Scram Pilot Solenoids on RPV Low Water Level	1C71A-K14H e GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP	REACTOR PROTECTION SYSTEM	PNPP
DESCRIPTION:	Reactor Protection System	TABLE: 3.3.1-2
FUNCTION:	Reactor Vessel Water Level - High, Level 8	ITEM: 5.0
INSTRUCTION:	SVI-B21-T0252-A	CHANNEL: RPS A

Response Time: ≤ 1.05 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N080A a Rosemount 1153
MTU	Sends RPV Water Level signal to Slave Trip Unit (STU) (c)	1B21-N680A b Rosemount 510/710DU
STU	Deenergizes STU Output Relay (d) on RPV High Water Level	1B21-N683A c Rosemount 510/710DU
STU Output Relay	Deenergizes Scram Contactors (e/f) on RPV High Water Level	1C71A-K44A d Agastat EGPB
Scram Contactor	Deenergizes Group 1A/4A Scram Pilot Solenoids on RPV High Water Level	1C71A-K14A e GE CR205
Scram Contactor	Deenergizes Group 2A/3A Scram Pilot Solenoids on RPV High Water Level	1C71A-K14E f GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A03 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP REACTOR PROTECTION SYSTEM PNPP

DESCRIPTION: Reactor Protection System
 FUNCTION: Reactor Vessel Water Level - High, Level 8
 INSTRUCTION: SVI-B21-T0252-B

TABLE: 3.3.1-2
 ITEM: 5.0
 CHANNEL: RPS B

Response Time: ≤ 1.05 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N080B a Rosemount 1153
MTU	Sends RPV Water Level signal to Slave Trip Unit (STU) (c)	1B21-N680B b Rosemount 510/710DU
STU	Deenergizes STU Output Relay (d) on RPV High Water Level	1B21-N683B c Rosemount 510/710DU
STU Output Relay	Deenergizes Scram Contactors (e/f) on RPV High Water Level	1C71A-K44B d Agastat EGPB
Scram Contactor	Deenergizes Group 1B/4B Scram Pilot Solenoids on RPV High Water Level	1C71A-K14B e GE CR205
Scram Contactor	Deenergizes Group 2B/3B Scram Pilot Solenoids on RPV High Water Level	1C71A-K14F f GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A03 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP REACTOR PROTECTION SYSTEM PNPP

DESCRIPTION: Reactor Protection System
 FUNCTION: Reactor Vessel Water Level - High, Level 8
 INSTRUCTION: SVI-B21-T0252-C

TABLE: 3.3.1-2
 ITEM: 5.0
 CHANNEL: RPS C

Response Time: ≤ 1.05 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N080C Rosemount 1153
MTU	Sends RPV Water Level signal to Slave Trip Unit (STU) (c)	1B21-N680C Rosemount 510/710DU
STU	Deenergizes STU Output Relay (d) on RPV High Water Level	1B21-N683C Rosemount 510/710DU
STU Output Relay	Deenergizes Scram Contactors (e/f) on RPV High Water Level	1C71A-K44C Agastat EGPB
Scram Contactor	Deenergizes Group 1A/4A Scram Pilot Solenoids on RPV High Water Level	1C71A-K14C GE CR205
Scram Contactor	Deenergizes Group 2A/3A Scram Pilot Solenoids on RPV High Water Level	1C71A-K14G GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A03 (V)
 A09 (P)
 A10 (L)
 A15 (V)

PNPP REACTOR PROTECTION SYSTEM PNPP

DESCRIPTION: Reactor Protection System
 FUNCTION: Reactor Vessel Water Level - High, Level 8
 INSTRUCTION: SVI-B21-T0252-D

TABLE: 3.3.1-2
 ITEM: 5.0
 CHANNEL: RPS D

Response Time: ≤ 1.05 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N080D a Rosemount 1153
MTU	Sends RPV Water Level signal to Slave Trip Unit (STU) (c)	1B21-N680D b Rosemount 510/710DU
STU	Deenergizes STU Output Relay (d) on RPV High Water Level	1B21-N683D c Rosemount 510/710DU
STU Output Relay	Deenergizes Scram Contactors (e/f) on RPV High Water Level	1C71A-K44D d Agastat EGPB
Scram Contactor	Deenergizes Group 1B/4B Scram Pilot Solenoids on RPV High Water Level	1C71A-K14D e GE CR205
Scram Contactor	Deenergizes Group 2B/3B Scram Pilot Solenoids on RPV High Water Level	1C71A-K14H f GE CR205

REFERENCES:

B-208-040 SH: A02 (V)
 A03 (V)
 A09 (P)
 A10 (L)
 A15 (V)

ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Reactor Vessel Water Level - Low, Level 1	ITEM: 2.a
INSTAUTION:	SVI-B21-T1407-A	CHANNEL: MSL A
Response Time: $\leq 1.0^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N081A a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV Low Water Level	1B21-N681A b Rosemount 510/710DU
MTU Output Relay	Deenergizes Isolation Relay (d) on RPV Low Water Level	1B21H-K1A c Agastat EGPB
Isolation Relay	Deenergizes Initiation Relays (e/f) on RPV Low Water Level	1B21H-K7A d Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on RPV Low Water Level	1B21H-K51A e Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on RPV Low Water Level	1B21H-K51B f Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)
 H10 (U)
 H11 (Y)
 H14 (W)

ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Reactor Vessel Water Level - Low, Level 1	ITEM: 2.a
INSTRUCTION:	SVI-B21-T1407-B	CHANNEL: MSL B
Response Time: $\leq 1.0^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N081B a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV Low Water Level	1B21-N681B b Rosemount 510/710DU
MTU Output Relay	Deenergizes Isolation Relay (d) on RPV Low Water Level	1B21H-K1B c Agastat EGPB
Isolation Relay	Deenergizes Initiation Relays (e/f) on RPV Low Water Level	1B21H-K7B d Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on RPV Low Water Level	1B21H-K14A e Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on RPV Low Water Level	1B21H-K14B f Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-3 SH: H02 (T)
 H03 (P)
 H07 (N)
 H10 (U)
 H11 (Y)
 H15 (X)

