ATTACHMENT I to JPN-94-050

REVISED TECHNICAL SPECIFICATION PAGES FOR
PROPOSED TECHNICAL SPECIFICATION CHANGES

INSTRUMENTATION SURVEILLANCE TEST INTERVALS,
ALLOWABLE OUT-OF-SERVICE TIMES, AND OTHER CHANGES

JPTS-90-010

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

LIST OF PAGE CHANGES

Proposed Technical Specification JPTS-90-010

Revise Appendix A as follows:

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TECHNICAL SPECIFICATIONS

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opened to perform necessary operational activities.

2. At least one door in each airlock is closed and sealed.

3. All automatic containment isolation valves are operable or de-activated in the isolated position.

4. All blind flanges and manways are closed.

N. Rated Power - Rated power refers to operation at a reactor power of 2,436 MWt. This is also termed 100 percent power and is the maximum power level authorized by the operating license. Rated steam flow, rated coolant flow, rated nuclear system pressure, refer to the values of these parameters when the reactor is at rated power.

O. Reactor Power Operation - Reactor power operation is any operation with the Mode Switch in the Startup/Hot Standby or Run position with the reactor critical and above 1 percent rated thermal power.

P. Reactor Vessel Pressure - Unless otherwise indicated, reactor vessel pressures listed in the Technical Specifications are those measured by the reactor vessel steam space sensor.

Q. Refueling Outage - Refueling outage is the period of time between the shutdown of the unit prior to refueling and the startup of the Plant subsequent to that refueling.

R. Safety Limits - The safety limits are limits within which the reasonable maintenance of the fuel cladding integrity and the reactor coolant system integrity are assured. Violation of such a limit is cause for unit shutdown and review by the Nuclear Regulatory Commission before resumption of unit operation. Operation beyond such a limit may not in itself result in serious consequences but it indicates an operational deficiency subject to regulatory review.

S. Secondary Containment Integrity - Secondary containment integrity means that the reactor building is intact and the following conditions are met:

1. At least one door in each access opening is closed.

2. The Standby Gas Treatment System is operable.

3. All automatic ventilation system isolation valves are operable or secured in the isolated position.

T. Surveillance Frequency Notations / Intervals

The surveillance frequency notations / intervals used in these specifications are defined as follows:

Notations	Intervals	Frequency
D	Daily	At least once per 24 hours
W	Weekly	At least once per 7 days
M	Monthly	At least once per 31 days
Q	Quarterly or every 3 months	At least once per 92 days
SA	Semiannually or every 6 months	At least once per 184 days
A	Annually or Yearly	At least once per 366 days
R	Note 1	At least once per 18 months (550 days)
S/U		Prior to each reactor startup
NA		Not applicable

Note 1: "Once each operating cycle," "once per operating cycle," "each refueling outage," "at least once during each operating cycle," "once each operating cycle not to exceed 18 months", or similar phrases, are equivalent to the definition for frequency notation "R".

3.0 Continued

D. Entry into an OPERATIONAL CONDITION (mode) or other specified condition shall not be made when the conditions for the Limiting Condition for Operation are not met and the associated ACTION requires a shutdown if they are not met within a specified time interval. Entry into an OPERATIONAL CONDITION (mode) or specified condition may be made in accordance with ACTION requirements when conformance to them permits continued operation of the facility for an unlimited period of time. This provision shall not prevent passage through OPERATIONAL CONDITIONS (modes) required to comply with ACTION requirements. Exceptions to these requirements are stated in the individual specifications.

E. When a system, subsystem, train, component or device is determined to be inoperable solely because its emergency power source is inoperable, or solely because its normal power source is inoperable, it may be considered OPERABLE for the purpose of satisfying the requirements of its applicable Limiting Condition for Operation, provided: (1) its corresponding normal or emergency power source is OPERABLE; and (2) all of its redundant system(s), subsystem(s), train(s), component(s) and device(s) are OPERABLE, or likewise satisfy the requirements of this specification. Unless both conditions (1) and (2) are satisfied, the unit shall be placed in COLD SHUTDOWN within the following 24 hours. This specification is not applicable when in Cold Shutdown or Refuel Mode.

F. Equipment removed from service or declared inoperable to comply with required actions may be returned to service under administrative control solely to perform testing required to demonstrate its operability or the operability of other equipment. This is an exception to LCO 3.0.B.

4.0 Continued

that a Surveillance Requirement has not been performed. The ACTION requirements may be delayed for up to 24 hours to permit the completion of the surveillance when the allowable outage time limits of the ACTION requirements are less than 24 hours. Surveillance requirements do not have to be performed on inoperable equipment.

D. Entry into an OPERATIONAL CONDITION (mode) shall not be made unless the Surveillance Requirement(s) associated with the Limiting Condition for Operation have been performed within the applicable surveillance interval or as otherwise specified. This provision shall not prevent passage through or to Operational Modes as required to comply with ACTION Requirements.

3.0 Bases - Continued

F. LCO 3.0.F establishes the allowance for restoring equipment to service under administrative controls when it has been removed from service or declared inoperable to comply with required actions. The sole purpose of this Specification is to provide an exception to LCO 3.0.B to allow testing to demonstrate: (a) the operability of the equipment being returned to service; or (b) the operability of other equipment.

The administrative controls ensure the time the equipment is returned to service in conflict with the requirements of the required actions is limited to the time absolutely necessary to perform the allowed testing. This Specification does not provide time to perform any other preventive or corrective maintenance.

An example of demonstrating the operability of the equipment being returned to service is reopening a containment isolation valve that has been closed to comply with the required actions and must be reopened to perform the testing.

An example of demonstrating the operability of other equipment is taking an inoperable channel or trip system out of the tripped condition to prevent the trip function from occurring during the performance of testing on another channel in the other trip system. A similar example of demonstrating the operability of other equipment is taking an inoperable channel or trip system out of the tripped condition to permit the logic to function and indicate the appropriate response during the performance of testing on another channel in the same trip system.

4.0 BASES

A. This specification provides that surveillance activities necessary to insure the Limiting Conditions for Operation are met and will be performed during the OPERATIONAL CONDITIONS (modes) for which the Limiting Conditions for Operation are applicable. Provisions for additional surveillance activities to be performed without regard to the applicable OPERATIONAL CONDITIONS (modes) are provided in the individual Surveillance Requirements.

B. Specification 4.0.B establishes the limit for which the specified time interval for Surveillance Requirements may be extended. It permits an allowable extension of the normal surveillance interval to facilitate surveillance scheduling and consideration of plant operating conditions that may not be suitable for conducting the surveillance (e.g., transient conditions or other ongoing surveillance or maintenance activities). It also provides flexibility to accommodate the length of a fuel cycle for surveillances that are performed at each refueling outage and are specified with an 18 month surveillance interval. It is not intended that this provision be used repeatedly as a convenience to extend surveillance intervals beyond that specified for surveillances that are not performed during refueling outages. The limitation of this specification is based on engineering judgement and the recognition that the most probable result of any particular surveillance being performed is the verification of conformance with the Surveillance Requirements. The limit on extension of the normal surveillance interval ensures that the reliability confirmed by surveillance activities is not significan[illegible]educed below that obtained from the specified surveillance interval.

C. This specification establishes the failure to perform a Surveillance Requirement within the allowed surveillance

C. Continued

interval, defined by the provisions of Specification 4.0.B, as a condition that constitutes a failure to meet the OPERABILITY requirements for a Limiting Condition for Operation. Under the provisions of this specification, systems and components are assumed to be OPERABLE when Surveillance Requirements have been satisfactorily performed within the specified time interval. However, nothing in this provision is to be construed as implying that systems or components are OPERABLE when they are found or known to be inoperable although still meeting the Surveillance Requirements. This specification also clarifies that the ACTION requirements are applicable when Surveillance Requirements have not been completed within the allowed surveillance interval and that the time limits of the ACTION requirements apply from the point in time it is identified that a surveillance has not been performed and not at the time that the allowed surveillance was exceeded. Completion of the Surveillance Requirement within the allowable outage time limits of the ACTION requirements restores compliance with the requirements of Specification 4.0.C. However, this does not negate the fact that the failure to have performed the surveillance within the allowed surveillance interval, defined by the provisions of Specification 4.0.B, was a violation of the OPERABILITY requirements of a Limiting Condition for Operation that is subject to enforcement action. Further, the failure to perform a surveillance within the provisions of Specification 4.0.B is a violation of a Technical Specification requirement and is, therefore, a reportable event under the requirements of 10 CFR 50.73(a)(2)(i)(B) because it is a condition prohibited by the plant Technical Specifications.

4.0 BASES - Continued

C. Continued

If the allowable outage time limits of the ACTION requirements are less than 24 hours or a shutdown is required to comply with ACTION requirements, a 24-hour allowance is provided to permit a delay in implementing the ACTION requirements. This provides an adequate time limit to complete Surveillance Requirements that have not been performed. The purpose of this allowance is to permit the completion of a surveillance before a shutdown is required to comply with ACTION requirements or before other remedial measures would be required that may preclude completion of a surveillance. The basis for this allowance includes consideration for plant conditions, adequate planning, availability of personnel, the time required to perform the surveillance and the safety significance of the delay in completing the required surveillance. This provision also provides a time limit for the completion of Surveillance Requirements that become applicable as a consequence of OPERATIONAL CONDITION (mode) changes imposed by ACTION requirements and for completing Surveillance Requirements that are applicable when an exception to the requirements of Specification 4.0.C is allowed. If a surveillance is not completed within the 24-hour allowance, the time limits of the ACTION requirements are applicable at that time. When a surveillance is performed within the 24-hour allowance and the Surveillance Requirements are not met, the time limits of the ACTION requirements are applicable at the time the surveillance is terminated.

C. Continued

Surveillance Requirements do not have to be performed on inoperable equipment because the ACTION requirements define the remedial measures that apply. However, the Surveillance Requirements have to be met to demonstrate that inoperable equipment has been restored to OPERABLE status.

D. This specification establishes the requirement that all applicable surveillances must be met before entry into an OPERATIONAL CONDITION or other condition of operation specified in the Applicability statement. The purpose of this specification is to ensure that system and component OPERABILITY requirements or parameter limits are met before entry into an OPERATIONAL CONDITION or other specified condition associated with plant shutdown as well as startup.

Under the provisions of this specification, the applicable Surveillance Requirements must be performed within the specified surveillance interval to ensure that the Limiting Conditions for Operation are met during initial plant startup or following a plant outage.

When a shutdown is required to comply with ACTION requirements, the provisions of this specification do not apply because this would delay placing the facility in a lower CONDITION of operation.

3.1 LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the instrumentation and associated devices which initiate the reactor scram.

Objective:

To assure the operability of the Reactor Protection System.

Specification:

A. The setpoints and minimum number of instrument channels per trip system that must be operable for each position of the reactor mode switch, shall be as shown in Table 3.1-1.

4.1 SURVEILLANCE REQUIREMENTS

4.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram.

Objective:

To specify the type of frequency of surveillance to be applied to the protection instrumentation.

Specification:

A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1-1 and 4.1-2 respectively.

The response time of the reactor protection system trip functions listed below shall be demonstrated to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each test shall include at least one channel in each trip system. All channels in both trip systems shall be tested within two test intervals.

1. Reactor High Pressure (02-3PT-55A, B, C, D)
2. Drywell High Pressure (05PT-12A, B, C, D)
3. Reactor Water Level-Low (L3) (02-3LT-101A, B, C, D)
4. Main Steam Line Isolation Valve Closure
(29PNS-80A2, B2, C2, D2)
(29PNS-86A2, B2, C2, D2)
5. Turbine Stop Valve Closure (94PNS-101, 102, 103, 104)
6. Turbine Control Valve Fast Closure (94PS-200A, B, C, D)
7. APRM Fixed High Neutron Flux
8. APRM Flow Referenced Neutron Flux

3.1 (cont'd)

B. <u>Minimum Critical Power Ratio (MCPR)</u>

During reactor power operation, the MCPR operating limit shall not be less than that shown in the Core Operating Limits Report.

1. During Reactor power operation with core flow less than 100% of rated, the MCPR operating limit shall be multiplied by the appropriate K_f as specified in the Core Operating Limits Report.

2. If anytime during reactor operation at greater than 25% of rated power it is determined that the operating limit MCPR is being exceeded, action shall then be initiated within fifteen (15) minutes to restore operation to within the prescribed limits. If the MCPR is not returned to within the prescribed limits within two (2) hours, an orderly reactor power reduction shall begin immediately. The reactor power shall be reduced to less than 25% of rated power within the next four hours, or until the MCPR is returned to within the prescribed limits.

4.1 (cont'd)

B. <u>Maximum Fraction of Limiting Power Density (MFLPD)</u>

The MFLPD shall be determined daily during reactor power operation at ≥25% rated thermal power and the APRM high flux scram and Rod Block trip settings adjusted if necessary as specified in the Core Operating Limits Report.

C. MCPR shall be determined daily during reactor power operation at ≥25% of rated thermal power and following any change in power level or distribution that would cause operation with a limiting control rod pattern as described in the bases for Specification 3.3.B.5.

D. Verification of the MCPR operating limits shall be performed as specified in the Core Operating Limits Report.

3.1 BASES

A. The reactor protection system automatically initiates a reactor scram to:

1. Preserve the integrity of the fuel cladding.

2. Preserve the integrity of the Reactor Coolant System.

3. Minimize the energy which must be absorbed following a loss of coolant accident, and prevent inadvertent criticality.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations. The basis for the allowable out-of-service times is provided in GE Topical Report NEDC-30851P-A, "Technical Specification Improvement Analysis for BWR Reactor Protection System," March 1988.

The Reactor Protection System is of the dual channel type (Reference subsection 7.2 FSAR). The System is made up of two independent trip systems, each having two subchannels of tripping devices. Each subchannel has an input from at least one instrument channel which monitors a critical parameter.

The outputs of the subchannels are combined in a 1 out of 2 logic; i.e., an input signal on either one or both of the subchannels will cause a trip system trip. The outputs of the trip systems are arranged so that a trip on both systems is required to produce a reactor scram.

This system meets the intent of IEEE-279 (1971) for Nuclear Power Plant Protection Systems. The system has a reliability greater than that of a 2 out of 3 system and somewhat less than that of a 1 out of 2 system.

With the exception of the average power range monitor (APRM) channel the intermediate range monitor (IRM) channels, the scram discharge volume, the main steam isolation valve closure and the turbine stop valve closure, each subchannel has one instrument channel. When the minimum condition for operation on the number of operable instrument channels per untripped protection trip system is met or if it cannot be met and the affected protection trip system is placed in a tripped condition, the effectiveness of the protection system is preserved.

Three APRM instrument channels are provided for each protection trip system. APRM's A and E operate contacts in one subchannel and APRM's C and E operate contacts in the other

4.1 BASES

A. The channels listed in Tables 4.1-1 and 4.1-2 are divided into three groups for functional testing. These are:

Group A: On-off sensors that provide a scram trip function.

Group B: Analog devices coupled with bi-stable trips that provide a scram function.

Group C: Devices which only serve a useful function during some restricted mode of operation, such as startup or shutdown, or for which the only practical test is one that can be performed at shutdown.

The sensors that make up Group (A) are on-off sensors. The probability of success is primarily a function of the sensor failure rate and the test interval. The basis for a three-month functional test interval for group (A) sensors is provided in NEDC-30851P-A, "Technical Specification Improvement Analysis for BWR Reactor Protection Systems."

Group (B) devices utilize an analog sensor coupled with a bi-stable trip (either the solid-state analog transmitter trip system (ATTS) or the more conventional arrangement of instrument amplifier and bi-stable). The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. An as-is failure is one that sticks mid-scale and is not capable of going either up or down in response to an out-of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track other channel(s).

The bi-stable trip circuit which is a part of the Group (B) devices can sustain failures which are revealed only during testing. Therefore, it is necessary to functionally test them periodically. A three month surveillance interval has been determined in accordance with NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System."

Group (C) devices are active only during certain modes of operation. For example, the IRM is active during start-up and inactive during full power operation. Thus the only test that is meaningful is the one performed just prior to shutdown or start-up; i.e., the tests that are performed just prior to use of the instrument.

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.

