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 BEMIS, P.R. Washington Public Power Supply System
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SUBJECT: Application for amend to license NPF-21, modifying response
 time testing surveillance requirements for RPS
 Instrumentation, Primary Containment Isolation Actuation
 Instrumentation & ECCS Actuation Instrumentation.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • Richland, Washington 99352-0968

March 22, 1997
G02-97-057

Docket No. 50-397

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NPF-21
REQUEST FOR AMENDMENT, UNDER EXIGENT CIRCUMSTANCES, TO
OPERATING LICENSE REGARDING TECHNICAL SPECIFICATION
RESPONSE TIME TESTING**

- References:
- 1) Letter GO2-97-056, JV Parrish (SS) to NRC, "Request for Enforcement Discretion to Technical Specification Response Time Testing Requirements, dated March 20, 1997.
 - 2) Letter GO2-94-160, JV Parrish (SS) to NRC, "Request for Amendment to the Technical Specifications, Relocation of Technical Specification Tables for Instrument Response Time Limits," dated July 12, 1994.
 - 3) Letter JW Clifford (NRC) to JV Parrish (SS), "Issuance of Amendment for the Washington Nuclear Power Supply System Nuclear Project No. 2 (TAC NO. M89907)," dated June 26, 1995.
 - 4) Generic Letter 93-08, "Relocation of Technical Specification Tables of Instrument Response Time Limits," dated December 29, 1993.
 - 5) GE Nuclear Energy, BWR Owners' Group Licensing Topical Report, NEDO-32291-A, "System Analysis for the Elimination of Selected Response Time Testing Requirements," dated October, 1995.
 - 6) Letter TP Gwynn (NRC) to JV Parrish (SS), "Response Time Measurement in Accordance with Technical Specification Surveillance Requirements," dated March 20, 1997.

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REQUEST FOR AMENDMENT TO OPERATING LICENSE REGARDING TECHNICAL SPECIFICATION RESPONSE TIME TESTING

In accordance with the Code of Federal Regulations, Title 10, Parts 50.59, 50.90 and 2.101, the Supply System hereby submits a request for amendment, under exigent circumstances, to the WNP-2 Operating License. Specifically, the Supply System is requesting modification of response time testing (RTT) surveillance requirements for Reactor Protection System (RPS) Instrumentation, Primary Containment Isolation Actuation Instrumentation, and Emergency Core Cooling System (ECCS) Actuation Instrumentation. Approval is requested by April 18, 1997.

This Technical Specification change request is submitted consistent with the Reference 1 commitment and the approval of this change will resolve the need for enforcement discretion. The proposed change would revise the following surveillance requirements (SR):

SR 3.3.1.1.15	Reactor Protection System (RPS) Response Time, Functions 3 and 4;
SR 3.3.5.1.7	Emergency Core Cooling System (ECCS) Response Time (relocated);
SR 3.3.6.1.7	Primary Containment Isolation System Response Time, Functions 1.a, 1.b, and 1.c; and
SR 3.5.1.8	ECCS Operating (new).

The change to SR 3.3.1.1.15 and SR 3.3.6.1.7 adds a note that allows the sensor to be excluded from response time testing when verifying that the response time is within limits. The ECCS response time testing (SR 3.3.5.1.7) is being relocated to the new ECCS Operating Technical Specification SR 3.5.1.8. A note similar to that added to SR 3.3.1.1.15 and 3.3.6.1.7 is added to the new SR 3.5.1.8 to clarify that no actuation instrumentation response time measurement is required. No new SR is added to the ECCS Shutdown specification. The current SR 3.3.5.1.7 requires that the SR be met when the supported system is required to be OPERABLE. The requirement that the SR be met in MODES 1, 2, and 3, but not in MODES 4 and 5, is therefore a relaxation.

BACKGROUND

Reference 2 requested, and Reference 3 authorized, relocation of RPS, Primary Containment Isolation Actuation, and ECCS instrumentation RTT tables from the Technical Specifications to the Final Safety Analysis Report (FSAR) consistent with Reference 4 recommendations. The RTT tables were relocated to the FSAR and subsequently to the Licensee Controlled Specifications (LCS). The LCS contains technical requirements which do not meet the criteria for inclusion in the WNP-2 Technical Specifications. However, the LCS have been incorporated, by reference, in the FSAR. The LCS changes must therefore be reviewed in accordance with the requirements of 10CFR50.59.

REQUEST FOR AMENDMENT TO OPERATING LICENSE REGARDING TECHNICAL SPECIFICATION RESPONSE TIME TESTING

The Supply System reviewed the implementation requirements for the Reference 5 methodology. In April 1996, the Supply System opted for implementation of the Reference 5 methodology via the 10CFR50.59 process and concluded that the method did not constitute a change to the Technical Specifications, a change in the facility or procedures described in the safety analysis report, or involve tests or experiments not described in the safety analysis report. The Supply System concluded that there was no unreviewed safety question. Consistent with Reference 5 guidelines, the Supply System retained, in individual specifications, surveillance requirements for demonstration of instrumentation system response time, within its limit, on an 18 month interval. Consistent with the Reference 5 guidelines and staff SER, the Supply System concluded that the revised methodology met this requirement.

The decision to implement a change in the methodology used to verify response times are within limits was subjected to further review and was the subject of Special Inspection 96-22 in September 1996. As a result of that inspection, the staff has concluded that the implementation of the Reference 5 changes involves a change to the Technical Specifications and as such required NRC approval prior to implementation. Due to the short time period available to prepare this request for amendment to the Technical Specifications, the Supply System has not had the opportunity to review in detail the staff's positions presented in Reference 6 for the basis that a non-compliance with the Technical Specifications has occurred. As such, the Supply System makes no statement regarding agreement or disagreement with the position presented by the staff.

The proposed Technical Specification changes are supported by an analysis performed by the BWR Owners' Group (Reference 5) demonstrating that other periodic tests required by Technical Specifications, such as channel calibrations, channel checks, channel functional tests, and logic system functional tests, ensure that the instrument response is acceptable. The Supply System has verified the applicability of the reference analysis to WNP-2.

In addition, two categories of components were included in this change in testing methodology which were not identified in the table of components in Reference 5. However, these components are used within the logic circuits addressed in Reference 5. These components were inadvertently omitted from lists provided to General Electric in support of preparation of the Reference 5 tables. These components have been reviewed for similarity to the items contained within the Reference 5 component tables and have been found to be similar to other equipment referenced in the table. These components are also subject to periodic functional testing by CFTs and LSFTs. The Supply System verifies instrument response of these components at an appropriate interval using the alternate methodology described in Reference 5.

Presently the Applicability (and therefore the SR) for the ECCS actuation instrumentation is for all MODES in which the associated ECCS is required to be OPERABLE. This request would change the Applicability to MODES 1, 2 and 3. The basis for this change is that there are no design basis events which credit ECCS during MODES 4 and 5. The response time tests which are typically performed during shutdown condition would identify operability problems that may exist. In addition, due to the pressure and temperature limitations of MODES 4 and 5, the

REQUEST FOR AMENDMENT TO OPERATING LICENSE REGARDING TECHNICAL SPECIFICATION RESPONSE TIME TESTING

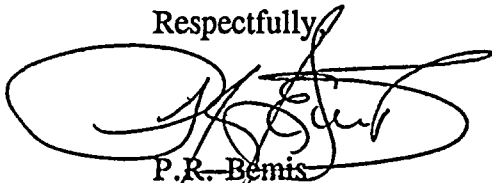
probability of an accident is reduced, as is the need for ECCS to respond within the times established for MODES 1, 2, and 3. This change has been approved by the staff for the Clinton Power Station and the Perry Nuclear Power Plant as part of their implementation of the Reference 5 recommendations.