PNPP		ISOLATION ACTUATION INSTRUMENTATION		PNPP	
DESCRIPTION:	Main Steam Line Isolation	TABLE:	3.3.2-3		
FUNCTION:	Reactor Vessel Water Level - Low, Level 1	ITEM:	2.a		
INSTRUCTION:	SVI-B21-T1407-C	CHANNEL:	MSL C		
	Response Time: $\leq 1.0^*$ seconds				
DESCRIPTION	FUNCTION	MPL & MODEL			
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N081C	a		
		Rosemount 1153			
MTU	Deenergizes MTU Output Relay (c) on RPV Low Water Level	1B21-N681C	b		
		Rosemount 510/710DU			
MTU Output Relay	Deenergizes Isolation Relay (d) on RPV Low Water Level	1B21H-K1C	c		
		Agastat EGPB			
Isolation Relay	Deenergizes Initiation Relays (e/f) on RPV Low Water Level	1B21H-K7C	d		
		Agastat EGPI			
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on RPV Low Water Level	1B21H-K51A	e		
		Agastat EGPI			
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on RPV Low Water Level	1B21H-K51B	f		
		Agastat EGPI			

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)
 H10 (U)
 H11 (Y)
 H14 (W)

PNPP ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Reactor Vessel Water Level - Low, Level 1	ITEM: 2.a
INSTRUCTION:	SVI-B21-T1407-D	CHANNEL: MSL D
Response Time: $\leq 1.0^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N081D a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on RPV Low Water Level	1B21-N681D b Rosemount 510/710DU
MTU Output Relay	Deenergizes Isolation Relay (d) on RPV Low Water Level	1B21H-K1D c Agastat EGPB
Isolation Relay	Deenergizes Initiation Relays (e/f) on RPV Low Water Level	1B21H-K7D d Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on RPV Low Water Level	1B21H-K14A e Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on RPV Low Water Level	1B21H-K14B f Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)
 H10 (U)
 H11 (Y)
 H15 (X)

PNPP ISOLATION ACTUATION INSTRUMENTATION PNPP		
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Pressure - Low	ITEM: 2.c
INSTRUCTION:	SVI-B21-T1404-A	CHANNEL: MSL A
Response Time: $\leq 1.0^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N076A a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL Low Pressure	1B21-N676A b Rosemount 510/710DU
MTU Output Relay	Deenergizes Isolation Relay (d) on MSL Low Pressure	1B21H-K4A c Agastat EGPB
Isolation Relay	Deenergizes Initiation Relays (e/f) on MSL Low Pressure	1B21H-K7A d Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL Low Pressure	1B21H-K51A e Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL Low Pressure	1B21H-K51B f Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)
 H10 (U)
 H11 (Y)
 H14 (W)

PNPP		ISOLATION ACTUATION INSTRUMENTATION		PNPP	
DESCRIPTION:	Main Steam Line Isolation	TABLE:	3.3.2-3		
FUNCTION:	Main Steam Line Pressure - Low	ITEM:	2.c		
INSTRUCTION:	SVI-B21-T1404-B	CHANNEL:	MSL B		
	Response Time: $\leq 1.0^*$ seconds				
DESCRIPTION	FUNCTION	MPL & MODEL			
Transmitter	Senses MSL Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N076B		a	
		Rosemount 1153			
MTU	Deenergizes MTU Output Relay (c) on MSL Low Pressure	1B21-N676B		b	
		Rosemount 510/710DU			
MTU Output Relay	Deenergizes Isolation Relay (d) on MSL Low Pressure	1B21H-K4B		c	
		Agastat EGPB			
Isolation Relay	Deenergizes Initiation Relays (e/f) on MSL Low Pressure	1B21H-K7B		d	
		Agastat EGPI			
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL Low Pressure	1B21H-K14A		e	
		Agastat EGPI			
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL Low Pressure	1B21H-K14B		f	
		Agastat EGPI			

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)
 H10 (U)
 H11 (Y)
 H15 (X)

PNPP ISOLATION ACTUATION INSTRUMENTATION PNPP		
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Pressure - Low	ITEM: 2.c
INSTRUCTION:	SVI-B2-T1404-C	CHANNEL: MSL C
Response Time: $\leq 1.0^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N076C a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL Low Pressure	1B21-N676C b Rosemount 510/710DU
MTU Output Relay	Deenergizes Isolation Relay (d) on MSL Low Pressure	1B21H-K4C c Agastat EGPB
Isolation Relay	Deenergizes Initiation Relays (e/f) on MSL Low Pressure	1B21H-K7C d Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL Low Pressure	1B21H-K51A e Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL Low Pressure	1B21H-K51B f Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)
 H10 (U)
 H11 (Y)
 H14 (W)

PNPP ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Pressure - Low	ITEM: 2.c
INSTRUCTION:	SVI-B21-T1404-D	CHANNEL: MSL D
Response Time: $\leq 1.0^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N076D Rosemount 1153 a
MTU	Deenergizes MTU Output Relay (c) on MSL Low Pressure	1B21-N676D Rosemount 510/710DU b
MTU Output Relay	Deenergizes Isolation Relay (d) on MSL Low Pressure	1B21H-K4D Agastat EGPB c
Isolation Relay	Deenergizes Initiation Relays (e/f) on MSL Low Pressure	1B21H-K7D Agastat EGPI d
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL Low Pressure	1B21H-K14A Agastat EGPI e
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL Low Pressure	1B21H-K14B Agastat EGPI f

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)
 H10 (U)
 H11 (Y)
 H15 (X)

PNPP ISOLATION ACTUATION INSTRUMENTATION PNPP

DESCRIPTION: Main Steam Line Isolation
 FUNCTION: Main Steam Line Flow - High
 INSTRUCTION: SVI-E31-T1405-A