2. Vacuum tube or semiconductor devices and detectors that drift or lose sensitivity.

4.1 BASES (cont'd)

For the APRM System, drift of electronic apparatus is not the only consideration in determining a calibration frequency. Change in power distribution and loss of chamber sensitivity dictates a calibration every 7 days. Calibration on this frequency assures plant operation at or below thermal limits.

The frequency of calibration of the APRM flow biasing network has been established as each refueling outage. The flow biasing network is functionally tested at least once every three months and, in addition, cross calibration checks of the flow input to the flow biasing network can be made during the functional test by direct meter reading. There are several instruments which must be calibrated and it will take several days to perform the calibration of the entire network. While the calibration is being performed, a zero flow signal will be sent to half of the APRM's resulting in a half scram and rod block condition. Thus, if the calibration were performed during operation, flux shaping would not be possible. Based on experience at other generating stations, drift of instruments, such as those in the flow biasing network, is not significant and therefore, to avoid spurious scrams, a calibration frequency of each refueling outage is established.

The measurement of response time provides assurance that the Reactor Protection System trip functions are completed within the time limits assumed in the transient and accident analyses.

In terms of the transient analysis, the Standard Technical Specifications (NUREG-0123, Rev.3) define individual trip function response time as "the time interval from when the monitored parameter exceeds its trip setpoint at the channel sensor until de-energization of the scram pilot valve solenoids." The individual sensor response time defined as "operating time" in General Electric (GE) design specification data sheet 22A3083AJ, note (8), is "the maximum allowable time from when the variable being measured just exceeds the trip setpoint to opening of the trip channel sensor contact during a transient." A transient is defined in note (4) of the same data sheet as "the maximum expected rate of change of the variable for the accident or the abnormal operating condition which is postulated in the safety analysis report.

4.1 BASES (cont'd)

The individual sensor response time may be measured by simulating a step change of the particular parameter. This method provides a conservative value for the sensor response time, and confirms that the instrument has retained its specified electromechanical characteristics. When sensor response time is measured independently, it is necessary to also measure the remaining portion of the response time in the logic train up to the time at which the scram pilot valve solenoids de-energize. The channel response time must include all component delays in the response chain to the ATTS output relay plus the design allowance for RPS logic system response time. A response time for the RPS logic relays in excess of the design allowance is acceptable provided the overall response time does not exceed the response time limits specified in the UFSAR. The basis for excluding the neutron detectors from response time testing is provided by NRC Regulatory Guide 1.118, Revision 2, section C.5.

The 18 month response time testing interval is based on NRC NUREG-0123, Revision 3, "Standard Technical Specifications," surveillance requirement 4.3.1.3.

Two instrument channels in Table 4.1-1 have not been included in Table 4.1-2. These are: mode switch in shutdown and manual scram. All of the devices or sensors associated with these scram functions are simple on-off switches and, hence, calibration during operation is not applicable.

B. The MFLPD is checked once per day to determine if the APRM scram requires adjustment. Only a small number of control rods are moved daily and thus the MFLPD is not expected to change significantly and thus a daily check of the MFLPD is adequate.

The sensitivity of LPRM detectors decreases with exposure to neutron flux at a slow and approximately constant rate. This is compensated for in the APRM system by calibrating twice a week using heat balance data and by calibrating individual LPRM's every 1000 effective full power hours, using TIP traverse data.

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TABLE 3.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Mode in Which Function Must be Operable: Refuel (Note 7)	Startup	Run	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (Note 3)
1	Mode Switch in Shutdown		X	X	X	1 Mode Switch	A
1	Manual Scram		X	X	X	2	A
3	IRM High Flux	≤ 96% (120/125) of full scale	X	X		8	A
3	IRM Inoperative		X	X		8	A
2	APRM Neutron Flux-Startup (Note 15)	≤ 15% Power	X	X		6	A
2	APRM Flow Referenced Neutron Flux (Not to exceed 117%) (Notes 13 and 14)	(Note 12)			X	6	A or B
2	APRM Fixed High Neutron Flux (Note 14)	≤ 120% Power			X	6	A or B
2	APRM Inoperative	(Note 10)	X	X	X	6	A or B

TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Mode in Which Function Must be Operable: Refuel (Note 7)	Startup	Run	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (Note 3)
2	Reactor High Pressure	≤ 1045 psig	X (Note 9)	X	X	4	A
2	Drywell High Pressure (Note 16)	≤ 2.7 psig	X (Note 8)	X (Note 8)	X	4	A
2	Reactor Low Water Level (Note 16)	≥ 177 in. above TAF	X	X	X	4	A
3	High Water Level in Scram Discharge Volume	≤ 34.5 gallons per Instrument Volume	X (Note 4)	X	X	8	A
4	Main Steam Line Isolation Valve Closure	≤ 10% valve closure			X (Note 6)	8	A
2	Turbine Control Valve Fast Closure	500 < P < 850 psig Control oil pressure between fast closure solenoid and disc dump valve			X (Note 5)	4	A or C
4	Turbine Stop Valve Closure	≤10% valve closure			X (Notes 5 & 6)	8	A or C

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TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

NOTES OF TABLE 3.1-1

1. There shall be two operable or tripped trip systems for each Trip Function, except as provided for below:

   a. For each Trip Function with one less than the required minimum number of operable instrument channels, place the inoperable instrument channel and/or its associated trip system in the tripped condition* within 12 hours. Otherwise, initiate the ACTION required by Table 3.1-1 for the Trip Function.

   b. For each Trip Function with two or more channels less than the required minimum number of operable instrument channels:

      1) Within one hour, verify sufficient instrument channels remain operable or tripped* to maintain trip capability in the Trip Function, and

      2) Within 6 hours, place the inoperable instrument channel(s) in one trip system and/or that trip system** in the tripped condition*, and

      3) Within 12 hours, restore the inoperable instrument channel(s) in the other trip system to an operable status, or place the inoperable instrument channel(s) in the trip system and/or that trip system in the tripped condition*.

   If any of these three conditions cannot be satisfied, initiate the ACTION required by Table 3.1-1 for the affected Trip Function.

   * An inoperable instrument channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable instrument channel is not restored to operable status within the required time, the ACTION required by Table 3.1-1 for that Trip Function shall be taken.

   ** This action applies to that trip system with the greatest number of inoperable instrument channels. If both systems have the same number of inoperable instrument channels, the ACTION can be applied to either trip system.

2. When a channel is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions For Operation and required actions may be delayed for up to 6 hours provided the associated Trip Function maintains RPS trip capability.

TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

NOTES OF TABLE 3.1-1 (cont'd)

3. Action Statements:

   A. Insert all operable control rods within four hours.
   B. Reduce power level to IRM range and place Mode Switch in the Startup position within eight hours.
   C. Reduce power level to less than 30 percent of rated within four hours.

4. Permissible to bypass, if the Reactor Mode Switch is in the Refuel or Shutdown position.

5. Bypassed when turbine first stage pressure is less than 217 psig or less than 30 percent of rated power.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be operable:

   A. Mode Switch in Shutdown.
   B. Manual Scram.
   C. High Flux IRM
   D. Scram Discharge Volume High Level when any control rod in a control cell containing fuel is not fully inserted.
   E. APRM 15% Power Trip.

8. Not required to be operable when primary containment integrity is not required.

9. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

10. An APRM will be considered operable if there are at least 2 LPRM inputs per level and at least 11 LPRM inputs of the normal complement.

11. (Deleted)

TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

12. The APRM Flow Referenced Neutron Flux Scram setting shall be less than or equal to the limit specified in the Core Operating Limits Report.

13. The Average Power Range Monitor scram function is varied as a function of recirculation flow (W). The trip setting of this function must be maintained as specified in the Core Operating Limits Report.

14. The APRM flow biased high neutron flux signal is fed through a time constant circuit of approximately 6 seconds. The APRM fixed high neutron flux signal does not incorporate the time constant, but responds directly to instantaneous neutron flux.

15. This Average Power Range Monitor scram function is fixed point and is increased when the reactor mode switch is placed in the Run position.

16. Instrumentation common to PCIS.

TABLE 4.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION TEST REQUIREMENTS

Trip Function	Group (Note 2)	Functional Test	Functional Test Frequency (Note 3)	Instrument Check
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	R	NA
Manual Scram	A	Trip Channel and Alarm	Q	NA
RPS Channel Test Switch	A	Trip Channel and Alarm	W (Note 1)	NA
IRM High Flux	C	Trip Channel and Alarm (Note 4)	S/U and W (Note 5)	NA
IRM Inoperative	C	Trip Channel and Alarm (Note 4)	S/U and W (Note 5)	NA
APRM				
High Flux	B	Trip Output Relays (Note 4)	Q	NA
Inoperative	B	Trip Output Relays (Note 4)	Q	NA
Flow Biased High Flux	B	Trip Output Relays (Note 4)	Q	NA
High Flux in Startup or Refuel	C	Trip Output Relays (Note 4)	S/U and W (Note 5)	NA
Reactor High Pressure	B	Trip Channel and Alarm (Note 4)	Q	D
Drywell High Pressure	B	Trip Channel and Alarm (Note 4)	Q	D
Reactor Low Level	B	Trip Channel and Alarm (Note 4)	Q	D
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel	Q (Note 6)	NA
High Water Level in Scram Discharge Instrument Volume	B	Trip Channel and Alarm (Note 4)	Q	D

TABLE 4.1-1 (Cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION TEST REQUIREMENTS

Trip Function	Group (Note 2)	Functional Test	Functional Test Frequency (Note 3)	Instrument Check
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Q	NA
Turbine Control Valve Fast Closure	A	Trip Channel and Alarm	Q	NA
Turbine First Stage Pressure Permissive	B	Trip Channel and Alarm (Note 4)	Q	D
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Q	NA

NOTES FOR TABLE 4.1-1

1. The automatic scram contactors shall be exercised once every week by either using the RPS channel test switches or performing a functional test of any automatic scram function. If the contactors are exercised using a functional test of a scram function, the weekly test using the RPS channel test switch is considered satisfied. The automatic scram contactors shall also be exercised after maintenance on the contactors.

2. A description of the three groups is included in the Bases of this Specification.

3. Functional tests are not required on the part of the system that is not required to be operable or are tripped. If tests are missed on parts not required to be operable or are tripped, then they shall be performed prior to returning the system to an operable status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the instrument channels.

5. Weekly functional test required only during refuel and startup mode.

6. The functional test shall be performed utilizing a water column or similar device to provide assurance that damage to a float or other portions of the float assembly will be detected.

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3.2 LIMITING CONDITIONS FOR OPERATION

3.2 INSTRUMENTATION

Applicability:

Applies to the plant instrumentation which either (1) initiates and controls a protective function, or (2) provides information to aid the operator in monitoring and assessing plant status during normal and accident conditions.

Objective:

To assure the operability of the aforementioned instrumentation.

Specifications:

A. Primary Containment Isolation Functions

When primary containment integrity is required, the limiting conditions of operation for the instrumentation that initiates primary containment isolation are given in Table 3.2-1.

4.2 SURVEILLANCE REQUIREMENTS

4.2 INSTRUMENTATION

Applicability:

Applies to the surveillance requirement of the instrumentation which either (1) initiates and controls protective function, or (2) provides information to aid the operator in monitoring and assessing plant status during normal and accident conditions.

Objective:

To specify the type and frequency of surveillance to be applied to the aforementioned instrumentation.

Specifications:

A. Primary Containment Isolation Functions

Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2-1. System logic shall be functionally tested as indicated in Table 4.2-1.

The response time of the main steam isolation valve actuation instrumentation isolation trip functions listed below shall be demonstrated to be within their limits at least once per 18 months. Each test shall include at least one channel in each trip system. All channels in both trip systems shall be tested within two test intervals.

1. MSIV Closure - Reactor Low Water Level (L1) (02-3LT-57A,B and 02-3LT-58A,B)
2. MSIV Closure - Low Steam Line Pressure (02PT-134A,B,C,D)
3. MSIV Closure - High Steam Line Flow (02DPT-116A-D, 117A-D, 118A-D, 119A-D)

3.2 (cont'd)

B. Core and Containment Cooling Systems - Initiation and Control

The limiting conditions for operation for the instrumentation that initiates or controls the Core and Containment Cooling Systems are given in Table 3.2-2. This instrumentation must be operable when the system(s) it initiates or controls are required to be operable as specified in Specification 3.5.

C. Control Rod Block Actuation

The limiting conditions of operation for the instrumentation that initiates control rod block are given in Table 3.2-3.

D. Radiation Monitoring Systems - Isolation and Initiation Functions

Refer to the Radiological Effluent Technical Specifications (Appendix B).

4.2 (cont'd)

B. Core and Containment Cooling Systems - Initiation and Control

Instrumentation shall be functionally tested, calibrated, and checked as indicated in Table 4.2-2.

System logic shall be functionally tested as indicated in Table 4.2-2.

C. Control Rod Block Actuation

Instrumentation shall be functionally tested, calibrated, and checked as indicated in Table 4.2-3.

System logic shall be functionally tested as indicated in Table 4.2-3.

D. Radiation Monitoring Systems - Isolation and Initiation Functions

Refer to the Radiological Effluent Technical Specifications (Appendix B).

3.2 BASES

Besides reactor protection instrumentation which initiates a reactor scram, additional protective instrumentation is also provided. This protective instrumentation initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the Core Cooling Systems, Control Rod Block and Standby Gas Treatment Systems. The objectives of the specifications are to assure the effectiveness of the protective instrumentation when required, even during periods when portions of such systems are out of service for maintenance, and to prescribe the trip settings required to assure adequate performance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2-1 which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary containment isolation is connected in a dual bus (two trip systems) arrangement. Main Steam Line Isolation Valve (MSIV) isolation utilizes a one-out-of-two-taken-twice logic arrangement which closes the four inboard and four outboard MSIVs. Other penetrations which have both inboard and outboard automatic isolation valves (except for the primary containment hydrogen and oxygen concentration sample, and the gaseous and particulate radioactivity sample systems) utilize logic arrangements in which one trip system closes inboard isolation valves and the other trip system closes outboard isolation valves. The primary containment hydrogen and oxygen concentration sample supply and return lines, as well as the gaseous and particulate sample supply and return lines, utilize inboard and outboard isolation valves that are both closed by a single trip system. Hydrogen and oxygen concentration sample supply and return isolation valve control circuits are provided with the capability to override automatic isolation to allow sampling during and following an accident. Penetrations which are isolated by a single automatic isolation valve (and a remote manual or check valve) utilize a single trip system to effect closure of the automatic isolation valve.

The low water level instrumentation set to trip at 177 in. above the top of the active fuel closes all isolation valves except those in Group 1. Details of the isolation valve grouping are given in Section 7.3 of the updated FSAR. For valves which isolate at this level, this trip setting is adequate to prevent uncovering the core in the case of a break in the largest line.

The low-low reactor water level instrumentation is set to trip when reactor water level is 126.5 in. above the top of active fuel. This trip

3.2 BASES (cont'd)

initiates the HPCI and RCIC systems and trips the recirculation pumps. The low-low-low reactor water level instrumentation is set to trip when the water level is 18 in. above the top of active fuel. This trip activates the remainder of the ECCS subsystems, closes the main steam isolation valves, main steam line drain valves and reactor water sample line isolation valves, and starts the emergency diesel generators. These trip level settings were chosen to be high enough to prevent spurious actuation but low enough to initiate ECCS operation and primary system isolation so that post-accident cooling can be accomplished and the guidelines of 10 CFR 100 will not be exceeded. For large breaks up to the complete circumferential break of a 24 in. recirculation line and with the trip setting given above, ECCS initiation and primary system isolation are initiated in time to meet the above criteria. Reference paragraph 6.5.3.1 of the updated FSAR.

The high drywell pressure instrumentation is a diverse signal for malfunctions to the water level instrumentation and in addition to initiating ECCS, it causes isolation of Groups B and C isolation valves. For the breaks discussed above, this instrumentation will generally initiate ECCS operation before the low-low-low water level instrumentation; thus the results given above are applicable here also. Details of the isolation valve closure group are given in Section 7.3 of the updated FSAR. The water level instrumentation initiates protection for the full spectrum of loss-of-coolant accidents.