Attachment 1 provides the basis for the change request. Attachment 2 contains mark-ups of the proposed changes to the Technical Specifications. Attachment 3 provides the No Significant Hazards Consideration and Environmental Considerations evaluations. The Supply System has concluded that the proposed change to the WNP-2 Technical Specifications does not result in a significant hazards consideration. In addition, the change meets the eligibility criteria for a categorical exclusion as set forth in 10CFR51.22(c)(9). Therefore, in accordance with 10CFR 51.22(b), an environmental assessment of the change is not required.

The Technical Specification amendment request has been reviewed and approved by the WNP-2 Plant Operations Committee and the Supply System Corporate Nuclear Safety Review Board. In accordance with 10CFR50.91, the State of Washington has been provided a copy of this letter.

Should you have any questions or desire additional information regarding this matter, please call me or D. A. Swank at (509) 377-4563.

Respectfully,



P.R. Bemis
Vice President Nuclear Operations
Mail Drop PE23

Attachments:

- 1) Basis for the Change Request.
- 2) Revised Technical Specification Pages
- 3) No Significant Hazards Consideration and Environmental Considerations Evaluations.

cc: EW Merschoff - NRC RIV
KE Perkins, Jr. - NRC RIV, Walnut Creek Field Office
TG Colburn - NRR
NRC Sr. Resident Inspector - 927N
DL Williams - BPA/399
R Wallis - EFSEC
PD Robinson - Winston & Strawn

STATE OF WASHINGTON)
)
COUNTY OF BENTON)

Subject: Request for Amendment to TS
Response Time Testing

I, P. R. BEMIS, being duly sworn, subscribe to and say that I am the Vice President, Nuclear Operations for the WASHINGTON PUBLIC POWER SUPPLY SYSTEM, the applicant herein; that I have the full authority to execute this oath; that I have reviewed the foregoing; and that to the best of my knowledge, information, and belief the statements made in it are true.


DATE 3/22/97, 199~~6~~⁷



P. R. Bemis
Vice President, Nuclear Operations

On this date personally appeared before me P. R. BEMIS, to me known to be the individual who executed the foregoing instrument, and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

GIVEN under my hand and seal this 22 day of March, 199~~6~~⁷.


Notary Public in and for the
STATE OF WASHINGTON

Residing at Kennelworth, WA

My Commission Expires 4/28/98

REQUEST FOR AMENDMENT TO OPERATING LICENSE REGARDING TECHNICAL SPECIFICATION RESPONSE TIME TESTING

Attachment 1
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Background:

This proposed change would modify the Technical Specifications response time testing requirements for selected instruments. Specifically, the response time testing requirements to be eliminated include sensors and specified loop instrumentation for Reactor Protection System (RPS), Primary Containment Isolation Actuation, and Emergency Core Cooling System (ECCS). An analysis has been performed demonstrating that other periodic tests required by Technical Specifications, such as channel calibrations, channel checks, channel functional tests, and logic system functional tests provide adequate assurance that instrument responses are within acceptance limits. The Reference 1 evaluation concludes that response time tests are of no safety significance, cause unnecessary personnel exposure, reduce availability of safety systems during shutdown, and are a significant burden to utility resource.

Basis:

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 tests."

The Reference 1 generic analysis provides the basis for eliminating selected response time testing requirements. The analysis was performed for two representative BWRs, and its applicability to WNP-2 has been verified by the Supply System. The list of affected instrument loop components is provided in Table 1 of this attachment.

The analysis 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 detection method. 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 these analyses demonstrate that other Technical Specification testing requirements (channel calibration, channel checks, channel function test, and logic system functional test).

In conjunction with actions taken in response to NRC Bulletin 90-01, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount," and Supplement 1, are normally sufficient to identify failure modes or degradations in instrument response time and assure operation of the analyzed instrument loops within acceptable limits. Furthermore, all known failure modes that are detected by response time testing are also detected by other Technical Specification tests.

REQUEST FOR AMENDMENT TO OPERATING LICENSE REGARDING TECHNICAL SPECIFICATION RESPONSE TIME TESTING

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The Supply System has updated WNP-2 test procedures to direct that the instrument technicians evaluate response time delays in instrumentation. A Reference 1 survey has concluded that changes in instrument response time delays from instantaneous up to five seconds can be reasonably detected by instrument technicians. The primary basis for implementation of the Reference 1 methodology is that the qualitative response time, in conjunction with normal instrument loop calibrations and other logic and system functional tests required by Technical Specifications, ensure that the safety system actuations required by the Safety Analysis are unchanged. 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 Reference 1 evaluations demonstrate that response time testing can be eliminated for the following:

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

In addition to application of Reference 1 recommendations, the Supply System addressed the following requirements from Reference 1:

- (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 RTT shall be performed to determine an initial sensor-specific response time value:

WNP-2 work processes have been revised to ensure appropriate response time testing is performed prior to installation.

- (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.

WNP-2 does not use transmitters or switches that use capillary tubes in applications that require response time testing. Future use of instrumentation using capillary tubes for selected instrument application will be restricted. Therefore, this recommendation is not applicable to WNP-2.

REQUEST FOR AMENDMENT TO OPERATING LICENSE REGARDING TECHNICAL
SPECIFICATION RESPONSE TIME TESTING

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The NRC SER endorsement of the Reference 1 methodology states that the licensee submittals must state the following in the request.

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

Each applicable calibration procedure was revised to include steps that direct the technician to insert a fast ramp or step function that begins just outside the setpoint and continues to a value well past the setpoint.

- (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 the performance of calibrations and functional tests.

This training has been completed and applicable calibration procedures have been revised, as necessary, to assure monitoring for response time degradation.

- (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.

Applicable calibration procedures have been revised to require the technicians, at different locations, to be in direct communication to verify the response of the instrumentation or associated logic.

- (d) That 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 90-01, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount."

Compliance with the guidelines of Supplement 1 to the NRC Bulletin 90-01 was reviewed and documented in Reference 4. The Reference 4 evaluation concluded that the Supply System's responses to 90-01 and Supplement 1 conform to the requested actions of NRC Bulletin 90-01 Supplement 1.

- (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.

The Supply System has reviewed the vendor information for the Reference 1, Table 1 components and confirmed that none of the manufacturers require periodic response time testing for their instrumentation or logic components.

REQUEST FOR AMENDMENT TO OPERATING LICENSE REGARDING TECHNICAL SPECIFICATION RESPONSE TIME TESTING

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WNP-2 specific evaluations demonstrate that response time testing may also be eliminated for the following:

- 1) Four (4) Reactor Core Isolation Cooling pressure switches, Barksdale model P1H-M340SS-V; and
- 2) Auxiliary relays, manufactured by ASEA (now ABB), model RXMK1 for reactor building ventilation exhaust.

This model of Barksdale pressure switch was not evaluated in the Reference 1 analysis. The RCIC pressure switches are safety-related, Quality Class I and provide highly reliable operation. These switches function to isolate the system when reactor pressure has been reduced to the point where it can no longer support RCIC turbine operation and to provide long term secondary containment leakage control. These pressure switches are not credited within any WNP-2 accident analysis. The equipment actuated by these pressure switches are motor operated valves which similarly have no specified required accident mitigation operating closure time limits. Therefore, a specific pressure switch response time is not necessary to maintain the results of the current accident analysis. These pressure switches are routinely tested as part of channel calibration, channel functional tests, and logic system functional tests.