TABLE: 3.3.2-3
 ITEM: 2.d
 CHANNEL: MSL A

Response Time: $\leq 0.5^*$ seconds

DESCRIPTION	FUNCTION	MFL & MODEL
Transmitter	Senses MSL A Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N086A a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL A High Flow	1E31-N686A b Rosemount 510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL A High Flow	1B21H-K120A c Agastat EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL A High Flow	1B21H-K3A d Agastat EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL A High Flow	1B21H-K7A e Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL A High Flow	1B21H-K51A f Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL A High Flow	1B21H-K51B g Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)

H10 (U)
 H11 (Y)
 H14 (W)

ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Flow - High	ITEM: 2.d
INSTRUCTION:	SVI-E31-T1405-B	CHANNEL: MSL B
Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL A Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N086B a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL A High Flow	1E31-N686B b Rosemount 510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL A High Flow	1B21H-K120B c Agastat EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL A High Flow	1B21H-K3B d Agastat EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL A High Flow	1B21H-K7B e Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL A High Flow	1B21H-K14A f Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL A High Flow	1B21H-K14B g Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)

H10 (U)
 H11 (Y)
 H15 (X)

PNPP ISOLATION ACTUATION INSTRUMENTATION PNPP

DESCRIPTION: Main Steam Line Isolation
 FUNCTION: Main Steam Line Flow - High
 INSTRUCTION: SVI-E31-T1405-C
 Response Time: $\leq 0.5^*$ seconds

TABLE: 3.3.2-3
 ITEM: 2.d
 CHANNEL: MSL C

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL A Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N086C Rosemount 1153 a
MTU	Deenergizes MTU Output Relay (c) on MSL A High Flow	1E31-N686C Rosemount 510/710DU b
MTU Output Relay	Deenergizes Interface Relay (d) on MSL A High Flow	1B21H-K120C Agastat EGPI c
Interface Relay	Deenergizes Isolation Relay (e) on MSL A High Flow	1B21H-K3C Agastat EGPI d
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL A High Flow	1B21H-K7C Agastat EGPI e
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL A High Flow	1B21H-K51A Agastat EGPI f
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL A High Flow	1B21H-K51B Agastat EGPI g

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)

H10 (U)
 H11 (Y)
 H14 (W)

PNPP		ISOLATION ACTUATION INSTRUMENTATION		PNPP	
DESCRIPTION: Main Steam Line Isolation				TABLE: 3.3.2-3	
FUNCTION: Main Steam Line Flow - High				ITEM: 2.d	
INSTRUCTION: SVI-E31-T1405-D				CHANNEL: MSL D	
		Response Time: ≤ 0.5* seconds			
DESCRIPTION	FUNCTION	MPL & MODEL			
Transmitter	Senses MSL A Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N086D	a	Rosemount 1153	
MTU	Deenergizes MTU Output Relay (c) on MSL A High Flow	1E31-N686D	b	Rosemount 510/710DU	
MTU Output Relay	Deenergizes Interface Relay (d) on MSL A High Flow	1B21H-K120D	c	Agastat EGPB	
Interface Relay	Deenergizes Isolation Relay (e) on MSL A High Flow	1B21H-K3D	d	Agastat EGPI	
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL A High Flow	1B21H-K7D	e	Agastat EGPI	
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL A High Flow	1B21H-K14A	f	Agastat EGPI	
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL A High Flow	1B21H-K14B	g	Agastat EGPI	

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)

H10 (U)
 H11 (Y)
 H15 (X)

PNPP

ISOLATION ACTUATION INSTRUMENTATION

PNPP

DESCRIPTION: Main Steam Line Isolation
 FUNCTION: Main Steam Line Flow - High
 INSTRUCTION: SVI-E31-T1405-E
 Response Time: $\leq 0.5^*$ seconds

TABLE: 3.3.2-3
 ITEM: 2.d
 CHANNEL: MSL A

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL B Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-NO87A Rosemount 1153 a
MTU	Deenergizes MTU Output Relay (c) on MSL B High Flow	1E31-N687A Rosemount 510/710DU b
MTU Output Relay	Deenergizes Interface Relay (d) on MSL B High Flow	1B21H-K121A Agastat EGPI c
Interface Relay	Deenergizes Isolation Relay (e) on MSL B High Flow	1B21H-K3A Agastat EGPI d
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL B High Flow	1B21H-K7A Agastat EGPI e
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL B High Flow	1B21H-K51A Agastat EGPI f
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL B High Flow	1B21H-K51B Agastat EGPI g

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)

H10 (U)
 H11 (Y)
 H14 (W)

ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Flow - High	ITEM: 2.d
INSTRUCTION:	SVI-E31-T1405-F	CHANNEL: MSL B
Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL B Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N087B Rosemount 1153 a
MTU	Deenergizes MTU Output Relay (c) on MSL B High Flow	1E31-N687B Rosemount 510/710DU b
MTU Output Relay	Deenergizes Interface Relay (d) on MSL B High Flow	1B21H-K121B Agastat EGPB c
Interface Relay	Deenergizes Isolation Relay (e) on MSL B High Flow	1B21H-K3B Agastat EGPI d
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL B High Flow	1B21H-K7B Agastat EGPI e
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL B High Flow	1B21H-K14A Agastat EGPI f
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL B High Flow	1B21H-K14B Agastat EGPI g

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)

H10 (U)
 H11 (Y)
 H15 (X)

ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Flow - High	ITEM: 2.d
INSTRUCTION:	SVI-E31-T1405-G	CHANNEL: MSL C
Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL B Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N087C a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL B High Flow	1E31-N687C b Rosemount 510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL B High Flow	1B21H-K121C c Agastat EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL B High Flow	1B21H-K3C d Agastat EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL B High Flow	1B21H-K7C e Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL B High Flow	1B21H-K51A f Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL B High Flow	1B21H-K51B g Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)

H10 (U)
 H11 (Y)
 H14 (W)

ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Flow - High	ITEM: 2.d
INSTRUCTION:	SVI-E31-T1405-H	CHANNEL: MSL D
Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL B Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N087D a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL B High Flow	1E31-N687D b Rosemount 510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL B High Flow	1B21H-K121D c Agastat EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL B High Flow	1B21H-K3D d Agastat EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL B High Flow	1B21H-K7D e Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL B High Flow	1B21H-K14A f Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL B High Flow	1B21H-K14B g Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)

H10 (U)
 H11 (Y)
 H15 (X)

PNFP ISOLATION ACTUATION INSTRUMENTATION

PNFP

DESCRIPTION: Main Steam Line Isolation
 FUNCTION: Main Steam Line Flow - High
 INSTRUCTION: SVI-E31-T1405-A
 Response Time: $\leq 0.5^*$ seconds

TABLE: 3.
 ITEM: 2.d
 CHANNEL: MSL A

DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL C Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N088A a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL C High Flow	1E31-N688A b Rosemount 510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL C High Flow	1B21H-K122A c Agastat EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL C High Flow	1B21H-K3A d Agastat EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL C High Flow	1B21H-K7A e Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL C High Flow	1B21H-K51A f Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL C High Flow	1B21H-K51B g Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)

H10 (U)
 H11 (Y)
 H14 (W)

PNPP ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Flow - High	ITEM: 2.d
INSTRUCTION:	SVI-E31-T1405-B	CHANNEL: MSL B
Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL C Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N088B a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL C High Flow	1E31-N688B b Rosemount 510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL C High Flow	1B21H-K122B c Agastat EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL C High Flow	1B21H-K3B d Agastat EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL C High Flow	1B21H-K7B e Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL C High Flow	1B21H-K14A f Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL C High Flow	1B21H-K14B g Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)

H10 (U)
 H11 (Y)
 H15 (X)

PNPP		ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE:	3.3.2-3	
FUNCTION:	Main Steam Line Flow - High	ITEM:	2.d	
INSTRUCTION:	SVI-E31-T1405-C	CHANNEL:	MSL C	
Response Time: $\leq 0.5^*$ seconds				
DESCRIPTION	FUNCTION	MPL & MODEL		
Transmitter	Senses MSL C Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N088C Rosemount 1153	a	
MTU	Deenergizes MTU Output Relay (c) on MSL C High Flow	1E31-N688C Rosemount 510/710DU	b	
MTU Output Relay	Deenergizes Interface Relay (d) on MSL C High Flow	1B21H-K122C Agastat EGPB	c	
Interface Relay	Deenergizes Isolation Relay (e) on MSL C High Flow	1B21H-K3C Agastat EGPI	d	
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL C High Flow	1B21H-K7C Agastat EGPI	e	
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL C High Flow	1B21H-K51A Agastat EGPI	f	
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL C High Flow	1B21H-K51B Agastat EGPI	g	

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)

H10 (U)
 H11 (Y)
 H14 (W)

PNPP		ISOLATION ACTUATION INSTRUMENTATION		PNPP	
DESCRIPTION:	Main Steam Line Isolation			TABLE:	3.3.2-3
FUNCTION:	Main Steam Line Flow - High			ITEM:	2.d
INSTRUCTION:	SVI-E31-T1405-D			CHANNEL:	MSL D
		Response Time: $\leq 0.5^*$ seconds			
DESCRIPTION	FUNCTION	MPL & MODEL			
Transmitter	Senses MSL C Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N088D	a	Rosemount	1153
MTU	Deenergizes MTU Output Relay (c) on MSL C High Flow	1E31-N688D	b	Rosemount	510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL C High Flow	1B21H-K122D	c	Agastat	EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL C High Flow	1B21H-K3D	d	Agastat	EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL C High Flow	1B21H-K7D	e	Agastat	EGPI
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL C High Flow	1B21H-K14A	f	Agastat	EGPI
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL C High Flow	1B21H-K14B	g	Agastat	EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)

H10 (U)
 H11 (Y)
 H15 (X)

PNPP ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Flow - High	ITEM: 2.d
INSTRUCTION:	SVI-E31-T1405-E	CHANNEL: MSL A
Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL D Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N089A a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL D High Flow	1E31-N689A b Rosemount 510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL D High Flow	1B21H-K123A c Agastat EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL D High Flow	1B21H-K3A d Agastat EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL D High Flow	1B21H-K7A e Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL D High Flow	1B21H-K51A f Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL D High Flow	1B21H-K51B g Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)

H10 (U)
 H11 (Y)
 H14 (W)

PNPP	ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE:	3.3.2-3
FUNCTION:	Main Steam Line Flow - High	ITEM:	2.d
INSTRUCTION:	SVI-E31-T1405-F	CHANNEL:	MSL B
	Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL	
Transmitter	Senses MSL D Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N089B Rosemount 1153	a
MTU	Deenergizes MTU Output Relay (c) on MSL D High Flow	1E31-N689B Rosemount 510/710DU	b
MTU Output Relay	Deenergizes Interface Relay (d) on MSL D High Flow	1B21H-K123B Agastat EGPB	c
Interface Relay	Deenergizes Isolation Relay (e) on MSL D High Flow	1B21H-K3B Agastat EGPI	d
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL D High Flow	1B21H-K7B Agastat EGPI	e
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL D High Flow	1B21H-K14A Agastat EGPI	f
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL D High Flow	1B21H-K14B Agastat EGPI	g

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)

H10 (U)
 H11 (Y)
 H15 (X)

ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE: 3.3.2-3
FUNCTION:	Main Steam Line Flow - High	ITEM: 2.d
INSTRUCTION:	SVI-E31-T1405-G	CHANNEL: MSL C
Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL
Transmitter	Senses MSL D Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N089C a Rosemount 1153
MTU	Deenergizes MTU Output Relay (c) on MSL D High Flow	1E31-N689C b Rosemount 510/710DU
MTU Output Relay	Deenergizes Interface Relay (d) on MSL D High Flow	1B21H-K123C c Agastat EGPB
Interface Relay	Deenergizes Isolation Relay (e) on MSL D High Flow	1B21H-K3C d Agastat EGPI
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL D High Flow	1B21H-K7C e Agastat EGPI
Initiation Relay	Deenergizes Outboard MSIV A Solenoids on MSL D High Flow	1B21H-K51A f Agastat EGPI
Initiation Relay	Deenergizes Inboard MSIV A Solenoids on MSL D High Flow	1B21H-K51B g Agastat EGPI