Venturis are provided in the main steam lines as a means of measuring steam flow and also limiting the loss of mass inventory from the vessel during a steam line break accident. The primary function of the instrumentation is to detect a break in the main steam line. For the worst case accident, main steam line break outside the drywell, a trip setting of 140 percent of rated steam flow in conjunction with the flow limiters and main steam line valve closure, limits the mass inventory loss such that fuel is not uncovered, fuel temperature peak at approximately 1,000°F and release of radioactivity to the environs is below 10 CFR 100 guidelines. Reference Section 14.6.5 of the updated FSAR.

The main steam line high temperature isolation function utilizes 16 sensors (instrument channels), with 4 sensors located at each of 4 different areas in the vicinity of the main steam lines. The 4 instrument channels associated with each of the 4 areas are arranged in a 1-out-of-2-taken-twice logic. Thus a main steam line break in any of the 4 areas will effect closure of all 8 main steam line isolation valves.

3.2 BASES (cont'd)

High radiation monitors in the area of the main steam lines have been provided to detect gross fuel failure as in the control rod drop accident. A trip setting of 3 times normal full-power background is established to close the main steam line drain valves, the recirculation loop sample valves, the mechanical vacuum pump isolation valves, and trip the pumps, to limit fission product release. For changes in the Hydrogen Water Chemistry hydrogen injection rate, the trip setpoint may be adjusted based on a calculated value of the expected radiation level. Hydrogen addition will result in an increase in the N-16 carryover in the main steam.

Pressure instrumentation is provided to close the main steam isolation valves in the run mode when the main steam line pressure drops below 825 psig. The reactor pressure vessel thermal transient due to an inadvertent opening of the turbine bypass valves when not in the run mode is less severe than the loss of feedwater analyzed in Section 14.5 of the FSAR, therefore, closure of the main steam isolation valves for thermal transient protection when not in the run mode is not required.

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI steam piping. Tripping of this instrumentation results in actuation of HPCI isolation valves. Tripping logic for the high flow is a 1 out of 2 logic. The trip settings of approximately 300 percent of design flow for this high flow or 40°F above maximum ambient for high temperature are such that uncovering the core is prevented and fission product release is within limits.

The RCIC high flow and temperature instrumentation are arranged the same as that for the HPCI. The trip settings of approximately 300 percent for high flow or 40°F above maximum ambient for temperature are based on the same criteria as the HPCI.

The HPCI high temperature isolation function utilizes 16 sensors (instrument channels) located in the vicinity of the HPCI equipment and piping. The 16 instrument channels provide inputs into two trip systems, eight instrument channels per trip system. One trip system is associated with the inboard isolation valve and the other trip system is associated with the outboard isolation valves. Trip logic for each trip system is one-out-of-eight-taken-once logic for the high temperature isolation function. The logic for the RCIC high temperature isolation function is the same as the HPCI logic, except 8 instrument channels, 4 per trip system provide input to the high temperature isolation logic circuits.

The reactor water cleanup system high temperature instrumentation are arranged similar to that for the HPCI. The trip settings are such that uncovering the core is prevented and fission product release is within limits.

The instrumentation which initiates ECCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion, the specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed. An exception to this is when logic functional testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to the Safety Limit. The trip

4.2 BASES

The instrumentation listed in Tables 4.2-1 through 4.2-8 will be functionally tested and calibrated at regularly scheduled intervals. The same design reliability goal as the Reactor Protection System is generally applied. Sensors, trip devices and power supplies are tested, calibrated and checked at the same frequency as comparable devices in the Reactor Protection System.

The surveillance test interval for the instrumentation channel functional tests are once/three months for most instrumentation. This surveillance interval is based on the following NRC approved licensing topical reports:

1. GE Topical Report NEDC-30851P-A, "Technical Specification Improvement Analysis for BWR Reactor Protection System," March 1988.

2. GE Topical Report NEDC-30851P-A, Supplement 1 "Technical Specification Improvement Analysis for BWR Control Rod Block Instrumentation," October 1988.

3. GE Topical Report NEDC-30851P-A, Supplement 2 "Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," July 1986.

4. GE Topical Report NEDC-31677P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation, " July 1990.

5. GE Topical Report NEDC-30936P-A, Parts 1 and 2, "BWR Owners Group Technical Specification Improvement Methodology (With Demonstration for BWR ECCS Actuation Instrumentation)," December 1988.

6. GE Topical Report GENE-770-06-1-A, "Bases for Changes to Surveillance Test Intervals and Allowed Out-Of-Service Times For Selected Instrumentation Technical Specifications," December 1992.

7. GE Topical Report GENE-770-06-2-A, "Addendum to Bases for Changes to Surveillance Test Intervals and Allowed Out-Of-Service Times For Selected Instrumentation Technical Specifications," December 1992.

The measurement of the response time interval for the Main Steam Isolation Valve (MSIV) isolation actuation instrumentation begins when the monitored parameter exceeds the isolation actuation setpoint at the channel sensor and ends when the MSIV pilot solenoid relay contacts open. With the exception of the MSIVs, response time testing is not required for any other primary containment isolation actuation instrumentation. The safety analyses results are not sensitive to individual sensor response times of the logic systems to which the sensors are connected for isolation actuation instrumentation

TABLE 3.2-1
PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION REQUIREMENTS

Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (Note 3)
2	Reactor Low Water Level (Notes 4 & 7)	≥ 177 in. above TAF	4	A
2	Reactor Low Water Level (Notes 7 & 8)	≥ 177 in. above TAF	2	A
1	Reactor High Pressure (Shutdown Cooling Isolation)	≤ 75 psig	2	D
2	Reactor Low-Low-Low Water Level	≥ 18 in. above the TAF	4	A
2	Drywell High Pressure (Notes 4 & 7)	≤ 2.7 psig	4	A
2	Drywell High Pressure (Notes 7 & 8)	≤ 2.7 psig	2	A
2	Main Steam Line Tunnel High Radiation	≤ 3 x Normal Rated Full Power Background	4	E
2	Main Steam Line Low Pressure (Note 5)	≥ 825 psig	4	B
2	Main Steam Line High Flow	≤ 140% of Rated Steam Flow	4	G
8	Main Steam Line Leak Detection High Temperature	≤ 40°F above max ambient	16	B
4	Reactor Water Cleanup System Equipment Area High Temperature	≤ 40°F above max ambient	8	C
2	Condenser Low Vacuum (Note 6)	≥ 8" Hg. Vac	4	B

TABLE 3.2-1 (Cont'd)

PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION REQUIREMENTS

Minimum No. of Operable Instrument Channels Per Trip System (Note 1 and 2)	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (Note 3)
1	HPCI Turbine Steam Line High Flow	$\leq$ 160 in H_2O dp	2	F
1	HPCI Steam Line Low Pressure	100 > P > 50 psig	2	F
1	HPCI Turbine High Exhaust Diaphragm Pressure	$\leq$ 10 psig	2	F
8	HPCI Steam Line/ Area Temperature	$\leq$ 40°F above max. ambient	16	F
1	RCIC Turbine Steam Line High Flow	$\leq$ 282 in H_2O dp	2	F
1	RCIC Steam Line Low Pressure	100 > P > 50 psig	2	F
1	RCIC Turbine High Exhaust Diaphragm Pressure	$\leq$ 10 psig	2	F
4	RCIC Steam Line/ Area Temperature	$\leq$ 40°F above max. ambient	8	F

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TABLE 3.2-1 (Cont'd)

PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION REQUIREMENTS

NOTES FOR TABLE 3.2-1

1. Whenever Primary Containment integrity is required by Specification 3.7.A.2, there shall be two operable or tripped trip systems for each Trip Function, except as provided for below:

   a. For each Trip Function with one less than the required minimum number of operable instrument channels, place the inoperable instrument channel and/or its associated trip system in the tripped condition* within:

      1) 12 hours for trip functions common to RPS instrumentation, and

      2) 24 hours for trip functions not common to RPS instrumentation,

      or, initiate the ACTION required by Table 3.2-1 for the affected trip function.

   b. For each Trip Function with two or more channels less than the required minimum number of operable instrument channels:

      1) Within one hour, verify sufficient instrument channels remain operable or tripped* to maintain trip capability in the Trip Function, and

      2) Within 6 hours, place the inoperable instrument channel(s) in one trip system and/or that trip system** in the tripped condition*, and

      3) Restore the inoperable instrument channel(s) in the other trip system to an operable status, or place the inoperable instrument channel(s) in the trip system and/or that trip system in the tripped condition* within:

         (a) 12 hours for trip functions common to RPS instrumentation, and

         (b) 24 hours for trip functions not common to RPS instrumentation.

      If any of these three conditions cannot be satisfied, initiate the ACTION required by Table 3.2-1 for the affected Trip Function.

      Asterisk shown on next page

TABLE 3.2-1 (Cont'd)

PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION REQUIREMENTS

NOTES FOR TABLE 3.2-1 (cont'd)

* An inoperable instrument channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable instrument channel is not restored to operable status within the required time, the ACTION required by Table 3.2-1 for that Trip Function shall be taken.

** This action applies to that trip system with the greatest number of inoperable instrument channels. If both systems have the same number of inoperable instrument channels, the ACTION can be applied to either trip system.

2. When a channel, and/or the affected primary containment isolation valve, is placed in an inoperable status solely for performance of required instrumentation surveillances, entry into associated Limiting Conditions for Operation and required actions may be delayed as follows:

   a) for up to 6 hours for Trip Functions utilizing a two-out-of-two-taken-once logic; or

   b) for up to 6 hours for the remaining Trip Functions provided the associated Trip Function maintains PCIS initiation capability for at least one containment isolation valve in the affected penetration.

3. Actions:

   A. Place the reactor in the cold condition within 24 hours.
   B. Isolate the main steam lines within eight hours.
   C. Isolate Reactor Water Cleanup System within four hours.
   D. Isolate shutdown cooling within four hours.
   E. Isolate the main steam line drain valves, the recirculation loop sample valves, and the mechanical vacuum pump, within eight hours.
   F. Isolate the affected penetration flow path(s) within one hour and declare the affected system inoperable.
   G. Isolate the affected main steam line within eight hours.

TABLE 3.2-1 (Cont'd)

PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION REQUIREMENTS

NOTES FOR TABLE 3.2-1 (cont'd)

4. These signals also start SGTS and initiate secondary containment isolation.

5. Only required in run mode (interlocked with Mode Switch).

6. Only required in the run mode and turbine stop valves are open.

7. Instrumentation common to RPS.

8. Trip Function utilizes a two-out-of-two-taken-once logic for isolation of both primary containment isolation valves on the hydrogen and oxygen sample, and gaseous and particulate sample supply and return lines.

TABLE 3.2-2

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
1	2	Reactor Low-Low Water Level	$\geq$ 126.5 in. above TAF	4 (HPCI & RCIC)	Initiates HPCI, RCIC, and SGTS.
2	2	Reactor Low-Low-Low Water Level	$\geq$ 18 in. above TAF	4 (Core Spray & RHR)	Initiates Core Spray, RHR (LPCI), and Emergency Diesel Generators.
				4 (ADS)	Initiates ADS (if not inhibited by ADS override switches), in conjunction with Confirmatory Low Level, 120 second delay and RHR (LPCI) or Core Spray pump discharge pressure interlock.
3	2	Reactor High Water Level	$\leq$ 222.5 in. above TAF	2 (Note 8)	Trips HPCI turbine.
4	2	Reactor High Water Level	$\leq$ 222.5 in. above TAF	2 (Note 8)	Closes RCIC steam suppply valve.
5	1 (Note 9)	Reactor Low Level (inside shroud)	$\geq$ 0 in. above TAF	2	Prevents inadvertent operation of containment spray during accident condition.
6	2	Containment High Pressure	$1 < p < 2.7$ psig	4	Prevents inadvertent operation of containment spray during accident condition.

TABLE 3.2-2 (Cont'd)

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
7	1 (Note 9)	Reactor Low Level	≥ 177 in. above TAF	2	Confirmatory low water level for ADS actuation.
8	2	Drywell High Pressure	≤ 2.7 psig	4	Initiates Core Spray, RHR (LPCI), HPCI and SGTS.
9	2	Reactor Low Pressure	≥ 450 psig	4	Permits opening Core Spray and RHR (LPCI) injection valves.
10	1 (Note 9)	Reactor Low Pressure	50 ≤ p ≤ 75 psig	2	Permits closure of RHR (LPCI) injection valves while in shutdown cooling in conjunction with PCIS signal.
11	1 (Notes 3 & 9)	Core Spray Pump Start Timer (each loop)	11 ± 0.6 sec.	1 (Note 8)	Initiates starting of core spray pump. (each loop)
12	1 (Notes 3 & 9)	RHR (LPCI) Pump Start Timer			
		1st Pump (A Loop)	1.0 + 0.5 (-) 0 sec.	1 (Note 8)	Starts 1st Pump (A Loop)
		1st Pump (B Loop)	1.0 + 0.5 (-) 0 sec.	1 (Note 8)	Starts 1st Pump (B Loop)
		2nd Pump (A Loop)	6.0 ± 0.5 sec.	1 (Note 8)	Starts 2nd Pump (A Loop)
		2nd Pump (B Loop)	6.0 ± 0.5 sec.	1 (Note 8)	Starts 2nd Pump (B Loop)

Amendment No. ~~10~~, ~~48~~, ~~67~~, ~~84~~, ~~179~~

TABLE 3.2-2 (Cont'd)

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
13	1 (Note 9)	Auto Blowdown Timer	120 sec. ± 5 sec.	2	Initiates ADS (if not inhibited by ADS override switches).
14	4	RHR (LPCI) Pump Discharge Pressure Interlock	125 psig ± 20 psig	8	Permits ADS actuation.
15	2	Core Spray Pump Discharge Pressure Interlock	100 psig ± 10 psig	4	Permits ADS actuation.
16	* (Note 9)	RHR (LPCI) Trip System Bus Power Monitor	Loss of Voltage	2	Monitors availability of power to logic systems.
17	1 (Note 9)	Core Spray Trip System Bus Power Monitor	Loss of Voltage	2	Monitors availability of power to logic systems.

Amendment No. ~~18~~, ~~48~~, ~~84~~, ~~134~~

TABLE 3.2-2 (cont'd)

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
18	1 (Note 9)	ADS Trip System Bus Power Monitor	Loss of Voltage	2	Monitors availability of power to logic systems.
19	1 (Note 9)	HPCI Trip System Bus Power Monitor	Loss of Voltage	2	Monitors availability of power to logic systems
20	1 (Note 9)	RCIC Trip System Bus Power Monitor	Loss of Voltage	2	Monitors availability of power to logic systems.
21	1 (Note 9)	Core Spray Sparger to Reactor Pressure Vessel d/p	$\leq$ 0.5 psid	2	Alarms to indicate Core Spray sparger pipe break.
22	2	Condensate Storage Tank Low Level	$\geq$ 59.5 in. above tank bottom (= 15,600 gal. avail)	2 (Note 8)	Transfers RCIC pump suction to suppression chamber.
23	2	Condensate Storage Tank Low Level	$\geq$ 59.5 in. above tank bottom (=15,600 gal avail)	2 (Note 8)	Transfers HPCI pump suction to suppression chamber.
24	2	Suppression Chamber High Level	$\leq$ 6 in. above normal level	2 (Note 8)	Transfers HPCI pump suction to suppression chamber.
25	1 (Note 9)	LPCI Cross-Connect Valve Position	NA	1 (Note 8)	Alarms when valve is not closed.

Amendment No. ~~5~~, ~~37~~, ~~48~~, ~~84~~

TABLE 3.2-2 (cont'd)

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
26	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Relay (Degraded Voltage)	110.6 ± 1.2 secondary volts	2	Initiates both 4kV Emergency Bus Undervoltage Timers. (Degraded Voltage LOCA and non-LOCA) (Notes 4 and 6)
27	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Timer (Degraded Voltage LOCA)	9.0 ± 1.0 sec.	2	(Note 5)
28	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Timer (Degraded Voltage non-LOCA)	45 ± 5.0 sec.	2	(Note 5)
29	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Relay (Loss of Voltage)	85 ± 4.25 secondary volts	2	Initiates 4kV Emergency Bus Undervoltage Loss of Voltage Timer. (Notes 4 and 7)
30	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Timer (Loss of Voltage)	2.50 ± 0.05 sec.	2	(Note 5)
31	2	Reactor Low Pressure	285 to 335 psig	4	Permits closure of recirculation pump discharge valve.