The ASEA relay model has a secondary containment isolation function in the reactor building ventilation exhaust. Only ASEA relay model RXMH2 was evaluated and approved by the Reference 1 analysis. The model RXMK1 is of the same model series as the RXMH2 which was evaluated by the Reference 1 analysis. Manufacturer's data indicates that the model RXMK1 is a faster operating relay than the RXMH2 relay as identified by pick-up and drop out times. The RXMK1 is approximately a half-size model of the RXMH2 and accordingly houses half the contacts and contains half the case mass. The manufacturer's relay parts list indicates that both models use numerous identical parts. A review of the manufacturer's component inspection procedures indicate identical or consistent relay inspections and/or testing practices for both models.

The seismic qualification envelopes both models with the same test. Both passed the minimum contact chatter tests. The two models have been environmentally qualified by separate tests.

A review of NPRDS data indicates no reported failures of the RXMK1 relay type. One failure of the NRC approved model RXMH2 was reported at one of the Turkey Point plants. This failure resulted from a displaced contact. This failure mode is possible with the RXMK1. However, a review of WNP-2 operating experience data indicates no reported failures of the E-RLY-CRAX, CRAY, CRBX, or CRBY relays (Model RXMK1 relays). The low failure rate, coupled with other surveillances, provide assurance of continued functionality.

Elimination of the RTT for these components is consistent with the analysis and review scope of the Reference 1 analysis.

REQUEST FOR AMENDMENT TO OPERATING LICENSE REGARDING TECHNICAL
SPECIFICATION RESPONSE TIME TESTING

Attachment 1
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References:

1. GE Nuclear Energy, BWR Owners' Group Licensing Topical Report, NEDO-32291-A, "System Analysis for the Elimination of Selected Response Time Testing Requirements," October, 1995.
2. EPRI, Report No. NP-72-43, "Investigation of Response Time Testing Requirements," May 1991.
3. Letter GO2-90-125, GC Sorensen (SS) to NRC "Response to NRC Bulletin 90-01: Loss of Fill-Oil in Transmitters Manufactured," dated July 12, 1990.
4. Letter JW Clifford (NRC) to JV Parrish, Response to NRC Bulletin 90-01, Supplement 1, "Loss of Fill-Oil in Transmitters Manufactured," dated August 3, 1994.

TABLE 1
LPCS/RHR C INSTRUMENTATION

LPCS AND RHR A (LPCI)				
DESCRIPTION	FUNCTION	DEVICE EPN	MFG	MODEL
Interfacing Relay and Initiation Relay	Energizes relays LPCS-RLY-K12, LPCS-RLY-K13, & LPCS-RLY-K14. Auto closes LPCS-V-12 on initiation.	LPCS-RLY-K10	GE	HFA
Interfacing Relay	Energizes relays RHR-RLY-K98A, K9A, K109A, K94A, & K109AX.	LPCS-RLY-K11	GE	HFA
Initiation Relay	Starts LPCS-P-1.	LPCS-RLY-K12	GE	HMA
Initiation Relay	LPCS-P-1 Manual Start	LPCS-RLY-K13	GE	HMA
Initiation Relay	Opens injection valve LPCS-V-5.	LPCS-RLY-K14	GE	HMA
Interfacing Relay	Energizes relays LPCS-RLY-K10, & LPCS-RLY-K11.	LPCS-RLY-K2	GE	HFA
Interfacing Relay	Energizes relays LPCS-RLY-K10, & LPCS-RLY-K11.	LPCS-RLY-K3	GE	HFA
Interfacing Relay	Energizes relays LPCS-RLY-K10, LPCS-RLY-K11, & RHR-RLY-K58A.	LPCS-RLY-K4	GE	HFA
Interfacing Relay	Energizes relays LPCS-RLY-K10, LPCS-RLY-K11, & RHR-RLY-K58A.	LPCS-RLY-K5	GE	HFA
Differential Pressure Switch	Energizes relay LPCS-RLY-K2 on RPV level signal.	MS-LIS-37A	BARTON	288
Differential Pressure Switch	Energizes relay LPCS-RLY-K3 on RPV level signal.	MS-LIS-37C	BARTON	288
Pressure Switch	Energizes relay LPCS-RLY-K4 on high drywell pressure.	MS-PS-48A	SOR	12N-AA5
Pressure Switch	Energizes relay LPCS-RLY-K5 on high drywell pressure.	MS-PS-48C	SOR	12N-AA5
Initiation Relay	Close RHR-V-53A, shutdown cooling return valve.	RHR-RLY-K103A	GE	HMA
Spare Relay	Spare	RHR-RLY-K103AX	GE	HMA
Initiation Relay	RHR-V-27A closes on LPCI initiation.	RHR-RLY-K108A	GE	HFA
Interfacing Relay and Initiation Relay	RHR initiation closes RHR-V-24A & 27A. Input to RHR-RLY-K59A & K108A in RHR-V-24A & 27A open logic.	RHR-RLY-K109A	GE	HFA
Spare Relay	Spare	RHR-RLY-K109AX	GE	HMA
Initiation Relay	Close RHR-V-53B, shutdown cooling return valve.	RHR-RLY-K121	GE	HFA
Initiation Relay	Starts RHR-P-2A.	RHR-RLY-K18A	GE	HMA
Initiation Relay	RHR-V-42A injection valve auto open.	RHR-RLY-K23A	GE	HMA
Initiation Relay	RHR-V-42A injection valve lockout.	RHR-RLY-K24A	GE	HMA
Initiation Relay	RHR-P-2A control.	RHR-RLY-K28A	GE	HMA
Initiation Relay	Permissive open logic for RHR-V-16A & 17A.	RHR-RLY-K58A	GE	HMA
Initiation Relay	RHR-V-24A closes on LPCI initiation.	RHR-RLY-K59A	GE	HFA
Interfacing Relay and Initiation Relay	Energizes RHR-RLY-K18A after a 5 second time delay with logic satisfied.	RHR-RLY-K70A	AGASTAT	ETR
Interfacing Relay	Energizes RHR-RLY-K95A, K121, K103, & K103AX after a 600 second time delay with logic satisfied.	RHR-RLY-K93A	AGASTAT	7012
Interfacing Relay	Containment spray logic. RHR-RLY-K58A.	RHR-RLY-K94A	GE	HFA
Initiation Relay	Open logic for RHR-V-48A, Hx shell side bypass.	RHR-RLY-K95A	GE	HMA
Initiation Relay	Start DG 1.	RHR-RLY-K98A	GE	HFA

TABLE 1
LPCS/RHR C INSTRUMENTATION

Interfacing Relay	Energizes relays RHR-RLY-K93A, K95A, K70A, K18A, K28A, K23A, & K24A.	RHR-RLY-K9A	GE	HFA
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TABLE 1
RHR B/C INSTRUMENTATION