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H06 (U)

H10 (U)
 H11 (Y)
 H14 (W)

PNPP		ISOLATION ACTUATION INSTRUMENTATION		PNPP
DESCRIPTION:	Main Steam Line Isolation	TABLE:	3.3.2-3	
FUNCTION:	Main Steam Line Flow - High	ITEM:	2.d	
INSTRUCTION:	SVI-E31-T1405-H	CHANNEL:	MSL D	
		Response Time: $\leq 0.5^*$ seconds		
DESCRIPTION	FUNCTION	MPL & MODEL		
Transmitter	Senses MSL D Flow and sends signal to Master Trip Unit (MTU) (b)	1E31-N089D Rosemount 1153	a	
MTU	Deenergizes MTU Output Relay (c) on MSL D High Flow	1E31-N689D Rosemount 510/710DU	b	
MTU Output Relay	Deenergizes Interface Relay (d) on MSL D High Flow	1B21H-K123D Agastat EGPB	c	
Interface Relay	Deenergizes Isolation Relay (e) on MSL D High Flow	1B21H-K3D Agastat EGPI	d	
Isolation Relay	Deenergizes Initiation Relays (f/g) on MSL D High Flow	1B21H-K7D Agastat EGPI	e	
Initiation Relay	Deenergizes Outboard MSIV B Solenoids on MSL D High Flow	1B21H-K14A Agastat EGPI	f	
Initiation Relay	Deenergizes Inboard MSIV B Solenoids on MSL D High Flow	1B21H-K14B Agastat EGPI	g	

* No diesel generator delays assumed.

REFERENCES:

B-208-013 SH: H02 (T)
 H03 (P)
 H07 (N)

H10 (U)
 H11 (Y)
 H15 (X)

PNPP		EMERGENCY CORE COOLING SYSTEM		PNPP
DESCRIPTION:	RHR-A (LPCI MODE) and LPCS System	TABLE:	3.3.3-3	
FUNCTION:	Reactor Vessel Water Level - Low, Level 1	ITEM:	A.1.a	
INSTRUCTION:	SVI-B21-T0150-A/E	CHANNEL:	DIV 1	
Response Time: ≤ 37 seconds				
DESCRIPTION	FUNCTION	MPL & MODEL		
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N091A Rosemount 1153	a	
MTU	Energizes MTU Output Relay (c) on RPV Low Water Level	1B21-N691A Rosemount 510/710DU	b	
MTU Output Relay	Energizes LOCA Relays (g/j) on RPV Low Water Level, if MTU Output Relay (f) energized	1E21A-K91 Agastat EGPB	c	
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (e)	1B21-N091A Rosemount 1153	d	
MTU	Energizes MTU Output Relay (f) on RPV Low Water Level	1B21-N691E Rosemount 510/710DU	e	
MTU Output Relay	Energizes LOCA Relays (g/j) on RPV Low Water Level, if MTU Output Relay (c) energized,	1E21A-K81 Agastat EGPB	f	
LOCA Relay	Energizes LPCS Initiation Relays (h/i) on RPV Low Water Level	1E21A-K10 Agastat EGPB	g	
Initiation Relay	Starts LPCS Pump on RPV Low Water Level (15 sec delay)	1E21A-K12 Agastat E7012PC	h	
Initiation Relay	Opens LPCS Injection Valve on RPV Low Water Level, if permissive met	1E21A-K14 Agastat EGPB	i	

----- CONTINUED -----

PNPP EMERGENCY CORE COOLING SYSTEM (CONT.) PNPP

DESCRIPTION: RHR-A (LPCI MODE) and LPCS System
 FUNCTION: Reactor Vessel Water Level - Low, Level 1
 INSTRUCTION: SVI-B21-T0150-A/E
 Response Time: ≤ 37 seconds

TABLE: 3.3.3-3
 ITEM: A.1.a
 CHANNEL: DIV 1

DESCRIPTION	FUNCTION	MPL & MODEL
LOCA Relay	Energizes RHR A Interface Relay (k) on RPV Low Water Level	1E21A-K11 j Agastat EGPD
Interface Relay	Energizes RHR A Time Delay Relay (l) and Initiation Relay (n) on RPV Low Water Level	1E12A-K9A k Agastat EGPD
Time Delay Relay	Energizes RHR A Initiation Relay (m) on RPV Low Water Level (5 sec delay)	1E12A-K70A l Agastat TRD
Initiation Relay	Starts RHR A Pump on RPV Low Water Level	1E12A-K18A m GE HMA
Initiation Relay	Opens RHR A Injection Valve on RPV Low Water Level, if permissive met	1E12A-K23A n Agastat EGPD

REFERENCES:

B-208-055 SH: A03 (BB)
 A07 (AA)
 A17 (T)
 A32 (S)

 B-208-060 SH: A01 (V)
 A04 (Y)
 A06 (X)
 A08 (X)
 A11 (L)