TABLE 3.2-2 (Cont'd)

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

NOTES FOR TABLE 3.2-2

1. Whenever any ECCS subsystem is required by Specification 3.5 to be operable, there shall be two operable or tripped trip systems (or in the case of single trip system instrument logics, one operable trip system), except as provided for below:

   a. For each Trip Function with one less than the required minimum number of operable instrument channels, place the inoperable instrument channel in the tripped condition* within 24 hours. Otherwise, declare the associated ECCS inoperable.

   b. For each Trip Function with two or more channels less than the required minimum number of operable instrument channels:

      1) Within one hour, verify sufficient instrument channels remain operable or tripped* to maintain trip capability in the Trip Function, and

      2) Within 6 hours, place the inoperable instrument channel(s) in one trip system** in the tripped condition*, and

      3) Within 24 hours, restore the inoperable instrument channel in the other trip system to an operable status.

      If any of these three conditions cannot be satisfied, declare the associated ECCS inoperable.

      * An inoperable instrument channel need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable instrument channel is not restored to operable status within the required time, declare the associated ECCS inoperable.

      ** This action applies to that trip system with the greatest number of inoperable instrument channels. If both systems have the same number of inoperable instrument channels, the ACTION can be applied to either trip system.

2. When a channel is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions For Operation and required actions may be delayed as follows: (a) for up to 6 hours for single channel Trip Functions; or (b) for up to 6 hours for the remaining Trip Functions provided the associated Trip Function maintains ECCS initiation capability.

Table 3.2-2 (Cont'd)

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

3. Refer to Technical Specification 3.5 for Limiting Conditions for Operation. Failure of one (1) instrument channel disables automatic initiation of one (1) pump.

4. Tripping of 2 out of 2 sensors is required for an undervoltage trip. With one operable sensor, operation may continue with the inoperable sensor in the tripped condition.

5. The 4kV Emergency Bus Undervoltage Timers (degraded voltage LOCA, degraded voltage non-LOCA, and loss-of-voltage) initiate the following: starts the Emergency Diesel-Generators; trips the normal/reserve tie breakers and trips all 4kV motor breakers (in conjunction with 75 percent Emergency Diesel-Generator voltages); initiates diesel-generator breaker close permissive (in conjunction with 90 percent Emergency Diesel-Generator voltages) and; initiates sequential starting of vital loads in conjunction with low-low-low reactor water level or high drywell pressure.

6. A secondary voltage of 110.6 volts corresponds to approximately 93% of 4160 volts on the bus.

7. A secondary voltage of 85 volts corresponds to approximately 71.5% of 4160 volts on the bus.

8. Only one trip system.

9. Single channel trip systems.

TABLE 3.2-3

CONTROL ROD BLOCK INSTRUMENTATION REQUIREMENTS

Minimum No. of Operable Instrument Channels Per Trip Function (Notes 1 and 3)	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided By Design	Action (Note 2)
4	APRM Flow Referenced Neutron Flux	(Note 9)	6	A
4	APRM Neutron Flux-Start-up	≤ 12%	6	A
4	APRM Downscale	≥ 2.5 indicated on scale	6	A
2 (Note 7)	Rod Block Monitor (Flow Biased)	(Note 9)	2	B
2 (Note 7)	Rod Block Monitor (Downscale)	≥ 2.5 indicated on scale	2	B
6	IRM Detector not in Start-up Position	(Note 8)	8	A
6	IRM Upscale	≤ 86.4% (108/125) of full scale	8	A
6	IRM Downscale (Note 4)	≥ 2% (2.5/125) of full scale	8	A
3	SRM Detector not in Start-up Position	(Note 5)	4	A
3 (Note 6)	SRM Upscale	≤ 10^5 counts/sec	4	A
2	Scram Discharge Instrument Volume High Water Level	≤ 26.0 gallons per instrument volume	2	C (Note 10)

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TABLE 3.2-3 (Cont'd)

CONTROL ROD BLOCK INSTRUMENTATION REQUIREMENTS

NOTES FOR TABLE 3.2-3

1. The trip functions shall be operable in the Startup and Run modes except as follows:

   a) SRM and IRM: Startup mode only.
   b) RBM: Run mode and ≥ 30% reactor power only.
   c) APRM Neutron Flux-Startup: Startup mode only.
   d) APRM Flow Referenced Neutron Flux: Run mode only.

2. Actions:

   Action A: If the number of operable instrument channels is:

   a) one less than the required minimum number of operable instrument channels per trip function, restore the inoperable instrument channel to operable status within 7 days, or place the inoperable instrument channel in the tripped condition within the next hour.

   b) two or more channels less than the required minimum number of operable instrument channels per trip function, place at least one inoperable instrument channel in the tripped condition within one hour.

   Action B: If the number of operable instrument channels is:

   a) one less than the required minimum number of operable instrument channels per trip function, verify that the reactor is not operating on a Limiting Control Rod Pattern, and within 7 days restore the inoperable instrument channel to operable status; otherwise, place the inoperable instrument channel in the tripped condition within the next hour. See Specification 3.3.B.5.

   b) two channels less than the required minimum number of operable instrument channels per trip function, place at least one inoperable instrument channel in the tripped condition within one hour. See Specification 3.3.B.5.

   Action C:

   If the number of operable instrument channels is less than the required minimum number of operable instrument channels per trip function, place the inoperable instrument channel in the tripped condition within 12 hours.

Table 3.2-3 (Cont'd)

CONTROL POD BLOCK INSTRUMENTATION REQUIREMENTS

NOTES FOR TABLE 3.2-3 (Con 'd)

3. When a channel is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required actions may be delayed for up to 6 hours provided the associated Trip Function maintains CRB initiation capability.

4. IRM downscale is bypassed when it is on its lowest range.

5. This function is bypassed when the count rate is $\geq$ 100 cps.

6. This SRM Function is bypassed when the IRM range switches are on range 8 or above.

7. RBM is required when reactor power is greater than or equal to 30%.

8. This function is bypassed when the Mode Switch is placed in Run.

9. The APRM Flow Referenced Neutron Flux and Rod Block Monitor trip level setpoint shall be less than or equal to the limit specified in the Core Operating Limits Report.

10. When the reactor is subcritical and the reactor water temperature is less than 212°F, the control rod block is required to be operable only if any control rod in a control cell containing fuel is not fully inserted.

TABLE 3.2-7

ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION REQUIREMENTS

Minimum Number of Operable Instrument Channels Per Trip System (Notes 1 & 2)	Trip Function	Trip Level Setting	Applicable Modes
2	Reactor Pressure - High	≤ 1120 psig	Run
2	Reactor Water Level - Low Low	≥ 126.5 in. above TAF	Run

NOTES FOR TABLE 3.2-7

See next page for Notes 1 and 2.

TABLE 3.2-7 (cont'd)

ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION REQUIREMENTS

NOTES FOR TABLE 3.2-7

1. There shall be two operable or tripped trip systems for each Trip Function, except as provided for below:

   a. For each Trip Function with one less than the required minimum number of operable instrument channels, place the inoperable instrument channel and/or its associated trip system in the tripped condition* within 72 hours. Otherwise, place the reactor in the start-up/hot standby mode within the next 6 hours.

   b. For each Trip Function with two or more channels less than the required minimum number of operable instrument channels:

      1) Within one hour, verify sufficient instrument channels remain operable or tripped* to maintain trip capability in the Trip Function, and

      2) Within 6 hours, place the inoperable instrument channel(s) in one trip system and/or that trip system** in the tripped condition*, and

      3) Within 24 hours, restore the inoperable instrument channel in the other trip system to an operable status.

      If any of these three conditions cannot be satisfied, place the reactor in the start-up/hot standby mode within the next 6 hours.

   * An inoperable instrument channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable instrument channel is not restored to operable status within the required time, place the reactor in the start-up/hot standby mode within the next 6 hours.

   ** This action applies to that trip system with the greatest number of inoperable instrument channels. If both systems have the same number of inoperable instrument channels, the ACTION can be applied to either trip system.

2. When a channel is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required actions may be delayed for up to 6 hours provided the associated Trip Function maintains ATWS RPT initiation capability.

TABLE 4.2-1

PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION TEST AND CALIBRATION REQUIREMENTS

	Instrument Channel (Note 8)	Instrument Functional Test	Calibration Frequency	Instrument Check (Note 4)
1)	Reactor High Pressure (Shutdown Cooling Isolation)	Q	Q	NA
2)	Reactor Low-Low-Low Water Level	Q (Note 5)	R (Note 15)	D
3)	Main Steam High Temperature	Q (Note 5)	R (Note 15)	D
4)	Main Steam High Flow	Q (Note 5)	R (Note 15)	D
5)	Main Steam Low Pressure	Q (Note 5)	R (Note 15)	D
6)	RWCU Area High Temperature	Q	Q (Note 16)	NA
7)	Condenser Low Vacuum	Q (Note 5)	R (Note 15)	D
8)	Main Steam Line High Radiation	Q (Note 5)	Q/R (Note 11)	D
9)	HPCI & RCIC Steam Line High Flow	Q (Note 5)	R (Note 15)	D
10)	HPCI & RCIC Steam Line/ Area High Temperature	Q (Note 5)	R (Note 15)	D
11)	HPCI & RCIC Steam Line Low Pressure	Q (Note 5)	R (Note 15)	D
12)	HPCI & RCIC High Exhaust Diaphragm Pressure	Q	Q	NA

NOTE: See notes following Table 4.2-5.

TABLE 4.2-1 (Cont'd)

PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION TEST AND CALIBRATION REQUIREMENTS

Logic System Functional Test (Notes 7 & 9)		Frequency
1)	Main Steam Line Isolation Valves Main Steam Line Drain Valves Reactor Water Sample Valves	SA
2)	RHR - Isolation Valve Control Shutdown Cooling Valves	SA
3)	Reactor Water Cleanup Isolation	SA
4)	Drywell Isolation Valves TIP Withdrawal Atmospheric Control Valves	SA
5)	Standby Gas Treatment System Reactor Building Isolation	SA
6)	HPCI Subsystem Auto Isolation	SA
7)	RCIC Subsystem Auto Isolation	SA

NOTE: See notes following Table 4.2-5.

TABLE 4.2-2

CORE AND CONTAINMENT COOLING SYSTEM INSTRUMENTATION TEST AND CALIBRATION REQUIREMENTS

	Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check (Note 4)
1)	Reactor Water Level	Q (Note 5)	SA / R (Note 15)	D
2a)	Drywell Pressure (non-ATTS)	Q	Q	NA
2b)	Drywell Pressure (ATTS)	Q (Note 5)	SA / R (Note 15)	D
3a)	Reactor Pressure (non-ATTS)	Q	Q	NA
3b)	Reactor Pressure (ATTS)	Q (Note 5)	SA / R (Note 15)	D
4)	Auto Sequencing Timers	NA	R	NA
5)	ADS - LPCI or CS Pump Disch.	Q	Q	NA
6)	Trip System Bus Power Monitors	Q	NA	NA
7)	Core Spray Sparger d/p	Q	Q	D
8)	HPCI & RCIC Suction Source Levels	Q	Q	NA
9)	4kV Emergency Bus Under-Voltage (Loss-of-Voltage, Degraded Voltage LOCA and non-LOCA) Relays and Timers.	R	R	NA
10)	LPCI Cross Connect Valve Position	R	NA	NA

NOTE: See notes following Table 4.2-5.

TABLE 4.2-2 (Cont'd)

CORE AND CONTAINMENT COOLING SYSTEM INSTRUMENTATION TEST AND CALIBRATION REQUIREMENTS

	Logic System Functional Test	Frequency
1)	Core Spray Subsystem	SA (Notes 7 & 9)
2)	Low Pressure Coolant Injection Subsystem	SA (Notes 7 & 9)
3)	Containment Cooling Subsystem	SA
4)	HPCI Subsystem	SA (Notes 7 & 9)
5)	ADS Subsystem	SA (Notes 7 & 9)

NOTE: See notes following Table 4.2-5.

TABLE 4.2-3

CONTROL ROD BLOCK INSTRUMENTION
TEST AND CALIBRATION REQUIREMENTS

	Instrument Channel	Instrument Functional Test (Note 5)	Calibration	Instrument Check (Note 4)
1)	APRM - Downscale	Q	Q	D
2)	APRM - Upscale	Q	Q	D
3)	IRM - Upscale	S/U (Note 2)	Q (Notes 3 & 6)	D
4)	IRM - Downscale	S/U (Note 2)	Q (Notes 3 & 6)	D
5)	IRM - Detector Not in Startup Position	S/U (Note 2)	NA	NA
6)	RBM - Upscale	Q	Q	D
7)	RBM - Downscale	Q	Q	D
8)	SRM - Upscale	S/U (Note 2)	Q (Notes 3 & 6)	D
9)	SRM - Detector Not in Startup Position	S/U (Note 2)	NA	NA
10)	Scram Discharge Instrument Volume - High Water Level (Group B Instruments)	Q	Q	D

	Logic System Function Test (Notes 7 & 9)	Frequency
1)	System Logic Check	SA

NOTE: See notes following Table 4.2-5.

NOTES FOR TABLES 4.2-1 THROUGH 4.2-5

1. Initially once every month until acceptance failure rate data are available; thereafter, a request may be made to the NRC to change the test frequency. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instruments operate in a environment similar to that of JAFNPP.

2. Functional tests are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed within seven (7) days prior to each startup.

3. Calibrations are not required when these instruments are not required to be operable or are tripped. Calibration tests shall be performed within seven (7) days prior to each startup or prior to a pre-planned shutdown.

4. Instrument checks are not required when these instruments are not required to be operable or are tripped.

5. This instrumentation is exempt from the functional test definition. The functional test will consist of injecting a simulated electrical signal into the measurement channel.

6. These instrument channels will be calibrated using simulated electrical signals once every three months.

7. Simulated automatic actuation shall be performed once each operating cycle.

8. Reactor low water level, and high drywell pressure are not included on Table 4.2-1 since they are listed on Table 4.1-2.

9. The logic system functional tests shall include a calibration of time delay relays and timers necessary for proper functioning of the trip systems.

10. (Deleted)

11. Perform a calibration once per operating cycle using a radiation source. Perform an instrument channel alignment once every 3 months using the built-in current source.

12. (Deleted)

13. (Deleted)

14. (Deleted)

15. Sensor calibration once per operating cycle. Master/slave trip unit calibration once per 6 months.

16. The quarterly calibration of the temperature sensor consists of comparing the active temperature signal with a redundant temperature signal.

TABLE 4.2-7

ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION TEST AND CALIBRATION REQUIREMENTS

FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	TRIP UNIT CALIBRATION	CHANNEL CALIBRATION	SIMULATED AUTO ACTUATION & LOGIC FUNCTIONAL TEST
Reactor Pressure-High	D	Q	SA	R	R
Reactor Water Level-Low Low	D	Q	SA	R	R

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7.0 REFERENCES

(1) E. Janssen, "Multi-Rod Burnout at Low Pressure," ASME Paper 62-HT-26, August 1962.

(2) K.M. Backer, "Burnout Conditions for Flow of Boiling Water in Vertical Rod Clusters," AE-74 (Stockholm, Sweden), May 1962.

(3) FSAR Section 11.2.2.

(4) FSAR Section 4.4.3.

(5) I.M. Jacobs, "Reliability of Engineered Safety Features as a Function of Testing Frequency," Nuclear Safety, Vol. 9, No. 4, July-August 1968, pp 310-312.

(6) Deleted

(7) I.M. Jacobs and P.W. Mariott, APED Guidelines for Determining Safe Test Intervals and Repair Times for Engineered Safeguards - April 1969.

(8) Bodega Bay Preliminary Hazards Report, Appendix 1, Docket 50-205, December 28, 1962.

(9) C.H. Robbins, "Tests of a Full Scale 1/48 Segment of the Humbolt Bay Pressure Suppression Containment," GEAP-3596, November 17, 1960.

(10) "Nuclear Safety Program Annual Progress Report for Period Ending December 31, 1966, Progress Report for Period Ending December 31, 1966, ORNL-4071."

(11) Section 5.2 of the FSAR.

(12) TID 20583, "Leakage Characteristics of Steel Containment Vessel and the Analysis of Leakage Rate Determinations."