RHR B & C (LPCI)				
DESCRIPTION	FUNCTION	DEVICE EPN	MFG	MODEL
Differential Pressure Switch	Energizes relay RHR-RLY-K7 on RPV level signal.	MS-LIS-37B	BARTON	288
Differential Pressure Switch	Energizes relay RHR-RLY-K8 on RPV level signal.	MS-LIS-37D	BARTON	288
Pressure Switch	Energizes relay RHR-RLY-K5 on high drywell pressure.	MS-PS-48B	SOR	12N-AA5
Pressure Switch	Energizes relay RHR-RLY-K6 on high drywell pressure.	MS-PS-48D	SOR	12N-AA5
Initiation Relay	RHR-V-21 closes on LPCI initiation.	RHR-RLY-K102	GE	HFA
Initiation Relay	RHR-V-27B closes on LPCI initiation.	RHR-RLY-K108B	GE	HFA
Interfacing Relay and Initiation Relay	RHR initiation closes RHR-V-24B & 27B. Input to RHR-RLY-K59B & K108B in RHR-V-24B & 27B open logic.	RHR-RLY-K109B	GE	HFA
Initiation Relay	Starts RHR-P-2B.	RHR-RLY-K18B	GE	HMA
Initiation Relay	Starts RHR-P-2C.	RHR-RLY-K21	GE	HMA
Initiation Relay	RHR-V-42B injection valve auto open.	RHR-RLY-K23B	GE	HMA
Initiation Relay	RHR-V-42B injection valve lockout.	RHR-RLY-K24B	GE	HMA
Initiation Relay	RHR-V-42C injection valve auto open.	RHR-RLY-K25	GE	HMA
Initiation Relay	RHR-V-42C injection valve lockout.	RHR-RLY-K26	GE	HMA
Initiation Relay	RHR-P-2C control.	RHR-RLY-K27	GE	HMA
Initiation Relay	RHR-P-2B control.	RHR-RLY-K28B	GE	HMA
Interfacing Relay	Energizes relays RHR-RLY-K58B, K98B, K9B, K109B, K94B & K102	RHR-RLY-K5	GE	HFA
Initiation Relay	Permissive open logic for RHR-V-16B & 17B.	RHR-RLY-K58B	GE	HMA
Initiation Relay	RHR-V-24B closes on LPCI initiation.	RHR-RLY-K59B	GE	HFA
Interfacing Relay	Energizes relays RHR-RLY-K58B, K98B, K9B, K109B, K94B & K102	RHR-RLY-K6	GE	HFA
Interfacing Relay	Energizes relays RHR-RLY-K98B, K9B, K109B, K94B, & K102.	RHR-RLY-K7	GE	HFA
Interfacing Relay and Initiation Relay	Energizes RHR-RLY-K18B after a 5 second time delay with logic satisfied.	RHR-RLY-K70B	AGASTAT	ETR
Interfacing Relay	Energizes relays RHR-RLY-K98B, K9B, K109B, K94B, & K102.	RHR-RLY-K8	GE	HFA
Interfacing Relay	Energizes RHR-RLY-K95B after a 600 second time delay with logic satisfied.	RHR-RLY-K93B	AGASTAT	7012
Interfacing Relay	Relay logic RHR-RLY-K21, K27, K23B, K24B, K25, K26, & K58B.	RHR-RLY-K94B	GE	HFA
Initiation Relay	Open logic for RHR-V-48B. Hx shell side bypass.	RHR-RLY-K95B	GE	HMA
Initiation Relay	Start DG 2.	RHR-RLY-K98B	GE	HFA
Interfacing Relay	Energizes relays RHR-RLY-K93B, K95B, K70B, K18B, K28B, K98B, K9B, K109B, K94B, & K102B.	RHR-RLY-K9B	GE	HFA

TABLE 1
HPCS INSTRUMENTATION

DESCRIPTION	HPCS FUNCTION	DEVICE EPN	MFG	MODEL
Level Indicating Switch	Senses RPV Level; signal to HPCS-RLY-K7, K8, K17, and K18	MS-LIS-21A-D	BARTON	288A
Interfacing Relays	Energize relays HPCS-RLY-K3, K9, K38, and K35 to initiate system start	HPCS-RLY-K7, K8, K17, and K18	GE	IHFA
Pressure Switch	Senses Drywell pressure; signal to HPCS-RLY-K5, K6, K15, and K16	MS-PS-47A-D	SOR	Press Switch
Interfacing Relays	Energize relay HPCS-RLY-K24	HPCS-RLY-K5, K6, K15, and K16	GE	IHFA
Interfacing Relay	Energize relays HPCS-RLY-K3, K9, K38, and K39	HPCS-RLY-K24	GE	IHMA
Initiation Relay	IStarts: DG Closes: F010, F023, E22BK14	HPCS-RLY-K3	GE	IHFA
Initiation Relay	IOpens: F001, F004 Closes: F011	HPCS-RLY-K9	GE	IHFA
Initiation Relay	IStarts: HPCS-P1	E22BK14	GE	IHMA

TABLE 1
SECONDARY CONTAINMENT INSTRUMENTATION CH A

Secondary Containment Isol CH "A"				
DESCRIPTION	FUNCTION	DEVICE EPN	IMFG	MODEL
Exhaust air plenum radiation detector reactor bldg.	Monitor radiation level in Reactor Bldg. exhaust plenum, initiate HVAC Isolation for detection of HI Radiation or downscale condition. Analog signal to REA-RIS-609A	REA-RE-9A MPL-D17-N009A	GE Nuclear	194X927G11
Reactor Bldg. Exhaust Plenum Radiation monitor Indicator and trip unit	Trips at preset level (open) to de-energize output relay E-RLY CRAX to generate Z isolation signal	REA-RIS-609A MPL-D17-K609A	GE Nuclear	129B2802G11
Containment Isolation Relay	De-energizes the following relays to initiate FAZ signal: E-RLY-CR1AX, E-RLY-CR3AX, E-RLY-CR4AX, E-RLY-CR5AX, E-RLY-CR6AX, E-RLY-CR7AX, E-RLY-CR2AX.	E-RLY-CRAX	ASEA ELEC INC	RXMKI
FAZ Isolation Relay	Isolation signal	E-RLY-CR1AX	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR3AX	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR4AX	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR5AX	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR6AX	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR7AX	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR2AX	ASEA ELEC INC	RXXMH2

TABLE 1
SECONDARY CONTAINMENT INSTRUMENTATION

Secondary Containment Isol CH "B"				
DESCRIPTION	FUNCTION	DEVICE EPN	MFG	MODEL
Exhaust air plenum radiation detector reactor bldg.	Monitor radiation level in Reactor Bldg. exhaust plenum, Initiate HVAC isolation for detection of HI Radiation or downscale condition. Analog signal to REA-RIS-609B	REA-RE-98	GE Nuclear	194X927G11
Reactor Bldg. Exhaust Plenum Radiation monitor Indicator and trip unit	Trips at preset level (open) to de-energize output relay E-RLY-CRAY to generate Z isolation signal	REA-RIS-609B MPL-D17-N009B	GE Nuclear	129B2802G11
Containment Isolation Relay	De-energizes the following relays to initiate FAZ signal: E-RLY-CR1AY, E-RLY-CR3AY, E-RLY-CR4AY, E-RLY-CR5AY, E-RLY-CR6AY, E-RLY-CR7AY, E-RLY-CR2AY.	E-RLY-CRAY	ASEA ELEC INC	RXMK1
FAZ Isolation Relay	Isolation signal	E-RLY-CR1AY	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR3AY	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR4AY	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR5AY	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR6AY	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR7AY	ASEA ELEC INC	RXXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR2AY	ASEA ELEC INC	RXXMH2

TABLE 1
SECONDARY CONTAINMENT INSTRUMENTATION CH C

Secondary Containment Isol CH "C"				
DESCRIPTION	FUNCTION	DEVICE EPN	IMFG	MODEL
Exhaust air plenum radiation detector reactor bldg.	Monitor radiation level in Reactor Bldg. exhaust plenum, initiate HVAC isolation for detection of HI Radiation or downscale condition. Analog signal to REA-RIS-609C	REA-RE-9C MPL-D17-N009C	GE Nuclear	194X927G11
Reactor Bldg. Exhaust Plenum Radiation monitor Indicator and trip unit	Trips at preset level (open) to de-energize output relay E-RLY CRBX to generate Z isolation signal	REA-RIS-609C MPL-D17-K609C	GE Nuclear	12982802G11
Containment Isolation Relay	De-energizes the following relays to initiate FAZ signal: E-RLY-CR1BX, E-RLY-CR3BX, E-RLY-CR4BX, E-RLY-CR5BX, E-RLY-CR6BX, E-RLY-CR7BX, E-RLY-CR2BX.	E-RLY-CR8X	ASEA ELEC INC	RXMK1
FAZ Isolation Relay	Isolation signal	E-RLY-CR1BX	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR3BX	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR4BX	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR5BX	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR6BX	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR7BX	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR2BX	ASEA ELEC INC	RXMH2