PNPP		EMERGENCY CORE COOLING SYSTEM		PNPP	
DESCRIPTION:	RHR-A (LPCI MODE) and LPCS System	TABLE:	3.3.3-3		
FUNCTION:	Drywell Pressure - High	ITEM:	A.1.b		
INSTRUCTION:	SVI-B21-T0175-A/E	CHANNEL:	DIV 1		
Response Time: ≤ 37 seconds					
DESCRIPTION	FUNCTION	MPL & MODEL			
Transmitter	Senses DW Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N094A		a	
		Rosemount 1153			
MTU	Energizes MTU Output Relay (c) on DW High Pressure	1B21-N694A		b	
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relays (g/j) on DW High Pressure, if MTU Output Relay (f) energized	1E21A-K94		c	
		Agastat EGPB			
Transmitter	Senses DW Pressure and sends signal to Master Trip Unit (MTU) (e)	1B21-N094E		d	
		Rosemount 1153			
MTU	Energizes MTU Output Relay (f) on DW High Pressure	1B21-N694E		e	
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relays (g/j) on DW High Pressure, if MTU Output Relay (c) energized	1E21A-K84		f	
		Agastat EGPB			
LOCA Relay	Energizes LPCS Initiation Relays (h/i) on DW high Pressure	1E21A-K10		g	
		Agastat EGPB			
Initiation Relay	Starts LPCS Pump on DW High Pressure (15 sec delay)	1E21A-K12		h	
		Agastat E7012PC			
Initiation Relay	Opens LPCS Injection Valve on DW High Pressure, if permissive met	1E21A-K14		i	
		Agastat EGPB			

----- CONTINUED -----

PNPP EMERGENCY CORE COOLING SYSTEM (CONT.) PNPP

DESCRIPTION: RHR-A (LPCI MODE) and LPCS System
 FUNCTION: Drywell Pressure - High
 INSTRUCTION: SVI-B21-T0175-A/E

TABLE: 3.3.3-3
 ITEM: A.1.b
 CHANNEL: DIV 1

Response Time: ≤ 37 seconds

DESCRIPTION	FUNCTION	MPL & MODEL
LOCA Relay	Energizes RHR A Interface Relay (k) on DW High Pressure	1E21A-K11 j Agastat EGPD
Interface Relay	Energizes RHR A Time Delay Relay (l) and Initiation Relay (n) on DW High Pressure	1E12A-K9A k Agastat EGPD
Time Delay Relay	Energizes RHR A Initiation Relay (m) on DW High Pressure (5 sec delay)	1E12A-K70A l Agastat TRD
Initiation Relay	Starts RHR A Pump on DW High Pressure	1E12A-K18A m GE HMA
Initiation Relay	Opens RHR A Injection Valve on DW High Pressure, if permissive met	1E12A-K23A n Agastat EGPD

REFERENCES:

B-208-055 SH: A03 (BB)
 A07 (AA)
 A17 (T)
 A32 (S)

B-208-060 SH: A01 (V)
 A04 (Y)
 A06 (X)
 A08 (X)
 A11 (L)

PNPP		EMERGENCY CORE COOLING SYSTEM		PN2P
DESCRIPTION:	RHR B and C (LPCI MODE)	TABLE:	3.3.3-3	
FUNCTION:	Reactor Vessel Water Level - Low, Level 1	ITEM:	B.1.a	
INSTRUCTION:	SVI-B21-T0150-B/F	CHANNEL:	DIV 2	
Response Time: ≤ 37 seconds				
DESCRIPTION	FUNCTION	MPL & MODEL		
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N091B Rosemount 1153	a	
MTU	Energizes MTU Output Relay (c) on RPV Low Water Level sensed at transmitter	1B21-N691B Rosemount 510/710DU	b	
MTU Output Relay	Energizes LOCA Relays (g/j/m) on RPV Low Water Level, if MTU Output Relay (f) energized	1E12A-K7 Agastat EGPB	c	
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (e)	1B21-N091F Rosemount 1153	d	
MTU	Energizes MTU Output Relay (f) on RPV Low Water Level	1B21-N691F Rosemount 510/710DU	e	
MTU Output Relay	Energizes LOCA Relays (g/j/m) on RPV Low Water Level, if MTU Output Relay (c) energized	1E12A-K8 Agastat EGPB	f	
LOCA Relay	Energizes RHR B Time Delay Relay (h) on RPV Low Water Level	1E12A-K9B Agastat EGPD	g	
Time Delay Relay	Energizes RHR B Initiation Relay (i) on RPV Low Water Level (5 sec delay)	1E12A-K70B Agastat TRD	h	
Initiation Relay	Starts RHR B Pump on RPV Low Water Level	1E12A-K18B GE HMA	i	

----- CONTINUED -----

PNPP		EMERGENCY CORE COOLING SYSTEM (CONT.)		PNPP
DESCRIPTION:	RHR B and C (LPCI Mode)			TABLE: 3.3.3-3
FUNCTION:	Reactor Vessel Water Level - Low, level 1			ITEM: B.1.a
INSTRUCTION:	SVI-B21-T0150-B/F			CHANNEL: DIV 2
Response Time: ≤ 37 seconds				
DESCRIPTION	FUNCTION			MPL/MODEL
LOCA Relay	Energizes RHR B/C Initiation Relays (k/l) on RPV Low Water Level			1E12A-K94B Agastat EGPD j
Initiation Relay	Starts RHR C Pump on RPV Low Water Level			1E12A-K21 GE HMA k
Initiation Relay	Opens RHR B Injection Valve on RPV Low Water Level, if permissive met			1E12A-K23B Agastat EGPD l
LOCA Relay	Energizes RHR C Initiation Relay / on RPV Low Water Level			1E12A-K125B Agastat EGPD m
Initiation Relay	Opens RHR C Injection Valve on RPV Low Water Level, if permissive met			1E12A-K25 Agastat EGPD n

REFERENCES:

B-208-055 SH: A03 (BB)
 A08 (X)
 A09 (T)
 A15 (S)
 A18 (X)
 A19 (V)
 A33 (V)
 A34 (P)