(13) Technical Safety Guide, "Reactor Containment Leakage Testing and Surveillance Requirements," USAEC, Division of Safety Standards, Revised Draft, December 15, 1966.

(14) Section 14.6 of the FSAR.

(15) ASME Boiler and Pressure Vessel Code, Nuclear Vessels, Section III. Maximum allowable internal pressure is 62 psig.

(16) 10 CFR 50.54, Appendix J, "Reactor Containment Testing Requirements."

(17) 10 CFR 50, Appendix J, February 13, 1973.

ATTACHMENT II to JPN-94-050

SAFETY EVALUATION FOR PROPOSED TECHNICAL SPECIFICATION CHANGES

INSTRUMENTATION SURVEILLANCE TEST INTERVALS, ALLOWABLE OUT-OF-SERVICE TIMES, AND OTHER CHANGES

JPTS-90-010

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

SAFETY EVALUATION FOR PROPOSED TECHNICAL SPECIFICATION CHANGES INSTRUMENTATION SURVEILLANCE TEST INTERVALS, ALLOWABLE OUT-OF-SERVICE TIMES, AND OTHER CHANGES (JPTS-90-010)

I. DESCRIPTION AND PURPOSE OF THE PROPOSED CHANGES

This application requests the following changes to the James A. FitzPatrick Technical Specifications:

1. Incorporate the results of the General Electric Licensing Topical Reports, prepared under the direction of the BWR Owners Group, supporting an increase of the surveillance test intervals (STI), and the repair and testing allowable out-of-service times (AOT), for most of the instrumentation listed in the Technical Specifications.

2. Remove instrument response time limits.

3. Remove the Average Power Range Monitor (APRM) downscale scram function.

4. Make additional miscellaneous changes to the instrumentation sections.

Because of the extensive nature of the changes, the exact wording of the proposed changes to the Technical Specifications (TS) are not provided in the following description. The proposed changes are described in sufficient detail so that, when reviewed in conjunction with the revised TS pages in Attachment I and the marked-up TS pages in Attachment III, a clear understanding of the changes to each specification and the referenced tables is provided.

Minor changes in format, such as type font, margins or hyphenation, are not described in this submittal. These changes are typographical in nature and do not affect the content of the Technical Specifications.

The proposed changes to the James A. FitzPatrick Technical Specifications are grouped into four categories. These categories and the intended purpose of the changes are as follows:

1. Incorporate STI and AOT Improvements - Category 1

   This application proposes an extension of the surveillance test intervals (STIs) from weekly or monthly to quarterly for the functional tests for most of the instrumentation in the Technical Specifications. Additionally, allowable out-of-service times (AOT) are proposed for the instrumentation. These times, specified separately for both repair and test situations, represent the time that the instrument may be inoperable before entry into its Limiting Condition For Operation action statement. The bases for these changes are presented in seven NRC approved General Electric Licensing Topical Reports (References 1 through 7), prepared under the direction of the BWR Owners Group.

The STI and AOT revisions will enhance plant safety by reducing the potential for test related plant scrams, excessive test cycles on equipment, and operator errors.

2. Relocation of Instrument Response Time Limits - Category 2

This application incorporates a line-item TS improvement that implements the guidance of Generic Letter 93-08, "Relocation of Technical Specification Tables of Instrument Response Time Limits" (Reference 24). The NRC guidance permits the relocation of the instrument response times from the TS to the Updated FSAR (UFSAR). Maintaining the response times in the UFSAR permits changes under the regulatory provisions of 10 CFR 50.59 without the need to use the license amendment process. The change does not alter the surveillance requirements for these limits.

The change to the TS involves the deletion of the two TS tables that specify instrument response time limits (Table 3.1-2, "Reactor Protection System Instrumentation Response Times," and Table 3.2-9, "Primary Containment Isolation System Actuation Instrumentation Response Times"). The response time limit requirements will be relocated to the UFSAR in the July 1995 annual update.

3. Delete APRM Downscale Scram - Category 3

This application proposes a change to delete the APRM downscale scram function listed in Technical Specification Table 3.1-1, "Reactor Protection System (Scram) Instrumentation Requirements." This function does not independently initiate a scram. The APRM downscale scram actually serves as an Intermediate Range Monitor (IRM) high flux scram interlock that bypasses the IRM high scram when both of the following conditions exist: (1) Reactor is in the RUN mode, and (2) APRM power level is above the APRM downscale trip setpoint (above 2.5%). This interlock feature is described in section 7.5.5.4 and Table 7.5-4 of the UFSAR.

The change will permit removal of the APRM downscale scram from the design of the RPS system. Removal of this interlock feature will defeat the IRM high scram in the RUN mode irrespective of the APRM power level. The rod block and annunciator functions associated with the APRM downscale trip will remain.

The change will permit any one IRM channel per trip system and any one APRM channel per trip system to be simultaneously bypassed, as intended by the plant design (UFSAR 7.5.5.3 and 7.5.7.4), avoiding the need to operate the plant in the "half scram" condition. Due to the different number of APRM and IRM channels (six vs. eight) some IRM channels share the same APRM channel. Consequently, some combinations of bypassed IRM and APRM channels results in less than the minimum number of required operable APRM downscale scrams. For these combinations, one of the failed channels cannot be bypassed, leaving the plant in a "half scram" condition. The change will provide the IRM and APRM channel bypass flexibility intended by the original plant design without the need to operate the reactor in a "half scram" condition.

4. Miscellaneous Changes - Category 4

Changes that include editorial revisions, clarification improvements, relocation of material, and revisions to conform the TS to the actual plant design as described in the FSAR.

The following describes the changes and their purpose. For ease of review, the discussion has been structured to parallel the order of presentation in the Technical Specifications. The page numbers specified in the heading of each change description pertain to the location of the subject material in the current Technical Specifications. These page numbers are the same for the location of the subject material in the revised Technical Specifications unless otherwise noted in the discussion. The category of each change (CAT 1, 2, 3, or 4) is specified in each change description.

A. Table of Contents, List of Tables / Figures, Pages i, v and vii

1. Page i: Revise the Table of Content page numbers to reflect the re-distribution of text. (CAT 4)

2. Page v: Delete Tables 3.1-2 and 3.2-9 from List of Tables. The change reflects the removal of instrument response time limits in accordance with NRC Generic Letter 93-08. Revise the table titles and page numbers to reflect changes described later in this section. (CAT 2 and 4)

3. Page vii: Delete Figures 4.1-1 and 4.2-1 from List of Figures. The change reflects the addition of new STI / ACTs based on several GE Licensing Topical Reports as discussed later in the safety evaluation. (CAT 1)

B. Specification 1.0, Definitions, Page 5

1. Page 5: Add a new definition: "T. Instrument Surveillance Frequency Notations/Intervals," that defines surveillance frequency notations and intervals. The definition conforms with the definition in the Standard Technical Specifications (Reference 17), Table 1.1, page 1-7. The new definition permits the use of notations for surveillance intervals on the instrumentation tables subject to changes in this amendment application, and relates all surveillance intervals to a consistent and precise time period.

   Further, the definition clarifies "once each operating cycle", and similar phrases, by relating the interval to the definition of the frequency notation "R". This will apply the definition of "R" to test frequencies based on operating cycle intervals as used throughout the Technical Specifications, in addition to the "once per operating cycle" requirement used on pages subject to this application. In this manner, a consistent and precise time period will be established for all operating cycle requirements in the TS. (CAT 4)

2. Page 5: Change "Atomic Energy Commission" to "Nuclear Regulatory Commission." (CAT 4)

C. <u>Specification 3.0, General Limiting Conditions for Operation, Pages 30a, 30d, and 30e.</u>

The changes appear on revised pages 30a, 30d, 30e, and 30f.

Add new Specification 3.0.F (revised page 30a) to permit equipment removed from service, or declared inoperable to satisfy a TS action statement, to be returned to service in order to perform testing to demonstrate its operability or the operability of other equipment. Also add Bases 3.0.F on revised page 30d. These additions conform with NUREG-1433, LCO 3.0.5, page 3.0-2, and Bases LCO 3.0.5, pages B 3.0-6 and 7 (Reference 18). Current pages 30d and 30e are renumbered 30e and 30f, respectively, to accommodate a redistribution of text. The revised text appears on revised pages 30a and 30d.

New Specification 3.0.F envelops a current LCO presented in the second sentence of Specification 4.1.D which states: "The trip system containing the unsafe failure may be placed in the untripped condition during the period in which surveillance testing is being performed on the other RPS channels". The addition of the new specification as proposed will permit deletion of this sentence. (CAT 4)

D. <u>Specification 3.1/4.1, Reactor Protection System, Pages 30f and 31</u>

The revise text appears on revise pages 30g and 31.

1. Page 30f: Delete the reference to the table that specifies RPS instrument response time limits. The table is removed in accordance with NRC Generic Letter 93-08. The information in the table regarding response time limits will be relocated to the UFSAR. The changes involve: (1) removal of the last sentence in the first paragraph of Specification 3.1.A, (2) removal of the Table reference in the second paragraph of Specification 4.1.A, (3) the insertion of the sentence, "Neutron detectors are exempt from response time testing," into Specification 4.1.A, and (4) add a list of the RPS trip functions subject to the response time surveillance requirement of Specification 4.1.A (list conforms to the trip functions listed on deleted Table 3.1-2). The change regarding neutron detectors is consistent with note 2 on deleted Table 3.1-2 (page 43a), and with the guidance of Generic Letter 93-08. (CAT 2)

2. Page 30f: Make editorial changes to the first sentence of Specification 3.1.A to conform with the contents of Table 3.1-1. Re-distribute text associated with Specification 3.1.B and 4.1.B to page 31. (CAT 4)

3. Page 31: Delete the first sentence of Specification 4.1.D that reads "When it is determined that a channel has failed in the unsafe condition, the other RPS channels that monitor the same variable shall be functionally tested immediately before the trip system containing the failure is tripped." This provision is

unnecessary based on the absence of a similar provision in the General Electric Licensing Topical Report NEDC-30851P-A (Reference 1) that provides the basis for an extension in the STI/AOTs for RPS instrumentation, and the amendment approved for Duane Arnold (Reference 23). (CAT 1)

4. Page 31: Delete the second sentence of Specification 4.1.D to reflect the addition of new Specification 3.0.F on revised page 30a. See change C. (CAT 4)

5. Page 31: Renumber Specification 4.1.E as 4.1.D. (CAT 4)

E. <u>Bases 3.1, Page 32</u>

Revise the second paragraph to reference the NRC approved evaluation used as the bases for the new AOTs. (CAT 1)

F. <u>Bases 4.1, Pages 36, 37, 38, 39, and 40</u>

The changes appear on revised pages 36, 37, and 38. Page 39 is blank.

The changes to the Bases 4.1, (RPS surveillance requirement) accomplish the following objectives:

(1) Remove text that discusses previous instrument reliability evaluations that are obsolete, and insert the reference to the NRC approved evaluations.

(2) Establish consistency with the new instrument repair and test AOTs.

(3) Clarify the current design of the RPS instrumentation.

(4) Reflect the removal of the instrument response time limits.

(5) Reorganize the text according to subject matter.

The changes that accomplish these objectives are as follows:

1. Page 36: Delete the first paragraph since it discusses an instrument reliability evaluation superseded by the NRC approved Licensing Topical Report (LTR). (CAT 1)

2. Page 36: Revise the second paragraph to: (1) add a reference to the GE Licensing Topical Report NEDC-30851P-A (Reference 1) used as the bases for the change to a quarterly functional test interval, and (2) delete text discussing instrument reliability criteria unrelated to the reliability data used in the newly referenced GE evaluation. (CAT 1)

3. Page 37: Delete the first paragraph since it discusses an instrument reliability evaluation that has been superseded by the NRC approved LTR. (CAT 1)

4. Page 37: Revise the first sentence in the second paragraph to clarify the design of the instrumentation. Delete the third sentence in this paragraph since this may not be possible under all circumstances. Delete the last sentence in this paragraph since it is not applicable to the newly referenced GE evaluation. The revised text appears on revised page 36. (CAT 1 and 4)

5. Page 38: Delete the word "unsafe" from the first sentence since it is a term not used in the TS. Also, revise the last sentence of the first paragraph to add "functionally," and add a reference to the GE Licensing Topical Report in a new sentence. The revised material appears on revised page 36. (CAT 1)

6. Page 38: Delete the second and third paragraph since they discuss a previous instrument reliability evaluation that has been superseded by the NRC approved LTR. (CAT 1)

7. Page 38: Replace "once/month" with "once/every three months" in the second sentence of the fourth paragraph to reflect the new AOTs. The revised material appears on revised page 37. (CAT 1)

8. Page 38: Delete the last paragraph to maintain consistency with the changes regarding the removal of the RPS response time limits in accordance with the guidance of Generic Letter 93-08 (Reference 24). (CAT 2)

9. Page 39: Add a reference for the Standard Technical Specifications mentioned in the first paragraph and move to revised page 37. Revise the second paragraph and move to revised page 38. Delete the third and fourth (except for the last sentence) paragraphs to remove text containing specific values for the instrument response times. These changes maintains consistency with the changes associated with Generic Letter 93-08 (Reference 24), regarding removal of the response time limits. (CAT 2 and 4)

10. Page 40: Move the first paragraph to revised page 38. Move the second paragraph (with a minor editorial change) and the third paragraph to revised page 36 so that the discussion of Group C devices follows the discussion of Group B devices. (CAT 4)

11. Page 40: Delete the fourth paragraph since drift specifications may change as a result of the modification process. (CAT 4)

12. Page 40: Move the first and second paragraphs in the right column to the top of revised page 37 to consolidate discussion of APRM calibration in one area of the bases. (CAT 4)

13. Page 40: Make editorial changes to the first sentence of the third paragraph in the right column and move paragraph to revised page 38. (CAT 4)

14. Page 40: Move Bases 4.1.B to revised page 38. (CAT 4)

G. Table 3.1-1, Reactor Protection System Instrumentation, Pages 41, 41a, 41b, 42 and 43

Revised Table 3.1-1 is redistributed onto revised pages 40, 41, 42, 43, and 43a. Pages 41a and 41b are deleted.

The changes accomplish the following objectives:

(1) Incorporates the 12 hours repair AOT and the 6 hour test AOT based on GE Licensing Topical Report NEDC-30851P-A (Reference 1).

(2) Consolidates all of the LCOs statements into the notes to Table 3.1-1.

(3) Addresses a concern identified by the NRC that a loss of scram function may occur if two or more channels are inoperable during the 12 hour AOT.

(4) Deletes the APRM Downscale Scram trip function.

1. Pages 41, 41a, 41b, 42, 43: Renumber and add notes as follows. These changes appear on revised pages 40, 41, 42, and 43. (CAT 1)

    a) Change note for the ACTION column from 1 to 3.

    b) Add note 2 to the "Minimum No. of Operable Instrument Channels Per Trip System" column heading.

    c) Renumber note 2 as note 4 with some minor editorial changes.

    d) Relocate action statements from note 1 to note 3.

    e) Renumber notes 4 through 8 as notes 5 through 9, respectively.