TABLE 1
SECONDARY CONTAINMENT INSTRUMENTATION

Secondary Containment Isol CH "D"				
DESCRIPTION	FUNCTION	DEVICE EPN	MFG	MODEL
Exhaust air plenum radiation detector reactor bldg.	Monitor radiation level in Reactor Bldg. exhaust plenum, initiate HVAC isolation for detection of HI Radiation or downscale condition. Analog signal to REA-RIS-609D	REA-RE-9D MPL-D17-N009D	GE Nuclear	194X927G11
Reactor Bldg. Exhaust Plenum Radiation monitor Indicator and trip unit	Trips at preset level (open) to de-energize output relay E-RLY CRBY to generate Z isolation signal	REA-RIS-609D MPL-D17-K609D	GE Nuclear	129B2802G11
Containment Isolation Relay	De-energizes the following relays to initiate FAZ signal: E-RLY-CR1BY, E-RLY-CR3BY, E-RLY-CR4BY, E-RLY-CR5BY, E-RLY-CR6BY, E-RLY-CR7BY, E-RLY-CR2BY.	E-RLY-CRBY	ASEA ELEC INC	RXMK1
FAZ Isolation Relay	Isolation signal	E-RLY-CR1BY	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR3BY	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR4BY	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR5BY	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR6BY	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR7BY	ASEA ELEC INC	RXMH2
FAZ Isolation Relay	Isolation signal	E-RLY-CR2BY	ASEA ELEC INC	RXMH2

TABLE 1
RWCU A INSTRUMENTATION

RWCU "A" ISOLATION				
DESCRIPTION	FUNCTION	DEVICE EPN	MFG	MODEL
Flow Switch	RWCU High Differential Flow	LD-FS-605A	Bailey Inst	745110AAAEI
Timer	RWCU Isolation Timer	LD-TM-621A E31-R621A	Eagle Signal	HP52A6
Relay	RWCU Isolation Relay	LD-RLY-K05A E31A-K05A	GE Nuclear	12HMA24AIF
Relay	RWCU Power Failure	LD-RLY-K07A E31A-K07A	GE Nuclear	12HMA124A9
Relay	Reset Circuit, Isolation Valves	MS-RLY-K12 B22H-K12	Amerace Elect Comp	EGPI-002
Relay	RWCU-V-4 Isolation Control	MS-RLY-K27 B22H-K27	GE Nuclear	12HFA151A9 F
Relay	Actuation Relay	SLC-RLY-KLA C41A-K6A	AGASTAT Amerace	EGPI-003
Relay	RWCU Isolation Relay	LD-RLY-K07A E31A-K07A	GE Nuclear	12HMA124A9
Relay	Time Delay Relay RWCU System Isolation	LD-RLY-K01A E31A-K01A	Amerace Elect.	ETR14I3CA2 004002
Flow Switch	High Flow Switch, RWCU Blowdown to Condenser	LD-FS-15	Bailey Inst.	745112AAAA 2
Relay	Reactor LO-LO WTR. Level	MS-RLY-K1B B22H-K1B	GE Nuclear	12HFA151A9 F
Relay	Reactor LO-LO WTR. Level	MS-RLY-K1A B22H-K1A	GE Nuclear	12HFA151A9 F
Relay	Main Steam Isolation Initiation	MS-RLY-K35B B22H-K35B	GE Nuclear	12HFA151A9 F

TABLE 1
RWCU A INSTRUMENTATION

RWCU A FLOW HI FT-41				
DESCRIPTION	FUNCTION	DEVICE EPN	IMFG	MODEL
Differential Pressure Transmitter	Converts Differential Pressure to an electrical signal for processing by square root extractor RWCU-SQRT-603 via signal resistor unit LD-SRU-1 for scaling	RWCU-FT-41 E31-N041	Rosemount	1153DB5PA
Square Root Extractor	Converts electrical signal proportional to differential pressure from RWCU-FT-41 to electrical flow signal output to Leak Detection Summer LD-Sum-604	RWCU-SQRT-603 E31-K603	Bailey	750010AAAE1
Summer	Leak Detection Flow Summer.	LD-SUM-604 E31 K604	Bailey	752410AAAE1
Flow Switch	RWCU high differential flow, div. 1 isolation.	LD-FS-605A E31-N605A	Bailey	745110AAAE1
Flow Switch	RWCU high differential flow, div. 2 isolation.	LD-FS-605B E31-N605B	Bailey	745110AAAE1
Differential Pressure Transmitter	Converts Differential Pressure to an electrical signal for processing by square root extractor RWCU-SQRT-602	RWCU-FT-36 E31-N036	Rosemount	1153DB5PA
Square Root Extractor	Converts electrical signal proportional to differential pressure from RWCU-FT-36 to electrical flow signal output of Leak Detection Summer LD-Sum-604	RWCU-SQRT-602 E31-K602	Bailey	750010AAAE1
Flow Element	Differential Pressure to Flow Transmitter RWCU-FT-15	RWCU-FE-11 G33 N011	Vickery Simms	HTK51292
Differential Pressure Transmitter	Converts Differential Pressure to an electrical signal for processing by square root extractor RWCU-SQRT-605	RWCU-FT-15 E31-N015	Rosemount	1153DB5PA
Square Root Extractor	Converts electrical signal proportional to differential pressure from RWCU-FT-15 to electrical flow signal output of Leak Detection Summer LD-Sum-604	RWCU-SQRT-605 E31-K605	Bailey	750010AAAE1

TABLE 1
RWCU B INSTRUMENTATION

RWCU "B" ISOLATION				
DESCRIPTION	FUNCTION	DEVICE EPN	IMFG	MODEL
TIMER	RWCU isolation timer	LD-TM-621B	Eagle Signal	HP52A6
		E31-621B		
RELAY	RWCU isolation relay	LD-RLY-K07B	GE	12HMA124A9
		E31A-K07B		
RELAY	Reset circuit, isolation valves	MS-RLY-K07B	AGASTAT	EG-PI-002
		E31A-K07B		
RELAY	RWCU-V-1 isolation control	MS-RLY-K11	GE	12HFA151A9 F
		B22H-K11		
RELAY	Time delay relay for RWCU isolation	LD-RLY-K01B	AGASTAT	ETR14ISC200 4002
		E31A-K01B		
FLOW SWITCH	High flow switch, RWCU blowdown to condenser	LD-FS-16	Bailey Inst	745112AAAA2
MANUAL SWITCH	RWCU isolation	MS-RMS-S21D	GE	CR2940
		B22H-S21D		
MANUAL SWITCH	RWCU isolation	MS-RMS-S21C	GE	CR2940
		B22H-S21C		
RELAY	Reactor LO-LO water level	MS-RLY-K1D	GE	12HFA151A9 F
		B22H-K1D		
RELAY	Main steam isolation	MS-RLY-K35D	GE	12HFA151A9 F
		B22H-K35D		
RELAY	RWCU-V-1 isolation control	MS-RLY-K26	GE	12HFA151A9 F
		B22H-K26		