PNPP		EMERGENCY CORE COOLING SYSTEM		PNPP	
DESCRIPTION:	RHR B and C (LPCI MODE)	TABLE:	3.3.3-3		
FUNCTION:	Drywell Pressure - High	ITEM:	B.1.b		
INSTRUCTION:	SVI-B21-T0175-B/F	CHANNEL:	DIV 2		
Response Time: ≤ 37 seconds					
DESCRIPTION	FUNCTION	MPL & MODEL			
Transmitter	Senses DW Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N094B	a		
		Rosemount 1153			
MTU	Energizes MTU Output Relay (c) on DW High Pressure	1B21-N694B	b		
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relays (g/j/m) on DW High Pressure, if MTU Output Relay (f) energized	1E12A-K5	c		
		Agastat EGPB			
Transmitter	Senses DW Pressure and sends signal to Master Trip Unit (MTU) (e)	1B21-N094F	d		
		Rosemount 1153			
MTU	Energizes MTU Output Relay (f) on DW High Pressure	1B21-N694F	e		
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relays (g/j/m) on DW High Pressure, if MTU Output Relay (c) energized	1E12A-K6	f		
		Agastat EGPB			
LOCA Relay	Energizes RHR B Time Delay Relay (h) on DW High Pressure	1E12A-K9B	g		
		Agastat EGPB			
Time Delay Relay	Energizes RHR B Initiation Relay (i) on DW High Pressure (5 sec delay)	1E12A-K70B	h		
		Agastat TRD			
Initiation Relay	Starts RHR B Pump on DW High Pressure	1E12A-K18B	i		
		GE HMA			

----- CONTINUED -----

PNPP EMERGENCY CORE COOLING SYSTEM (CONT.) PNPP

DESCRIPTION: RHR B and C (LPCI Mode)
 FUNCTION: Drywell Pressure - High
 INSTRUCTION: SVI-B21-T0175-B/F

TABLE: 3.3.3-3
 ITEM: B.1.b
 CHANNEL: DIV 2

Response Time: ≤ 37 seconds

DESCRIPTION	FUNCTION	MPL/MODEL
LOCA Relay	Energizes RHR B/C Initiation Relays (k/l) on DW High Pressure	1E12A-K94B Agastat EGPD j
Initiation Relay	Starts RHR C Pump on DW High Pressure	1E12A-K21 GE HMA k
Initiation Relay	Opens RHR B Injection Valve on DW High Pressure, if permissive met	1E12A-K23B Agastat EGPD l
LOCA Relay	Energizes RHR C Initiation Relay (n) on DW High Pressure	1E12A-K125B Agastat EGPD m
Initiation Relay	Opens RHR C Injection Valve on DW High Pressure, if permissive met	1E12A-K25 Agastat EGPD r

REFERENCES:

B-208-055 SH: A03 (BB)
 A08 (X)
 A09 (T)
 A15 (S)
 A18 (X)
 A19 (V)
 A33 (V)
 A34 (P)

PNPP		EMERGENCY CORE COOLING SYSTEM		PNPP	
DESCRIPTION:	HPCS System	TABLE:	3.3.3-3		
FUNCTION:	Reactor Vessel Water Level - Low, Level 2	ITEM:	C.1.a		
INSTRUCTION:	SVI-B21-T0202-C	CHANNEL:	DIV 3		
Response Time: \leq 27 seconds					
DESCRIPTION	FUNCTION	MPL/A RL			
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N073C	a	Rosemount 1153	
MTU	Energizes MTU Output Relay (c) on RPV Low Water Level	1B21-N673C	b	Rosemount 510/710DU	
MTU Output Relay	Energizes LOCA Relay (g) on RPV Low Water Level, if MTU Output Relay (f) energized	1E22A-K73	c	Agastat EGPB	
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (e)	1B21-N073G	d	Rosemount 1153	
MTU	Energizes MTU Output Relay (f) on RPV Low Water Level	1B21-N673G	e	Rosemount 510/710DU	
MTU Output Relay	Energizes LOCA Relay (g) on RPV Low Water Level, if MTU Output Relay (c) energized	1E22A-K93	f	Agastat EGPB	
LOCA Relay	Energizes HPCS Initiation Relays (h/j) on RPV Low Water Level	1E22A-K11	g	Agastat EGPD	
Initiation Relay	Energizes HPCS Time Delay Relay (i) on RPV Low Water Level	1E22A-K3	h	GE HFA	
Time Delay Relay	Starts HPCS Pump on RPV Low Water Level (10 sec delay)	1E22B-K114	i	Agastat TRD	

----- CONTINUED -----

PNPP		EMERGENCY CORE COOLING SYSTEM (CONT.)	PNPP
DESCRIPTION:	HPCS System		TABLE: 3.3.3-3
FUNCTION:	Reactor Vessel Water Level - Low, level 2		ITEM: C.1.a
INSTRUCTION:	SVI-B21-T0202-C		CHANNEL: DIV 3
	Response Time: ≤ 27 seconds		
DESCRIPTION	FUNCTION	MPL/MODEL	
Initiation Relay	Opens HPCS Injection Valve on RPV Low Water Level, if permissive met	1E22A-K9 Agastat EGPD	j

REFERENCES:

B-208-065 SH: A02 (N)
A03 (P)
A04 (P)
A14 (N)

B-208-066 SH: B01 (Y)
B02 (L)

PNPP		EMERGENCY CORE COOLING SYSTEM		PNPP	
DESCRIPTION:	HPCS System	TABLE:	3.3.3-3		
FUNCTION:	Reactor Vessel Water Level - Low, Level 2	ITEM:	C.1.a		
INSTRUCTION:	SVI-B21-T0202-L	CHANNEL:	DIV 3		
Response Time: \leq 27 seconds					
DESCRIPTION	FUNCTION	MPL/MODEL			
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (b)	1B21-N073L	a		
		Rosemount 1153			
MTU	Energizes MTU Output Relay (c) on RPV Low Water Level	1B21-N673L	b		
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relay (g) on RPV Low Water Level, if MTU Output Relay (f) energized	1E22A-K83	c		
		Agastat EGPB			
Transmitter	Senses RPV Water Level and sends signal to Master Trip Unit (MTU) (e)	1B21-N073R	d		
		Rosemount 1153			
MTU	Energizes MTU Output Relay (f) on RPV Low Water Level	1B21-N673R	e		
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relay (g) on RPV Low Water Level, if MTU Output Relay (c) energized	1E22A-K103	f		
		Agastat EGPB			
LOCA Relay	Energizes HPCS Initiation Relays (h/j) on RPV Low Water Level	1E22A-K11	g		
		Agastat EGPB			
Initiation Relay	Energizes HPCS Time Delay Relay (i) on RPV Low Water Level	1E22A-K3	h		
		GE HFA			
Time Delay Relay	Starts HPCS Pump on RPV Low Water Level (10 sec delay)	1E22B-K114	i		
		Agastat TRD			