2. Page 41: Delete the mode switch annotation "(4 Selections)" since this information is not applicable to the operating requirements of Table 3.1-1. (CAT 4)

3. Page 41: Add the IRM High Flux trip level setting percentage that corresponds to 120/125. (CAT 4)

4. Pages 41, 41b, and 42: Delete obsolete note 16 from the "Mode in Which Function Must be Operable" column heading to reflect a previous amendment (amendment 207). (CAT 4)

5. Page 41a: Delete the APRM downscale trip function. The change provides the IRM and APRM channel bypass flexibility, as intended by the plant design (UFSAR 7.5.5.3 and 7.5.7.4), avoiding the need to operate the plant in a "half scram" condition under certain inoperable IRM/APRM channel combinations. (CAT 3)

6. Page 41a and 43: Add note 16 to the Drywell High Pressure and Reactor Low Water Level trip functions to identify the RPS instrumentation common to PCIS. (CAT 1)

7. Page 42: Add the 12 hour repair AOT as note 1 to Table 3.1-1. The AOT value conforms to General Electric Licensing Topical Report NEDC-30851P-A (Reference 1), pages 5-33; and NRC Safety Evaluation Report (Reference 8): Enclosure 2, page 1. The Limiting Condition for Operation (LCO) used in note 1 of Table 3.1-1 addresses an NRC concern (Reference 16) that a loss of scram function may occur if two or more channels are inoperable during the 12 hour AOT. The LCO uses the text, with some minor editorial changes, as that approved in an operating license amendment for the Duane Arnold Energy Center (Reference 23). Failure of multiple channels in an RPS trip function may result in a loss of scram function if tripping the channels is delayed by the AOT. Note 1 requires confirmation within one hour of RPS functional capability after two or more channels become inoperable. Further, the LCO limits the inoperable channels in one of the trip systems to a 6 hour AOT. (CAT I)

8. Page 42: Add the 6 hour AOT as note 2 to Table 3.1-1. The AOT value conforms to General Electric Licensing Topical Report NEDC-30851P-A (Reference 1), pages 5-34. The wording of the AOT conforms to NUREG-1433, Specification 3.3.1.1, and provides assurance that the associated trip function will remain operational following entry into the 6 hour test AOT. (CAT 1)

9. Page 43: Delete note (9) since it pertains to the deleted APRM downscale trip function. (CAT 3)

10. Page 3: Delete note 11 since it is not currently used, nor has it been previously used, in the Technical Specifications. The note references another section of the TS, and its deletion does not impact any TS requirement. (CAT 4)

H. <u>Table 3.1-2, Reactor Protection System Instrumentation Response Times, Page 43a</u>

Page 43a: Delete Table 3.1-2 in its entirety to reflect the guidance of NRC Generic Letter 93-08 (Reference 24) permitting the transfer of these limits to the UFSAR. (CAT 2)

I. <u>Tables 4.1-1 and 4.1-2, Reactor Protection System Instrumentation Surveillance Requirement, Pages 44, 45, 45a</u>

Revised Table 4.1-1 appears on revised pages 44, and 45. Page 45a is deleted.

1. Revise the frequency of functional tests to conform with Licensing Topical Report NEDC-30851P-A (Reference 1), pages 5-35, 5-36; and NRC Safety Evaluation Report (Reference 8), Enclosure 2, page 2 and 3. The specific changes are:

a. Page 44/45: Revise the frequency of channel functional tests from weekly or monthly to quarterly for the following:

- APRM High Flux
- APRM Inoperative
- APRM Flow Biased High Flux
- Reactor High Pressure
- Drywell High Pressure
- Reactor Low Level
- Scram Discharge Instrument Volume - High Water Level (Group A & B sensors)
- Main Steam Line Isolation Valve Closure
- Turbine Control Valve Fast Closure
- Turbine First Stage Pressure Permissive
- Turbine Stop Valve Closure

The change is not applicable to the IRM high flux and APRM high flux in startup or refuel modes.

The turbine first stage pressure permissive listed in Table 4.1-1, page 45, is not listed in the STS used for the markup TS page in LTR NEDC-30851P-A. However, the permissive provides an interlock feature that bypasses the turbine control valve fast closure, and turbine stop valve closure, when turbine first stage pressure is below a point corresponding to 30% rated thermal power (FSAR 7.2.3.8), and therefore should be considered an integral part of the scram features subject to the quarterly functional test interval.

The notations, as defined in proposed definition "T" on page 5, are used for all surveillance frequencies specified on the table. (CAT 1)

b. Page 44: Revise the frequency of the functional test for the RPS Channel Test Switch from "every refueling outage" to "weekly." The FitzPatrick RPS design uses separate scram contactors for the automatic scram logic and the manual scram logic (FSAR 7.2.3.5). Consequently, the manual scram switches do not actuate the automatic scram contactors. The RPS Channel Test Switches are provided to manually actuate the automatic scram contactors. Accordingly, the RPS Channel Test Switches should be subjected to the "weekly" functional test frequency in accordance with Licensing Topical Report NEDC-30851P-A (Reference 1). The weekly testing of these switches is acknowledged in the last paragraph on page 5-21 of the referenced LTR. (CAT 1)

c. Page 44/45a: Delete obsolete text from note 1, and substitute a provision that weekly functional tests of a scram function may be used instead of the RPS Channel Test Switches. Also transfer the test requirement after maintenance from the table to note 1. Reference note 1 at the functional test notation for the RPS Channel Test Switch. (CAT 1)

2. Page 44: Delete the APRM downscale trip function. The change provides the IRM and APRM channel bypass flexibility, as intended by the plant design, avoiding the need to operate the plant in a "half scram" condition under certain inoperable

IRM/APRM channel combinations. (CAT 3)

3. Make the following editorial changes (CAT 4):

   a. Page 44: Insert missing reference to note 2 to the "Group" heading.

   b. Page 44/45: Change "APRM-Flow Bias" to "APRM-Flow Bias High Flux." Change "Calibrate Flow Bias Signal" to "Trip Output Relays" for the APRM Flow Bias (Table 4.1-2 identifies calibration requirements). Revise the table title, and change the "Minimum Frequency" heading to "Functional Test Frequency."

   c. Page 44/45: Delete note 7, and add a column to the table specifying the instrument check requirements.

   d. Page 44/45a: Move the operating mode requirements for the weekly testing of the IRM High Flux, IRM Inoperative, and APRM High Flux in Startup or Refuel, scram functions to a new note (note 5).

   e. Page 44/45/45a: Renumber note 7 as note 6.

   f. Redistribute text from page 45a to page 45. Delete page 45a.

   g. Page 45: Change the nomenclature for the "turbine control valve EHC oil pressure" to "turbine control valve fast closure" to be consistent with the nomenclature in Table 3.1-1.

J. Figure 4.1-1, Page 48

Delete Figure 4.1-1 since it is referenced in text deleted by change F.6. (CAT 1)

K. Page 49, Specifications 3.2.A / 4.2.A, Primary Containment Isolation Functions

Delete the references to Table 3.2-9 which specifies main steam isolation valve actuation instrumentation response time limits. The table will be removed in accordance with NRC Generic Letter 93-08 (Reference 24) permitting the transfer of these limits to the UFSAR. The changes involve (1) the removal of the second paragraph of Specification 3.2.A, (2) the removal of the reference to Table 3.2-9 in the last paragraph of Specification 4.2.A, and (3) editorial changes to Specification 4.2.A that identifies the specific trip functions subject to the response time surveillance requirement. (CAT 2)

L. Page 50, Control Rod Block Actuation

Delete 3.2.C.2 regarding the test AOT for the rod block monitor. A revised test AOT will be added to Table 3.2-3, Instrumentation that Initiates Control Rod Blocks, as note 3, that conforms to GE Licensing Topical Report GENE-770-06-1-A (Reference 6), Appendix A, page A-40; and NRC Safety Evaluation Report

(Reference 14), attachment: Technical Evaluation Report, page 16 and 17; Enclosure 1, Table 2; and Enclosure 2, page 3-51. (CAT 1).

M. Bases 3.2, Pages 55, 56, and 57

1. Page 55: Add a paragraph that describes the trip logic for the isolation valves. (CAT 4)

2. Page 56: Add a paragraph that describes the trip logic for the main steam line high temperature isolation function. (CAT 4)

3. Page 57: Add a paragraph that describes the trip logic for the HPCI and RCIC high temperature isolation function. (CAT 4)

N. Bases 4.2, Pages 61, 62, and 63

Revised Bases 4.2 appears on revised page 61.

1. Pages 61, 62, and 63: Revise Bases 4.2 as follows to reflect the STI / AOT changes based on the GE Licensing Topical Report (References 1 through 7). (CAT 1)

   a. Add a new second paragraph that identifies the GE Licensing Topical Reports that provide the bases for the instrument AOTs and STIs.

   b. Delete the remainder of Bases 4.2 except for the first paragraph, and the last two sentences of the second paragraph, on page 61. The deleted material is superseded by the bases provided in the referenced Licensing Topical Reports.

2. Page 61: Delete the first three sentences of the second paragraph on page 61 to reflect the guidance of NRC Generic Letter 93-08 (Reference 24) permitting the transfer of response time limits from the TS to the UFSAR. The deleted text involves a reference to deleted Table 3.2-9 and discussion of specific response times. The remaining text is presented as part of the last paragraph of revised Bases 4.2 (Page 61). Transfer the definition of response time interval from deleted Table 3.2-9 to the last paragraph on revised page 61. (CAT 2)

O. Table 3.2-1, Instrumentation That initiates Primary Containment Isolation, Pages 64 and 65

The revised table and associated notes are redistributed to revised pages 62, 63, 64, and 65, and new page 65a.

1. Pages 64, 65: Make the following editorial changes. (CAT 4)

   a. Relocate the action statement in note 2 to note 3.

b. Delete note 5 since it does not appear on the table.

c. Renumber notes 6 through 8 as notes 4 through 6, respectively.

d. Change the "Instrument" column heading to "Trip Function" and revise the title of Table 3.2-1.

e. Make minor editorial changes to the trip function nomenclatures.

f. Move re-numbered notes 4, 5, and 6 to the more appropriate location next to the trip function notations.

g. Delete re-numbered note 5 from the Condenser Low Vacuum function since re-numbered note 6 addresses the run mode requirement.

h. Add new page 65a to accommodate a re-distribution of text

2. Revised Page 63: Relocate eight instruments from Table 3.2-2 to Table 3.2-1 since these instruments perform an isolation function, not an ECCS function. This will establish consistency with the STS (Reference 17), and resolves an NRC concern expressed in Inspection Report No. 50-333/88-01, item 10 (Reference 19). The NRC inspector was concerned that the absence of these instruments from Table 3.2-1 may result in the inoperability of these instruments when primary containment integrity is required by Specification 3.7.A.2. The relocation subjects these instruments to the operability requirements of Specification 3.7.A.2. These instruments are:

   - HPCI turbine steam line high flow
   - HPCI steam line low pressure
   - HPCI turbine high exhaust diaphragm pressure
   - HPCI steam line/area temperature
   - RCIC turbine steam line high flow
   - RCIC steam line low pressure
   - RCIC turbine high exhaust diaphragm pressure
   - RCIC steam line/area temperature,

   Add action statement F to the table for these valve isolation functions. Action statement F is described in renumbered note 3. With less than the minimum number of instrument channels operable, action statement F requires that the affected penetration flowpath be isolated within one hour, and the affected system declared inoperable. Closing an isolation valve on the penetration assures that the associated system (HPCI or RCIC) is isolated when a portion of the pipe break protection is in a degraded condition. Declaring the HPCI or RCIC system inoperable, limits continued plant operation to the seven day AOT specified for an inoperable HPCI and RCIC system in TS 3.5.C.1.a and TS 3.5.E.1, respectively. This action statement is similar to the action statement in the STS (Reference 17), page 3-12, and 3-14, Action 22, for RCIC systems. The portion of the action statement regarding the requirement to "isolate the affected penetration flow path" conforms with required action statement F.1 on page 3.3-2 of NUREG-1433 (Reference 18). (CAT 4)

3. Revised Page 63: For the HPCI Steam line Area Temperature function, revise the total number of instrument channels provided by design for both trip system, and the minimum number of operable instrument channels per trip system, from 2 and 1, to 16 and 8, respectively. For the RCIC Steam Line Area Temperature function, revise the total number of instrument channels provided by design for both trip system, and the minimum number of operable instrument channels per trip system, from 2 and 1, to 8 and 4, respectively. The change reflects the actual design of the trip system. The instrument channels provide inputs to two trip systems. If any one of the channels becomes inoperable, the required action must be taken. This change does not impact the operability requirements for this trip function. (CAT 4)

4. Page 64: For the Main Steam Line Detection High Temperature function, revise the total number of instrument channels provided by design for both trip system, and the minimum number of operable instrument channels per trip system, from 4 and 2, to 16 and 8, respectively. The changes reflects the actual design of the trip system as the plant was licensed (FSAR 7.3.4.2). There are four temperature sensors located at each of four different areas in the vicinity of the steam lines for a total of 16 temperature sensors. If any one of the 16 channels becomes inoperable, the required action must be taken. This change does not impact the operability requirements for this trip function. (CAT 4)

5. Pages 64 and 65: Revise the action statement for the Main Steam Line High Flow isolation trip function to "Isolate the affected main steam line within eight hours" by adding Action G to the table and revised note 3. There are a total of four high flow instrument channels, one for each of the four main steam lines. Loss of an instrument channel affects leakage detection capability for only its associated main steam line. Therefore, the appropriate action in response to an inoperable instrument channel is to isolate the main steam line associated with the high flow instrument channel. (CAT 4)

6. Pages 64 and 65: Add two trip functions to reflect the design of the isolation logic of the isolation valves on the primary containment hydrogen and oxygen concentration sample, and the gaseous and particulate radioactivity sample supply and return lines. These additional trip functions appears as the "Reactor Low Water Level" and "Drywell High Pressure" functions with notes 7 and 8. Note 8 is added to identify the isolation logic of the isolation valves on these systems as a two-out-of-two-taken-once logic. (CAT 4)

7. Page 65: Add the 6 hour testing AOT as note 2 to Table 3.2-1, Instrumentation That Initiates Primary Containment Isolation. This AOT value conforms to: (1) GE Licensing Topical Reports NEDC-30851P-A, Supplement 2 (Reference 3), (2) GE LTR NEDC-31677P-A (References 5), page D-3, (3) NRC Safety Evaluation Report (Reference 10), Enclosure 1, Table 2; and Enclosure 2, page 3-16, and (4) NRC Safety Evaluation Report (Reference 13), Enclosure 1, page 2, and Enclosure 2, page 3-14. The wording of the AOT conforms, except as noted below, to NUREG-1433, Specification 3.3.6.1, and provides assurance that the associated trip function will remain operational following entry into the 6 hour test AOT. The exceptions are as follows:

   a) Maintaining PCIS initiation capability is clarified to mean that "the associated

Trip Function maintains PCIS initiation capability for at least one containment isolation valve on the affected penetration. (CAT 1)

b) The 6 hour AOT is also applied to the primary containment isolation valve affected by the test of the instrument channel. This permits the affected isolation valve to be deactivated in the open position for the duration of the test of its associated isolation logic. Placing the valve in this configuration is necessary on systems whose isolation valves are normally open to support plant operation (e.g. RWCU, HPCI, RCIC). This provision supersedes the 4 hour AOT requirement of Specification 3.7.D.2 for inoperable isolation valves, and applies only when the valve is deactivated in the open position to support testing of its instrumentation. (CAT 1).

c) The STS (Reference 18) permits an unconditional 6 hour testing AOT for single channel trip systems. The presumption is that if the isolation logic is designed such that isolation capability is disabled when one instrument channel is removed from service for testing, then an unconditional 6 hour AOT is necessary to effect testing of the instrumentation. For the same reason, an unconditional 6 hour AOT is applied in note 2 to the trip functions designed as a two-out-of-two-taken-once logic. This logic is utilized for the isolation valves on the primary containment hydrogen and oxygen concentration sample, and the gaseous and particulate sample supply and return lines. Note 8 is added to identify the two trip functions subject to this unconditional AOT. (CAT 1)

8. Page 65: Delete the first sentence of note 2 to Table 3.2-1, and add the longer repair AOTs to note 1 . The AOT values conform to: (1) GE Licensing Topical Reports NEDC-30851P-A, Supplement 2 (Reference 3), (2) GE LTR NEDC-31677P-A (Reference 5), D-1 and D-2; (3) NRC Safety Evaluation Report (Reference 10), Enclosure 1, Table 2 and Enclosure 2, page 3-9, and (4) NRC Safety Evaluation Report (Reference 13), Enclosure 1, page 2, and Enclosure 2, page 3-9.

   The change adds a 12 hour AOT for isolation instrumentation common to RPS and/or ECCS instrumentation, and a 24 hour AOT for isolation instrumentation not common to RPS. The proposed AOT uses text that is similar to the text proposed for the RPS AOT. The AOT is permitted for multiple channel failures only when their inoperability does not prevent the PCIS trip function capability. Note 1 requires confirmation within one hour of PCIS functional capability after two or more channels become inoperable, otherwise entry into the action statement is required. (CAT 1)

9. Page 65: Add note 7 to identify instrumentation common to the RPS instrumentation. The instrumentation common to both the RPS and PCIS trip functions are the Reactor Low Water Level and Drywell High Pressure Instruments. This note is provided to assist in the interpretation of the new AOT in note 1. (CAT 1)

10. Page 65: Reword note 6 to read as a requirement rather than a design feature. This does not change the operating requirement for this isolation function. (CAT 4)

P. Table 3.2-2, Instrumentation That Initiates or Controls the Core and Containment Cooling Systems, Pages 66, 67, 68, 69, 70, 70a, 70b, 70c, and 71.