TABLE 1
RPS/PCI/RCIC
INSTRUMENTATION

DESCRIPTION	RCIC/Pri Cont Isol/RPS FUNCTION	DEVICE EPN	IMFG	MODEL
Level Switch	Senses, RPV level, opens on low level, de-energizes C72-K6A	B22-N024A	BARTON	288A
Level Switch	Senses, RPV level, opens on low level, de-energizes C72-K6B	B22-N024B	BARTON	288A
Interfacing Relay	Opens to De-energize B22-K84, K18, K54	C72A-K6B	GE	12HFA151A9F
Interfacing Relay	Opens to De-energize B22-K84, K18, K55	C72A-K6A	GE	12HFA151A9F
Interfacing Relay	Opens to De-energize B22-K85 (seal in), K30	B22-K54	Agastat	EGPI003
Initiating Relay	De-energizes to close E12-F008 (SDC suction isolation), E12-F023 (RPV head spray isolation), energizes RHR-RLY-K121 and RHR-RLY-K103A	B22-K30	GE	12HFA151A9F
Interfacing Relay	Opens to de-energize E12-K22	B22-K84	GE	12HFA151A9F
Interfacing Relay	De-energizes to close E12-F040 (discharges to Radwaste) and energizes B22-K40	B22H-K18	GE	12HFA151A9F
Initiating Relay	Closes sample valve F075B	B22H-K22	Agastat	EGPI003
Initiating Relay	Energizes to close Loop B SDC return valve F053B	E12-K121	GE	IHMA
Initiating Relay	Energizes to close Loop A SDC return valve F053A	E12-K103A	GE	12HMA24A2F
Interfacing Relay	Opens to de-energize B22-K20	B22-K40	Agastat	EGPIC2004002
Initiating Relay	Closes sample line valve F075A	B22-K20	Agastat	EGPI003
Level Switch	Senses RPV level, senses reactor vessel level and controls trip channel relay	B22-N024C	BARTON	288A
Level Switch	Senses RPV level, senses reactor vessel level and controls trip channel relay	B22-N024D	BARTON	288A
Interfacing Relay	Opens to de-energize B22-K17, K53, K66, K82	C72A-K6C	GE	12HFA151A9F
Interfacing Relay	Opens to de-energize B22-K17, K53, K66, K83	C72A-K6D	GE	12HFA151A9F
Interfacing Relay	Opens to de-energize B22-K29	B22-K53	Agastat	EGPI003
Initiating Relay	Closes E12-F009 (SDC Suction Isolation)	B22-K29	GE	12HFA151A9F
Initiating Relay	Closes E12-F049 (discharge to Radwaste Isolation Valve), close E12-F099B (SDC return testable check valve)	B22-K17	GE	12HFA151A9F
Interfacing Relay	Opens to de-energize B22-K19	B22-K39	Agastat	EGPIC2004002
Initiating Relay	Closes sample line valve F060A	B22-K19	Agastat	EGPI003
Interfacing Relay	Closes to energize B22-K41	B22-K83	GE	12HFA151A9F
Interfacing Relay	Opens to de-energize B22-K21	B22-K41	Agastat	EGPIC003
Initiating Relay	Closes sample line valve F060B	B22-K21	Agastat	EGPI003
Initiating Relay	Close E12-F099 (SDC return testable check valve)	B22-K66	Agastat	EGPI003
RHR/RCIC Steam Line High Flow Switch	closes on high flow	E31-N007B	BARTON	288A
Interfacing Relay	Energizes to activate	E51A-K32	GE	12HMA24A2F
Initiating Relay	Energize to close E51-F063, E51-F076	E51A-K33	GE	12HFA151A2F
Steam Line high flow switch	closes on steam line high flow	RCIC-OPIS-N013A	BARTON	288A
Interfacing time delay relay	energize to P/U K15 after 2 seconds	E51A-K47	AGASTAT	ETR14D3BC20 04002
Initiating Relay	RCIC div 1 isolation, energize to close E51-F008	E51A-K15	GE	HFA151A2F
Steam Line high flow switch	closes on high differential pressure	RCIC-OPIS-N013B	BARTON	288A
Interfacing Relay	time delay relay to energize K33, 10 sec	E51A-K48	Agastat	ETR14D3BC20 04002
Initiation Relay	RCIC div 2 isolation signal, closes E51-F063, RCIC steam supply	E51A-K33	GE	12HFA151A2F
RCIC steam supply pressure	closes on low steam supply pressure	RCIC-PS-22A	Barksdale	P1H-M340SS-V
Interfacing relay	closes to energize relay E51-K15, E51-K62	E51A-K56	GE	12HFA151A2F
Initiating relay	RCIC div 1 isolation, energize to close E51-F008	E51A-K15	GE	12HFA151A2F
Initiating relay	closes vacuum breaker isolation valve E51-F080	E51A-K62	GE	12HMA24A1F
RCIC steam supply pressure	closes on low steam supply pressure	RCIC-PS-22B	Barksdale	P1H-M340SS-V

TABLE 1
RPS/PC/RCIC
INSTRUMENTATION

Interfacing relay	closes to energize relay E51-K33, E51-K66	E51A-K54	GE	12HFA151A2F
Initiating relay	RCIC div 2 isolation, energize to close E51-F063, RCIC steam supply	E51A-K33	GE	12HFA151A2F
Initiating relay	closes vacuum breaker isolation valve E51-F086	E51A-K66	GE	12HMA24A2F
RCIC steam supply pressure	closes on low steam supply pressure	RCIC-PS-22C	Barksdale	P1H-M340SS-V
Interfacing relay	closes to energize relay E51-K15, E51-K62	E51A-K57	GE	12HFA151A2F
Initiating relay	RCIC div 1 isolation, energize to close E51-F008	E51A-K15	GE	12HFA151A2F
Initiating relay	closes vacuum breaker isolation valve E51-F080	E51A-K62	GE	12HMA24A1F
RCIC Steam supply pressure	closes on low steam supply pressure	RCIC-PS-22D	Barksdale	P1H-M340SS-V
Interfacing relay	closes to energize relay E51-K33, E51-K66	E51A-K55	GE	12HFA151A2F
Initiation relay	RCIC div 2 isolation signal, to closes E51-F063, RCIC steam supply	E51A-K33	GE	12HFA151A2F
Initiation relay	closes vacuum breaker isolation valve E51-F086	E51A-K66	GE	12HMA24A2F
RPS				
Pressure Switch	Opens on primary containment high pressure	RPS-PS-2A	SOR	12N-AA4-X10TT
Reactor Vessel Steam Dome Pressure	Opens on reactor vessel high pressure	MS-PS-23A	Static O'ring	29-N6-845-NX-JJTTX12
Reactor Vessel Water Level - Level 3	Opens on reactor vessel low water level - level 3	MS-LIS-24A	Barton	288A
Trip Relay	De-energized from RPS-PS-2A	RPS-RLY-K4A (C72-K4A)	GE	HFA
Trip Relay	De-energized from MS-PS-23A	RPS-RLY-K5A (C72-K5A)	GE	12HFA151A9F
Trip Relay	De-energized from MS-LIS-24A	RPS-RLY-K6A (C72-K6A)	GE	12HFA151A9F
Interfacing Relay	De-energized by RPS-RLY-K4A, -K5A, or -K6A	RPS-RLY-K14A (C72-K14A)	GE	CR 305D022AAR
Interfacing Relay	De-energized by RPS-RLY-K4A, -K5A, or -K6A	RPS-RLY-K14E (C72-K14E)	GE	CR 305D022AAR
Pressure Switch	Opens on primary containment high pressure	RPS-PS-2B	SOR	12N-AA4-X10TT
Reactor Vessel Steam Dome Pressure	Opens on reactor vessel high pressure	MS-PS-23B	Static O'ring	29-N6-845-NX-JJTTX12
Reactor Vessel Water Level - Level 3	Opens on reactor vessel low water level - level 3	MS-LIS-24B	Barton	288A
Trip Relay	De-energized from RPS-PS-2B	RPS-RLY-K4B (C72-K4B)	GE	HFA
Trip Relay	De-energized from MS-PS-23B	RPS-RLY-K5B (C72-K5B)	GE	12HFA151A9F
Trip Relay	De-energized from MS-LIS-24B	RPS-RLY-K6B (C72-K6B)	GE	12HFA151A9F
Interfacing Relay	De-energized by RPS-RLY-K4B, -K5B, or -K6B	RPS-RLY-K14B (C72-K14B)	GE	CR 305D022AAR
Interfacing Relay	De-energized by RPS-RLY-K4B, -K5B, or -K6B	RPS-RLY-K14F (C72-K14F)	GE	CR 305D022AAR
Pressure Switch	Opens on primary containment high pressure	RPS-PS-2C	SOR	12N-AA4-X10TT
Reactor Vessel Steam Dome Pressure	Opens on reactor vessel high pressure	MS-PS-23C	Static O'ring	29-N6-845-NX-JJTTX12
Reactor Vessel Water Level - Level 3	Opens on reactor vessel low water level - level 3	MS-LIS-24C	Barton	288A
Trip Relay	De-energized from RPS-PS-2C	RPS-RLY-K4C (C72-K4C)	GE	HFA
Trip Relay	De-energized from MS-PS-23C	RPS-RLY-K5C (C72-K5C)	GE	12HFA151A9F