----- CONTINUED -----

PNPP		EMERGENCY CORE COOLING SYSTEM (CONT.)	PNPP
DESCRIPTION:	HPCS System		TABLE: 3.3.3-3
FUNCTION:	Reactor Vessel Water Level - Low, level 2		ITEM: C.1.a
INSTRUCTION:	SVI-B21-T0202-L		CHANNEL: DIV 3
		Response Time: ≤ 27 seconds	
DESCRIPTION	FUNCTION	MPL/MODEL	
Initiation Relay	Opens HPCS Injection Valve on RPV Low Water Level, if permissive met	1E22A-K9 Agastat EGPD	j

REFERENCES:

B-208-065 SH: A02 (N)
 A03 (P)
 A04 (P)
 A14 (N)

B-208-066 SH: B01 (Y)
 B02 (L)

PNPP		EMERGENCY CORE COOLING SYSTEM		PNPP	
DESCRIPTION:	HPCS System	TABLE:	3.3.3-3		
FUNCTION:	Drywell Pressure - High	ITEM:	C.1.b		
INSTRUCTION:	SVI-B21-T5364-C	CHANNEL:	DIV 3		
Response Time: ≤ 27 seconds					
DESCRIPTION	FUNCTION	MPL/MODEL			
Transmitter	Senses DW Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N067C		a	
		Rosemount 1153			
MTU	Energizes MTU Output Relay (c) on DW High Pressure	1B21-N667C		b	
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relay (g) on DW High Pressure, if MTU Output Relay (f) energized	1E22A-K67		c	
		Agastat EGPB			
Transmitter	Senses DW Pressure and sends signal to Master Trip Unit (MTU) (e)	1B21-N067C		d	
		Rosemount 1153			
MTU	Energizes MTU Output Relay (f) on DW High Pressure	1B21-N667C		e	
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relay (g) on DW High Pressure, if MTU Output Relay (c) energized	1E22A-K87		f	
		Agastat EGPB			
LOCA Relay	Energizes HPCS Initiation Relays (h/j) on DW High Pressure	1E22A-K29		g	
		Agastat EGPB			
Initiation Relay	Energizes HPCS Time Delay Relay (i) on DW high Pressure	1E22A-K3		h	
		GE HFA			
Time Delay Relay	Starts HPCS Pump on DW High Pressure (10 sec delay)	1E22B-K114		i	
		Agastat TRD			

----- CONTINUED -----

PNPP EMERGENCY CORE COOLING SYSTEM (CONT.) PNPP

DESCRIPTION: HPCS System
 FUNCTION: Drywell Pressure - High
 INSTRUCTION: SVI-B21-T5364-C

TABLE: 3.3.3-3
 ITEM: C.1.b
 CHANNEL: DIV 3

Response Time: ≤ 27 seconds

DESCRIPTION	FUNCTION	MPL/MODEL
Initiation Relay	Opens HPCS Injection Valve on DW High Pressure, if permissive met	1E22A-K9 Agastat EGPD j

REFERENCES:

B-208-065 SH: A02 (N)
 A03 (P)
 A04 (P)
 A14 (N)

B-208-066 SH: B01 (Y)
 B02 (L)

PNPP		EMERGENCY CORE COOLING SYSTEM		PNPP	
DESCRIPTION:	HPCS System	TABLE:	3.3.3-3		
FUNCTION:	Drywell Pressure - High	ITEM:	C.1.b		
INSTRUCTION:	SVI-B21-T5364-L	CHANNEL:	DIV 3		
Response Time: \leq 27 seconds					
DESCRIPTION	FUNCTION	MPL/MODEL			
Transmitter	Senses DW Pressure and sends signal to Master Trip Unit (MTU) (b)	1B21-N067L		a	
		Rosemount 1153			
MTU	Energizes MTU Output Relay (c) on DW High Pressure	1E21-N667L		b	
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relay (g) on DW High Pressure, if MTU Output Relay (f) energized	1E22A-K77		c	
		Agastat EGPB			
Transmitter	Senses DW Pressure and sends signal to Master Trip Unit (MTU) (e)	1B21-N067R		d	
		Rosemount 1153			
MTU	Energizes MTU Output Relay (f) on DW High Pressure	1B21-N667R		e	
		Rosemount 510/710DU			
MTU Output Relay	Energizes LOCA Relay (g) on DW High Pressure, if MTU Output Relay (c) energized	1E22A-K97		f	
		Agastat EGPB			
LOCA Relay	Energizes HPCS Initiation Relays (h/j) on DW High Pressure	1E22A-K29		g	
		Agastat EGPD			
Initiation Relay	Energizes HPCS Time Delay Relay (i) on DW high Pressure	1E22A-K3		h	
		GE HFA			
Time Delay Relay	Starts HPCS Pump on DW High Pressure (10 sec delay)	1E22B-K114		i	
		Agastat TRD			

----- CONTINUED -----

PNPP

CHANNEL: DIV 3

DESCRIPTION	FUNCTION	MPL/MODEL
Initiation Relay	Opens WPCS Injection Valve on DW High Pressure, if permissive met	1E22A-K9 Agastat EGPD

REFERENCES:

E-208-065 SH: A02 (N)
A03 (P)
A04 (P)
A14 (N)

B-208-066 SH: B01 (Y)
B02 (L)