The revised table and associated notes appear on revised pages 66, 67, 68, 69, 70, 71. Pages 70a, 70b, and 70c are deleted.

1. Pages 66 through 71: Make the following editorial changes. (CAT 4)

   a. Add a note 2 notation to the Table 3.2-2 heading for "Minimum Number of Operable Instrument Channels Per Trip System."

   b. Delete "inst. channel(s)" in the column for "Total Number of Instrument Channels Provided by Design for Both Trip Systems" to eliminate unnecessary redundancy.

   c. Add a second Reactor High Water Level trip function to page 66 to reflect the fact that the HPCI and RCIC trip features are controlled by independent trip systems. Renumber sequentially the remaining trip functions.

   d. Make several editorial revisions to the trip function nomenclature, and the text in the "Remarks" column, to improve clarity. Revise the title of Table 3.2-2.

2. Page 66 through 71: Add a note 8 to identify functions with only one trip systems. Add a note 9 to identify single channel trip systems. These notes assist in the interpretation of the revised repair and test AOTs. (CAT 1)

3. Page 67: For Drywell High Pressure, specify that the total number of instrument channels provided by design for both trip systems is "4" to reflect the plant design as described in UFSAR section 7.4.3.2.2. (CAT 4)

4. Page 69: Change the total number of instrument channels provided by design for both trip systems, and the minimum number of operable instrument channels per trip system, for the RHR (LPCI) Pump Discharge Pressure Interlock, from 4 and 2, to 8 and 4, respectively. The change reflects the actual design of the trip logic. If any one of the 4 channels becomes inoperable, the required action must be taken. This change does not impact the operability requirements for this trip function. (CAT 4)

5. Page 71: Add a 24 hour repair AOT for the instrumentation listed in Table 3.2-2 that initiates or controls the emergency core cooling systems. Revised note 1 reflects the new 24 hour AOT. The change for all instruments except the RCIC system conforms to: (1) GE Licensing Topical Report NEDC-30936P-A (Reference 4), Part 2, page A-18, (2) NRC Safety Evaluation Report (Reference 11), and (3) NRC Safety Evaluation Report (Reference 12), pages 3 and 4. The change for the RCIC system instruments conforms to GE Licensing Topical Report GENE-770-06-2-A (Reference 7): Appendix C, page C-4-4; and NRC Safety Evaluation Report (Reference 15), Enclosure 1, pages 3 and 4, and Enclosures 2. (CAT 1)

   The proposed AOT uses text that is similar to the text proposed for the RPS AOT. The AOT is permitted for multiple channel failures only when their inoperability

does not prevent ECCS trip function capability. Note 1 requires confirmation within one hour of ECCS functional capability after two or more channels become inoperable, otherwise entry into the action statement is required.

The NRC approved 24 hour repair AOT in NEDC-30936P-A, Part 2, Table A-9, references the action statement of Table 3.3.3-1 of the STS (Reference 17). Accordingly, the new note 1 to Table 3.2-2 is revised to conform with the following features of the action statement in Table 3.3.3-1 of the STS (Reference 17):

a. The current action statement (note 1) requires that the trip system be placed in the tripped condition if at least one of the channels is inoperable. This is not the intent of the action statement, since placing a trip system in the tripped condition would initiate ECCS. The revised action statement (note 1a) specifies a trip of the inoperable channel as the appropriate response to an inoperable condition. Tripping the inoperable channel will complete the safety function of the channel and permits the operable portion of the logic to function as designed (initiate ECCS in response to an actuation signal). (CAT 4)

b. The current action statement requires the reactor to be placed in the cold condition within 24 hours if the LCO is not satisfied. The current requirement can be interpreted in a manner that is inconsistent with the requirements of Technical Specification 3.5.F which identifies ECCS subsystem operability requirements when in cold shutdown. The revised action statement removes this inconsistent action requirement by declaring the "associated ECCS inoperable" when an inoperable instrument channel is not placed in the tripped condition within 24 hours. Declaring an ECCS inoperable assures that the appropriate LCO in Section 3.5 (ECCS LCOs) of the TS is applied. (CAT 4)

6. Page 71: Add a 6 hour test AOT for the instrumentation listed in Table 3.2-2 that initiates or controls the emergency core cooling systems. New note 2 reflects the new 6 hour AOT. The test AOT value for all instruments, except the RCIC system, conforms to (1) GE Licensing Topical report NEDC-30936P-A (Reference 4), Part 2, page A-17; (2) NRC Safety Evaluation Report (Reference 11); and (3) NRC Safety Evaluation Report (Reference 12), pages 3 and 4. The test AOT value for the RCIC system instruments conforms to GE Licensing Topical Report GENE-770-06-2-A (Reference 7), Appendix C, page C-4-3; and NRC Safety Evaluation Report (Reference 15), Enclosure 1, pages 3 and 4, and Enclosure 2. The wording of the AOT conforms to NUREG-1433, Specification 3.3.5.1, and provides assurance that the associated trip function will remain operational following entry into the 6 hour test AOT. (CAT 1)

7. Page 71: Current note 3 requires the LCO of Specification 3.5.A to be implemented when one of the Core Spray or Residual Heat Removal (RHR) pump timers is inoperable. This action statement inadvertently excludes consideration of the operability of these systems when in the cold condition. The revised note 3 will reference all Core Spray and RHR system requirements in TS 3.5 when their pump timers are inoperable. Additionally, the note is revised to explain that the consequences of an inoperable instrument (timer) is to disable the automatic initiation function for the pump. (CAT 4)

8. Pages 70a, 70b, and 70c: Relocate eight instruments from Table 3.2-2 to Table 3.2-1 since these instruments perform a primary containment isolation function, not an ECCS initiation or control function. This change will establish consistency with the STS, and resolves an NRC concern as discussed in item O.2. These instruments are: HPCI Turbine steam line high flow, HPCI steam line low pressure, HPCI Turbine high exhaust diaphragm pressure, HPCI steam line/area temperature, RCIC Turbine steam line high flow, RCIC steam line low pressure, RCIC Turbine high exhaust diaphragm pressure, and RCIC steam line/area temperature. (CAT 4)

Q. Table 3.2-3, Instrumentation That Initiates Control Rod Blocks, Pages 72 and 73

The revised Table 3.2-3 and associated notes appears on revised Pages 72, 73, and 74.

1. Page 72: Revise the table to specify the "minimum operable channels per trip function," rather than the "minimum operable channels per trip system." The minimum number of operable channel requirements listed in the column are doubled to reflect this change. Also remove the phrase "for both channels" from the column for total number of instrument channels. The change reflects the as-built configuration of the control rod block initiation logic (UFSAR 7.7.4.3). The control rod block (CRB) logic is designed as a "1 out of n" logic, where n is the total number of CRB channels. Only one input need be in the trip condition on either logic to effect a rod block signal. For example, the APRM rod block trip logic is based on one out of six, not one out of three taken twice logic. The change conforms to STS (Reference 17), Table 3.3.6-1, page 3-51 and 3-52. (CAT 4)

2. Page 72: Add notes 1 and 3 notations to column heading titled: "Minimum No. of Operable Instrument Channels Per Trip Function." Add note 2 notation to column heading titled: "Action." Make several editorial changes to the trip function nomenclature to establish consistency with Table 3.1-1, and revise the title of Table 3.2-3. (CAT 1)

3. Page 72: Add the setpoint to full scale ratio to the trip level settings of the IRM Upscale and IRM Downscale trip function. The ratio corresponds to the current setpoint specified in the table. (CAT 4)

4. Page 72 and 73: Delete current note 4 and change the minimum number of operable instrument channels per trip system requirement for the SRM trip functions from 4 to 3. This change reflects the capability as designed to bypass any one of the four SRM channels (FSAR 7.5.4.2). (CAT 4)

5. Pages 72 and 73: Clarify the notes for Table 3.2-3 by adopting features of the STS. The required actions for the control rod blocks are currently split between notes 1 and 10. Further, the current required actions in note 1 appears after the operating mode requirements for the CRBs. This presentation makes it difficult for the reader to locate the operability requirements. The following changes will improve the presentation of this material:

Split the current note 1 into two notes (notes 1 and 2). Note 1 presents the operating mode requirements for the CRBs. This change does not change the operability requirement of the current specification. Note 2 presents the AOTs and action statements for the CRBs in a manner that conforms to the STS (Reference 17): pages 3/4 1-18, 3/4 3-51, and 3/4 3-52, except that the 7 day AOT for the Action B instruments (RBM) is retained since this is a plant specific value. Some minor editorial changes have been incorporated into the action statements in note 2 to establish consistency with the required action language used for the other tables in TS 3.2. New note 2 replaces the AOTs in existing notes 1 and 10 (note 10 is therefore deleted). The change is also consistent with the NRC Safety Evaluation Report (Reference 14). The new AOTs / Action Statements differ in substance from the current TS as follows:

a) The required action for Action A instruments is the same as the current TS except for (1) the deletion of accelerated testing requirements for the operable system when less than the minimum number of operable channel are operable, and (2) adds a one hour time period to implement a required trip. The changes conform to the STS (Reference 17).

   The accelerated testing requirement is unnecessary based on the absence of a similar provision in the General Electric Licensing Topical Report GENE-770-06-1-A, and STI/AOT amendments approved for other plants (Reference 23). Frequent testing will reduce instrument reliability due to increased out-of-service time to perform the testing, and increases the risk of test-induced trips. (CAT 1)

b) The required action for Action B instruments (RBM) requires that the reactor not be operating in the Limiting Control Rod Pattern, which is consistent with TS 3.3.B.5 on page 94. (CAT 1)

c) The required action for Action C instruments conforms with the referenced Licensing Topical Report as described in change Q.7 below. (CAT 1)

6. Page 73: Add a 6 hour test AOT for the control rod block instruments as note 3 to Table 3.2-3. The AOT value conforms to GE Licensing Topical Report GENE-770-06-1-A (Reference 6): Appendix A, page A-40; and NRC Safety Evaluation Report (Reference 14): attachment titled "Technical Evaluation Report," page 16 and 17; Enclosure 1, Table 2, and Enclosure 2, page 3-51. The change permits deletion of Specification 3.2.C.2 on page 50. The wording of the AOT conforms to NUREG-1433, Specification 3.3.2.1, and provides assurance that the associated trip function will remain operational following entry into the 6 hour test AOT. (CAT 1)

7. Page 73: Establish a 12 hour repair AOT for the Scram Discharge Instrument Volume High Water Level control rod block. An AOT for this function is not currently specified (see current note 10 to Table 3.2-3). This AOT will appear in "Action C" of revised note 2 to Table 3.2-3. Note 10 is deleted. The change conforms to GE Licensing Topical Report GENE-770-06-1-A (Reference 6): Appendix A, pages A-41 and A-42; and NRC Safety Evaluation Report (Reference 14): attachment titled "Technical Evaluation Report," page 16 and 17; and Enclosure 1, Table 2. (CAT 1)

8. Page 73: Make the following editorial changes. (CAT 4)

   a. Reword current note 6 to read as an operability requirement rather than a design requirement.

   b. Make minor editorial changes to the nomenclature of instruments specified in current note 8 to be consistent with the table.

   c. Renumber current notes 2 through 9 as notes 4 through 10, respectively.

   d. Page 74 accommodates a redistribution of text.

R. <u>Table 3.2-7, ATWS Recirculation Pump Trip Actuation Instrumentation, Page 77</u>

The text for this table is redistributed onto revised pages 76 and 77.

1. Add notes 1 and 2 notation to "Minimum Number of Operable Channels per Trip System" column to reflect the repair and test AOTs. (CAT 1)

2. Change the AOT for multiple channel failures from one hour to 24 hours. The change applies to the situation where there are two or more inoperable channels. The AOT value is based on GE Licensing Topical Report GENE-770-06-1-A (Reference 6), Appendix A, page A-15; and NRC Safety Evaluation Report (Reference 14), Enclosure 1, Table 2. The proposed AOT appears as note 1, and uses text that is similar to that proposed for the RPS AOT. The AOT is permitted for multiple channel failures only when their inoperability does not prevent the RPT trip function capability. Note 1 requires confirmation within one hour of RPT functional capability after two or more channels become inoperable, otherwise entry into the action statement is required. The AOT value for a single channel failure, and the action statement, remains unchanged. (CAT 1)

3. Add a 6 hour test AOT as note 2 to Table 3.2-7. The AOT value is based on GE Licensing Topical Report GENE-770-06-1-A (Reference 6), Appendix A, page A-17; and NRC Safety Evaluation Report (Reference 14), Enclosure 1, Table 2. The wording of the AOT conforms to NUREG-1433, Specification 3.3.4.2, and provides assurance that the associated trip function will remain operational following entry into the 6 hour test AOT. (CAT 1)

4. Make minor editorial changes to the column headings and in the action statements to establish consistency with the other instrumentation tables. Also, some minor format changes are made to the table, and the title of the table is revised. Rearrange the order of the columns to conform with the other tables. (CAT 4)

S. <u>Table 3.2-9, Primary Containment Isolation System Actuation Instrumentation Response Times, Page 77e</u>

Delete page 77e to remove the response time limits for the main steam isolation valve closure actuation instrumentation. The change conforms with the guidance of

NRC Generic Letter 93-08 regarding the transfer of response time limits from the TS to the UFSAR. (CAT 2)

T. Table 4.2-1, Minimum Test and Calibration Frequency for PCIS, Page 78

The revised Table 4.2-1 is redistributed onto revised pages 78 and 79.

1. Relocate eight instruments from Table 4.2-2 to Table 4.2-1 since these instruments perform an isolation function, not an ECCS function. This will establish consistency with the STS, and resolves an NRC concern as described previously in changes O.2 and P.8. These instruments are: HPCI Turbine steam line high flow, HPCI steam line low pressure, HPCI Turbine high exhaust diaphragm pressure, HPCI steam line/area temperature, RCIC Turbine steam line high flow, RCIC steam line low pressure, RCIC Turbine high exhaust diaphragm pressure, and RCIC steam line/area temperature. (CAT 4)

2. Revise the frequency of the functional tests from monthly to quarterly to conform with: (1) GE Licensing Topical Report NEDC-30851P-A, Supplement 2, (Reference 3), Enclosure 2; (2) GE Licensing Topical Report NEDC-31677P-A (References 5), Appendix D, pages D-4 through D-8; (3) NRC Safety Evaluation Report (Reference 10), Enclosure 1, page 3; and Enclosure 2; and (4) NRC Safety Evaluation Report (Reference 13), Enclosure 1, page 2, and Enclosure 2. The change also applies to the eight instruments relocated from Table 4.2-2. The notations, as defined in proposed definition "T" on page 5, are used for all surveillance frequencies specified on the table. The PCIS functions for which the test frequencies are changed from monthly to quarterly are: (CAT 1)

   - Reactor High Pressure
   - Reactor Low-Low-Low Water Level
   - Main Steam High Temperature
   - Main Steam High Flow
   - Main Steam Low Pressure
   - RWCU High Temperature
   - Condenser Low Vacuum
   - Main Steam Line High Radiation
   - HPCI / RCIC Steam Line High Flow
   - HPCI / RCIC Steam Line/Area High Temperature
   - HPCI / RCIC Steam Line Low Pressure
   - HPCI / RCIC High Exhaust Diaphragm Pressure

3. Add a notation for new note 16 that defines the quarterly calibration for the temperature sensors for the RWCU Area High Temperature PCIS trip. (CAT 4)

4. Make the following editorial changes. (CAT 4)

   a. Correct a nomenclature error in the Reactor High Pressure trip function by changing "permissive" to "isolation." This trip function closes the shutdown cooling isolation valves.

b. The notations, as defined in proposed definition "T" on page 5, are used for the surveillance frequencies specified on the page.

c. Revise the title of the table.

d. Redistribute text to page 79.

U. <u>Table 4.2-2, Minimum Test and Calibration Frequency For Core and Containment Cooling Systems, 79 and 80</u>

The revised Table 4.2-2 is redistributed onto revised pages 80 and 81.