TABLE 1
RPS/PCV/RCIC
INSTRUMENTATION

Trip Relay	De-energized from MS-LIS-24C	RPS-RLY-K6C (C72-K6C)	GE	12HFA151A9F
Interfacing Relay	De-energized by RPS-RLY-K4C, -K5C, or -K6C	RPS-RLY-K14C (C72-K14C)	GE	CR 305D022AAR
Interfacing Relay	De-energized by RPS-RLY-K4C, -K5C, or -K6C	RPS-RLY-K14G (C72-K14G)	GE	CR 305D022AAR
Pressure Switch	Opens on primary containment high pressure	RPS-PS-2D	SOR	12N-AA4- X10TT
Reactor Vessel Steam Dome Pressure	Opens on reactor vessel high pressure	MS-PS-23D	Static O'ring	29-N6-B45-NX- JJTTX12
Reactor Vessel Water Level - Level 3	Opens on reactor vessel low water level - level 3	MS-LIS-24D	Barton	288A
Trip Relay	De-energized from RPS-PS-2D	RPS-RLY-K4D (C72-K4D)	GE	HFA
Trip Relay	De-energized from MS-PS-23D	RPS-RLY-K5D (C72-K5D)	GE	12HFA151A9F
Trip Relay	De-energized from MS-LIS-24D	RPS-RLY-K6D (C72-K6D)	GE	12HFA151A9F
Interfacing Relay	De-energized by RPS-RLY-K4D, -K5D, or -K6D	RPS-RLY-K14D (C72-K14D)	GE	CR 305D022AAR
Interfacing Relay	De-energized by RPS-RLY-K4D, -K5D, or -K6D	RPS-RLY-K14H (C72-K14H)	GE	CR 305D022AAR

TABLE 1
PRIMARY CONTAINMENT
INSTRUMENTATION

Primary Containment Isol., Reactor level 2				
DESCRIPTION	FUNCTION	DEVICE EPN	IMFG	MODEL
Level Switch	Differential pressure Level Switch...senses Reactor low water level (Level 2)	MS-LS-61A (B22H-N061A)	SOR	103AS-8B203 NX-JJTTX6
Trip Relay	De-energized from MS-LS-61A (contact 2C-2NC)	MS-RLY-K1A (B22H-K1A)	G.E.	HFA Relay
Trip Relay	De-energized from MS-LS-61A (contact 1C-1NC) or RPS-PS-2A (SW2)	MS-RLY-K104 (B22H-K104)	Agastat	EGP Relay
Interfacing Relays	De-energized from relay MS-RLY-K104 to provide Isolation functions in various Plant systems (evaluated elsewhere).	E-RLY-CR1AX through -CR13AX	ASEA	RXMH2, RXMK1 Relays
Pressure Switch	Main Steam Line Pressure ...Low	MS-PS-15A	GE	HFA Relay
Interfacing Relay	De-energized from MS-PS-15A	MS-RLY-K4A	GE	HFA Relay
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-8A	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-9A	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-810A	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-11A	Barton	288A
Interfacing Relay	De-energized from MS-DPIS-8A, 9A, 810A, or 11A	MS-RLY-K3A	GE	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K1A, -K3A, or -K4A	MS-RLY-K7A (B22H-K7A)	GE	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A or -K7C to de-energize MSIV Outboard SPV's	MS-RLY-K16 (B22H-K16)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K16 and -K52	MS-RLY-K25 (B22H-K25)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A or -K7C to de-energize MSIV Inboard SPV's	MS-RLY-K51 (B22H-K51)	G.E.	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K14 and -K51 for logic Interlock	MS-RLY-K15 (B22H-K15)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A and -K7B to auto-close MS-V-19 (B22-F019)	MS-RLY-K57 (B22H-K57)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A and -K7B to auto-close MS-V-67A & -67B (B22-F067A & -F067B)	MS-RLY-K70 (B22H-K70)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A and -K7B to auto-close MS-V-67C & -67D (B22-F067C & -F067D)	MS-RLY-K71 (B22H-K71)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1A and -K1B to auto-close RWCU-V-4 (G33-F004)	MS-RLY-K27 (B22H-K27)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K1A and -K1B	MS-RLY-K60 (B22H-K60)	G.E.	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K60 to auto-close FDR-V 4 (G11-F004)	MS-RLY-K93 (B22H-K93)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K60 to auto-close EDR-V 20 (G11-F020)	MS-RLY-K97 (B22H-K97)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1A and -K1B to remove seal-in	MS-RLY-K67 (B22H-K67)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1A and -K1B	MS-RLY-K73 (B22H-K73)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K73 to auto-close RRC-V 20 (B35-F020)	MS-RLY-K101 (B22H-K101)	Agastat	EGP Relay
Level Switch	Differential pressure Level Switch...senses Reactor low water level (Level 2)	MS-LS-61B (B22H-N061B)	SOR	103AS-8B203 NX-JJTTX6
Trip Relay	De-energized from MS-LS-61B (contact 2C-2NC)	MS-RLY-K1B (B22H-K1B)	G.E.	HFA Relay
Trip Relay	De-energized from MS-LS-61B (contact 1C-1NC) or RPS-PS-2B	MS-RLY-K106 (B22H-K106)	Agastat	EGP Relay
Interfacing Relays	De-energized from relay MS-RLY-K106 to provide Isolation functions in various Plant systems (evaluated elsewhere).	E-RLY-CR1AY through -CR13AY	ASEA	RXMH2, RXMK1 Relays

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Pressure Switch	Main Steam Line Pressure ...Low	MS-PS-15B	G.E.	HFA Relay
Interfacing Relays	De-energized from MS-PS-15B	MS-RLY-K4B	G.E.	HFA Relay
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-8B	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-9B	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-810B	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-11B	Barton	288A
Interfacing Relay	De-energized from MS-DPIS-8B, 9B, 810B, or 11B	MS-RLY-K3B	G.E.	HFA Relay
Pressure Switch	De-energized from relay MS-RLY-K1B, -K3B, or -K4B	MS-RLY-K7B (B22H-K7B)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K7B or -K7D to de-energize MSIV Inboard SPV's	MS-RLY-K14 (B22H-K14)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K14 and -K51 for logic Interlock	MS-RLY-K15 (B22H-K15)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7B or -K7D to de-energize MSIV Outboard SPV's	MS-RLY-K52 (B22H-K52)	G.E.	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K52 and -K16	MS-RLY-K25 (B22H-K25)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A and -K7B to auto-close MS-V-19 (B22-F019)	MS-RLY-K57 (B22H-K57)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A and -K7B to auto-close MS-V-67A & -67B (B22-F067A & -F067B)	MS-RLY-K70 (B22H-K70)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A and -K7B to auto-close MS-V-67C & -67D (B22-F067C & -F067D)	MS-RLY-K71 (B22H-K71)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1A and -K1B to auto-close RWCU-V-4(G33-F004)	MS-RLY-K27 (B22H-K27)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K1A and -K1B	MS-RLY-K60 (B22H-K60)	G.E.	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K60 to auto-close FDR-V 4 (G11-F004)	MS-RLY-K93 (B22H-K93)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K60 to auto-close EDR-V 20 (G11-F020)	MS-RLY-K97 (B22H-K97)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1A and -K1B to remove seal-in	MS-RLY-K67 (B22H-K67)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1A and -K1B	MS-RLY-K73 (B22H-K73)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K73 to auto-close RRC-V 20 (B35-F020)	MS-RLY-K101 (B22-K101)	Agastat	EGP Relay
Level Switch	Differential pressure Level Switch...senses Reactor low water level (Level 2)	MS-LS-61C (B22H-N061C)	SOR	103AS-8B203 NX-JJTTX6
Trip Relay	De-energized from MS-LS-61C (contact 2C-2NC)	MS-RLY-K1C (B22H-K1C)	G.E.	HFA Relay
Trip Relay	De-energized from MS-LS-61C (contact 1C-1NC) or RPS-PS-2C (SW2)	MS-RLY-K105 (B22H-K105)	Agastat	EGP Relay
Interfacing Relays	De-energized from relay MS-RLY-K105 to provide Isolation functions in various Plant systems (evaluated elsewhere).	E-RLY-CR18X through -CR13BX	ASEA	RXMH2, RXMK1 Relays
Interfacing Relays	De-energized from relay MS-RLY-K105 for Tip Withdraw and TIP-V-15 control	TIP-RLY-K108 (not listed)	Agastat	EGP Relay
Pressure Switch	Main Steam Line Pressure ...Low	MS-PS-15C	G.E.	HFA Relay
Interfacing Relay	De-energized from MS-PS-15C	MS-RLY-K4C	G.E.	HFA Relay
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-8C	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-9C	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-810C	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-DPIS-11C	Barton	288A

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Interfacing Relay	De-energized from MS-DPIS-8C, 9C, 810C, or 11C	MS-RLY-K3C (B22H-K7C)	IGE	HFA Relay
Pressure Switch	De-energized from relay MS-RLY-K1C, -K3C, or -K4C	MS-RLY-K7C (B22H-K7C)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A or -K7C to de-energize MSIV Outboard SPV's	MS-RLY-K16 (B22H-K16)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K16 and -K52 for logic Interlock	MS-RLY-K25 (B22H-K25)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7A or -K7C to de-energize MSIV Inboard SPV's	MS-RLY-K51 (B22H-K51)	G.E.	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K14 and -K51 for logic Interlock	MS-RLY-K15 (B22H-K15)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7C and -K7D to auto-close MS-V-16 (B22-F016)	MS-RLY-K56 (B22H-K56)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1C and -K1D to auto-close RWCU-V-1 (G33-F001)	MS-RLY-K26 (B22H-K26)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K1C and -K1D	MS-RLY-K59 (B22H-K59)	G.E.	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K59 to auto-close FDR-V 3 (G11-F003)	MS-RLY-K91 (B22H-K91)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K59 to auto-close EDR-V 19 (G11-F019)	MS-RLY-K95 (B22H-K95)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1C and -K1D	MS-RLY-K72 (B22H-K72)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K72 to auto-close RRC-V 19 (B35-F019)	MS-RLY-K99 (B22-K99)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1C and -K1D	MS-RLY-K82 (B22H-K82)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K82 for TIP Withdraw Command	MS-RLY-K120 (B22-K120)	Agastat	EGP Relay
Level Switch	Differential pressure Level Switch...senses Reactor low water level (Level 2)	MS-LS-61D (B22H-N061D)	SOR	103AS-8B203 NX-JJTTX6
Trip Relay	De-energized from MS-LS-61D (contact 2C-2NC)	MS-RLY-K1D (B22H-K1D)	G.E.	HFA Relay
Trip Relay	De-energized from MS-LS-61D (contact 1C-1NC) or RPS-RLY-2D (SW2)	MS-RLY-K107 (B22H-K107)	Agastat	EGP Relay
Interfacing Relays	De-energized from relay MS-RLY-K107 to provide Isolation functions in various Plant systems (evaluated elsewhere).	E-RLY-CR18Y through -CR13BY	ASEA	RXMH2, RXMK1 Relays
Interfacing Relays	De-energized from relay MS-RLY-K107 for Tip Withdraw and TIP-V-15 control	TIP-RLY-K108 (not listed)	Agastat	EGP Relay
Pressure Switch	Main Steam Line Pressure ...Low	MS-PS-15D	G.E.	HFA Relay
Interfacing Relay	De-energized from MS-PS-15D	MS-RLY-K4D	G.E.	HFA Relay
Differential Pressure Switch	Main Steam Line High Flow	MS-OPIS-8D	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-OPIS-9D	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-OPIS-810D	Barton	288A
Differential Pressure Switch	Main Steam Line High Flow	MS-OPIS-11D	Barton	288A
Interfacing Relay	De-energized from MS-OPIS-8D, 9D, 810D, or 11D	MS-RLY-K3D (B22H-K7D)	GE	HFA Relay
Pressure Switch	De-energized from relay MS-RLY-K1D, -K3D, or -K4D	MS-RLY-K7D (B22H-K7D)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K7B or -K7D to de-energize MSIV Inboard SPV's	MS-RLY-K14 (B22H-K14)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K14 and -K51 for logic Interlock	MS-RLY-K15 (B22H-K15)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K7B or -K7D to de-energize MSIV Outboard SPV's	MS-RLY-K52 (B22H-K52)	G.E.	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K16 and -K52 for logic Interlock	MS-RLY-K25 (B22H-K25)	Agastat	EGP Relay

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Interfacing Relay	De-energized from relays MS-RLY-K7C and -K7D to auto-close MS-V-16 (B22-F016)	MS-RLY-K56 (B22H-K56)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1C and -K1D to auto-close RWCU-V-1(G33-F001)	MS-RLY-K26 (B22H-K26)	G.E.	HFA Relay
Interfacing Relay	De-energized from relays MS-RLY-K1C and -K1D	MS-RLY-K59 (B22H-K59)	G.E.	HFA Relay
Interfacing Relay	De-energized from relay MS-RLY-K59 to auto-close FDR-V 3 (G11-F003)	MS-RLY-K91 (B22H-K91)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K59 to auto-close EDR-V 19 (G11-F019)	MS-RLY-K95 (B22H-K95)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1C and -K1D	MS-RLY-K72 (B22H-K72)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K72 to auto-close RRC-V 19 (B35-F019)	MS-RLY-K99 (B22-K99)	Agastat	EGP Relay
Interfacing Relay	De-energized from relays MS-RLY-K1C and -K1D	MS-RLY-K82 (B22H-K82)	Agastat	EGP Relay
Interfacing Relay	De-energized from relay MS-RLY-K82 for TIP Withdraw Command	MS-RLY-K120 (B22-K120)	Agastat	EGP Relay