1. Relocate eight instruments from Table 4.2-2 to Table 4.2-1 since these instruments perform an isolation function, not an ECCS function. This will establish consistency with the STS, and resolves an NRC concern previously described in change O.2, P.8, and T.1. These instruments are: HPCI & RCIC Steam Line High Flow, HPCI & RCIC Steam Line/Area High Temperature, HPCI & RCIC Steam Line Low Pressure, and HPCI & RCIC Exhaust Diaphragm Pressure High. The logic system function tests for the HPCI and RCIC Auto Isolation are also moved from Table 4.2-2 to Table 4.2-1. (CAT 4)

2. Revise the frequency of the instrument functional tests from monthly to quarterly for the following instruments that initiate or control the emergency core cooling systems:

   - Reactor Water Level
   - Drywell Pressure
   - Reactor Pressure
   - ADS - LPCI or CS Pump Disch.
   - HPCI & RCIC Suction Source Levels
   - Trip System Bus Power Monitors
   - Core Spray Sparger d/p

   The testing frequency for the other instruments on the table remain unchanged. The notations, as defined in proposed definition "T" on page 5, are used for all surveillance frequencies specified on the table. The change for all instruments, except the RCIC system, conforms to GE Licensing Topical Report NEDC-30936P-A, Part 2 (References 4): pages A-15 and A-16: and NRC Safety Evaluation Report (Reference 10): Enclosure 1, page 3. The change for the RCIC system instruments conforms to GE Licensing Topical Report GENE-770-06-2-A (Reference 8): Appendix C, page C-4-6; and NRC Safety Evaluation Report (Reference 15): Enclosures 1, page 3, and Enclosure 2. (CAT 1)

   Three of the functions for which the functional test frequency is extended from monthly to quarterly, do not appear on the marked-up Technical Specification pages in the GE Licensing Topical Report referenced in the preceding paragraph. Two of the functions are the Trip System Bus Power Monitors and the Core Spray Sparger d/p alarm. They are absent from the mark-up pages since these instruments do not appear in the STS (Reference 17). The function of these

instruments is limited to a monitoring function; i.e., they do not initiate an ECCS actuation. However, both instruments are part of the generic models analyzed in the referenced GE Licensing Topical Report. The Bus Power Monitors are shown in NEDC-30939P-A, Part 2, Appendix E, page E-4, E-5, and E-22. The Core Spray Sparger d/p instrument is shown in NEDC-30936P-A, Part 1, Appendix M, page M-16. The third function is the Reactor Low Level (inside shroud) trip function. This function prevents diversion of LPCI flow to the containment sprays if there is insufficient reactor water level. Basic event "Flow from pump loop B (A) diverted" on the fault tree shown in NEDC-30936P-A, Part 1, Appendix B, page B-20 considers failure of this function. Accordingly, the quarterly functional test frequency is applicable to these functions. (CAT 1)

3. Delete the logic system functional test for the ADS Relief Valve Bellow Pressure Switch since this trip function was eliminated when the relief valves were replaced with a valve of improved design during a previous modification. (CAT 4)

4. Revise the title of the table. (CAT 4)

V. <u>Table 4.2-3, Minimum Test and Calibration Frequency For Control Rod Block Actuations, Page 81</u>

The revised Table 4.2-3 is renumbered page 82.

1. Revise the frequency of the functional testing to quarterly for the APRM, Rod Block Monitor, and Scram Discharge Volume control rod blocks to conform to GE Licensing Topical Report NEDC-30851P-A, Supplement 1 (Reference 2), page A-4; and NRC Safety Evaluation Report (Reference 9): Enclosure 3. The notations, as defined in proposed definition "T" on page 5, are used for all surveillance frequencies specified on the table. (CAT 1)

2. Delete the requirement to perform a calibration of the SRM-Detector Not in Startup Position and IRM-Detector Not in Startup Position control rod blocks since a calibration is not applicable because these functions do not utilize analog devices. The instrument functional test of these position switches assures operability of their associated CRB function. The change conforms to the STS in enclosure 3 of NRC Safety Evaluation Report (Reference 9). (CAT 4)

3. Revise the title of the table. (CAT 4)

W. <u>Page 84, Notes For Tables 4.2-1 Through 4.2-5</u>

1. Add note 16 to define the method used to calibrate the temperature sensors for the RWCU Area High Temperature PCIS function. (CAT 4)

2. Delete notes 10, 13, and 14, since they are not currently used in the TS. Note 10 pertains to a sampling requirement that does not exist in the Technical Specifications (Appendix A). Notes 13 and 14 notations were deleted by Amendment 181 which deleted Table 4.2-6, Surveillance Instrumentation, and

incorporated Table 4.2-8, Accident Monitoring Instrumentations. That amendment deleted the SRM and IRM instruments from both the surveillance and accident monitoring categories. Consequently, the reference in note 13 to the SRM/IRM surveillance requirements in Tables 4.1-1, 4.2-1, and 4.2-3 is unnecessary. Note 14 requires the safety/relief valves, listed on deleted Table 4.2-6, Surveillance Instrumentation, to be functionally tested once each operating cycle. The note is unnecessary since this testing requirement was transferred to Table 4.2-8, Accident Monitoring Instrumentation, by Amendment No. 181. Deletion of these notes does not impact current TS requirements. (CAT 4)

3. Delete the last sentence in note 7 which reads " Where possible all logic system functional tests will be performed using the test jacks." This level of detail regarding the technique to be used to perform a test is not appropriate in the TS. (CAT 4)

X. Table 4.2-7, Minimum Test and Calibration Frequency For ATWS Recirculation Pump Trip Actuation Instrumentation, Page 85

1. Revise the frequency of the channel functional test requirement from monthly to quarterly. This change is based on GE Licensing Topical Report GENE-770-06-1-A (Reference 6), Appendix A, page A-19; and NRC Safety Evaluation Report (Reference 14), Enclosure 1, Table 2; and Enclosure 2, page 3-40. The notations, as defined in proposed definition "T" on page 5, are used for all surveillance frequencies specified on the table. (CAT 1)

2. Revise the title of the table. (CAT 4)

Y. Figure 4.2-1, Test Intervals vs. Probability of System Unavailability, Page 87

Page 87: Delete Figure 4.2-1 since it is referenced in text deleted by change N.1. (CAT 1)

Z. Section 7.0 References, Page 285

Delete reference 6 since it is used in text deleted on page 36, and does not appear elsewhere in these TS. (CAT 1)

II. SAFETY IMPLICATIONS OF THE PROPOSED CHANGES

The proposed changes to the James A. FitzPatrick Technical Specifications are grouped into four categories. The safety implications associated with each of these change categories are as follows:

1. Incorporate STI and AOT Improvements - Category 1

The amendment will extend the Reactor Protection System (RPS), Primary Containment Isolation System (PCIS), Emergency Core Cooling System (ECCS), Control Rod Block (CRB), and Recirculation Pump Trip (RPT) instrumentation functional test intervals from weekly or monthly to quarterly as described in the previous section. The interval for the functional test of the automatic scram contactors will change from "every refueling outage" to "weekly" using either the channel functional test or the RPS Channel Test Switches. The bases for this change is documented in General Electric Licensing Topical Report NEDC-30851P-A (Reference 1) which concludes that a common cause failure of the scram contactors is a major contributor to RPS unavailability.

Additionally, allowable out-of-service times, as described in the previous section, are specified for the instrumentation These times, specified separately for both repair and test situations, represent the time that the instrument may be rendered inoperable before entry into its associate Limiting Condition For Operation action statements.

The bases for these changes are presented in generic evaluations developed by the BWR Owners Group, submitted to the NRC in seven GE Licensing Topical Reports (References 1 through 7), and approved by NRC Safety Evaluation Reports (References 8 through 15). These generic evaluations are applicable to the FitzPatrick design as documented in References 26 through 31.

The generic evaluations utilize fault tree modeling to estimate the impact of the proposed STI and AOT changes on the instrument system failure frequency. The acceptance criteria used in the analyses for the proposed changes is based on a net change in risk. The net change in risk is the difference between the increase in risk that results from the longer STI / AOT, and the decrease in risk that results from the reduced likelihood of inadvertent scrams due to a reduction in testing. The generic evaluations concluded that the net change in risk is negligible. Further, the evaluations concluded that the overall effect of the proposed changes provides a net increase in plant safety when all factors are considered. This increase in plant safety is achieved by reducing the potential for: (a) unnecessary plant scrams (reduced challenges to plant shutdown systems and improved plant availability); (b) excessive test cycles on equipment (reduced wear-out potential); and (c) diversion of plant personnel and resources on unnecessary testing (potential safety and operational improvement).

The NRC Safety Evaluations Reports (References 8 through 15) concluded that the GE Licensing Topical Reports provide an acceptable generic basis for supporting plant-specific Technical Specification changes. The SER further states that each applicant for a license amendment must confirm the plant-specific applicability of the

generic evaluations. A plant specific evaluation was performed for each instrumentation category. The evaluations compared the instrumentation design configurations and surveillance requirements to the generic model used in the GE Licensing Topical Reports. Differences were identified and assessed as to their impact on instrumentation reliability calculated for the generic models. Additionally, the setpoint drift expected under the extended STIs was evaluated to determine the acceptability of current setpoint calculations. Provided below is a summary of the plant specific evaluations performed by the Authority (References 26 through 31) that address the proposed changes.

Summary of the Results of the Plant Specific Evaluation for the RPS System

a. SER Requirement

Confirm the applicability of the generic analysis for NEDC-30851P-A to the plant.

Plant-Specific Evaluation

The FitzPatrick plant is a BWR/NSSS with a RPS relay instrumentation design which is very similar to the base case model used in the generic RPS reliability evaluation (NEDC-30851P-A).

b. SER Requirement

Demonstrate by use of current drift information provided by the equipment vendor or plant-specific data, that the drift characteristics for instrumentation used in the RPS channels in the plant are bounded by the assumptions used in NEDC-30851-P-A when the functional test interval is extended from monthly to quarterly.

The NRC staff provided additional guidance in a letter from C. E. Rossi (NRC) to R. F. Janecek (BWR Owners Group), dated April 27, 1988, which states that:

"... licensees need only confirm that the setpoint drift which could be expected under the extended STIs has been studied and either (1) has been shown to remain within the existing allowance in the RPS and ESFAS instrument setpoint calculation of (2) that the allowance and setpoint have been adjusted to account for the additional expected drift."

Plant-Specific Response

Actual plant setpoints are set conservatively with respect to the Technical Specification limits to accommodate for the uncertainty associated with each particular instrument channel and associated test interval. Trip settings are adjusted, as necessary, when the instrument channel is calibrated and/or functionally tested. At the FitzPatrick plant, RPS calibrations, except for the LPRMs, occur at three months or longer intervals. Since the setpoints are set to accommodate the longer calibration intervals, the setpoint drift will be

acceptable between the quarterly functional test. The LPRM output is checked daily using a heat balance and adjusted as necessary to maintain an acceptable level of setpoint drift.

Confirmation that postulated setpoint drift associated with the longer functional test interval is within existing safety margins was established by reviewing the instrument calibration and functional test results (Reference 26).

c. SER Requirement

Confirm that the differences between the parts of the RPS that perform the trip functions in the plant and those of the base case plant were included in the analysis for the plant using the procedures of Appendix K of NEDC-30851-P-A, or provide plant-specific analyses to demonstrate that there is no appreciable change in RPS availability or public risk.

Plant -Specific Evaluation

NEDC-30851P-A concludes that RPS failure frequency is predominately a function of common cause failures of the scram contractors. There are no significant variations between the FitzPatrick RPS scram contractor configuration and the generic model. The FitzPatrick RPS differs from the generic model in sensor logic, sensor relays, scram valve design, backup and manual scram actuation, and technical specification requirements. These differences were identified, and evaluated in accordance with NEDC-30851P-A, Appendix K, procedures (Reference 26). This evaluation found the design differences to have a negligible effect on RPS failure frequency, based on the case studies presented in NEDC-30851P-A, Appendix K.

Summary of the Results of the Plant Specific Evaluations for the Other Instruments

a. SER Requirement

Confirm the applicability of the generic analyses to the plant.

Plant-Specific Response

The FitzPatrick plant is a BWR/4 NSSS with an ECCS, PCIS, CRB, and RPT relay instrumentation design which is very similar to the BWR 3/4 base case model used in the generic instrumentation reliability analyses (NEDC-30851P-A, Supplements 1 and 2, NEDC-30936P-A, NEDC-31677P-A, GENE-770-06-1, and GENE-770-06-2-A).

The FitzPatrick ECCS design was compared to the design considered in the generic evaluation in accordance with the procedure provided in Appendix F of NEDC-30936P-A, Part 2 (References 27 & 28). The differences identified are minor in nature and have a negligible impact on water injection failure frequency. The differences are within the boundary conditions of the generic model or are bounded by envelope case 4A of the generic evaluation.

There are no significant differences between the generic model (NEDC-31677P-A) and the FitzPatrick design for PCIS instrumentation common to the RPS. The only significant differences between the generic model and the FitzPatrick design for non-common PCIS instrumentation are the number of sensor variables that isolate RWCU, and the logic for actuating Secondary Containment isolation. These differences were evaluated using the case studies contained in NEDC-31677P-A and were found to have an insignificant effect on isolation function failure frequency (Reference 29).

Their are no significant differences between the generic model and the FitzPatrick design for CRB instrumentation. The generic evaluations (References 1 and 7) for the CRB function are applicable to plants with either Rod Block Monitors (RBM) or Rod Withdrawal Limiters (RWL) since they provide equivalent protection. The Fitzpatrick plant uses the Rod Block Monitor (RBM) for the CRB function (Reference 30).

The BWR/4 RPT system design considered in the generic evaluated (GENE-770-06-1), is a two-out-of-two taken once logic per trip system for either reactor low water level or reactor high pressure. The Fitzpatrick RPT system is initiated by a one-out-of-two logic taken twice, from the same signals. The Fitzpatrick logic design is bounded by the generic evaluation since it is inherently more reliable (Reference 31).

b. <u>SER Requirement</u>

Confirm that any increase in instrument drift due to the extended STIs is properly accounted for in the setpoint calculation methodology. (For additional information on this issue, see letter from C. E. Rossi to R. F. Jancek, dated April 27, 1988)

<u>Plant-Specific Response</u>

Actual plant setpoints are set conservatively with respect to the Technical Specification limits to accommodate for the uncertainty associated with each particular instrument channel and associated test interval. Trip settings are adjusted as necessary when the instrument channel is calibrated and/or functionally tested. The FitzPatrick plant calibrates the subject equipment at intervals of three months or longer. Since the setpoints are set to accommodate the longer calibration intervals, the setpoint drift will be acceptable between the quarterly functional tests. Therefore, changing the functional test interval from weekly or monthly to quarterly does not impact the TS trip settings.

Confirmation that postulated setpoint drift associated with the longer functional test interval is within existing safety margins was established by reviewing the instrument calibration and functional test results (References 27, 29, 30, and 31).

Allowable Out-of-Service Time Bases

The test allowable out-of-service times (AOT) provide a reasonable period of time to perform testing on an instrument channel made inoperable to perform required surveillance. An instrument channel removed from service (made inoperable) to perform required surveillance must be restored to service (made operable) in less than or equal to the six hour AOT, unless the instrument channel is found to be in need of repair. At that time, the instrument channel is declared inoperable and the repair AOT is entered.

When the repair AOT is entered for an inoperable instrument channel, a verification that sufficient instrument channels remain operable or tripped to maintain trip capability for that trip function is performed (if one or more additional instrument channels for the same trip function are also inoperable) and, within the time period specified in the repair AOT, the instrument channel: a) must be restored to service in an operable status or, b) must be placed in a tripped status or, c) the associated trip system must be tripped. If the required actions are not completed within the time period specified by the repair AOT, then the specified action for that trip function must be taken within the time period stated in the ACTION (e.g., insert all operable control rods within four hours; isolate the main steam lines within eight hours; declare the associated ECCS inoperable; place the reactor in the startup/hot standby mode within the next six hours).

When the repair AOT is entered, the entire time period specified by the AOT is available, even though it might become apparent that the repair cannot be completed within the allowed time, because analysis performed in support of the Licensing Topical Reports assumed that the entire time period specified in the AOT was used in each case. While it is expected that the entire time period specified by the AOT will seldom be needed, allowing the entire time period specified to be used in determining when required actions must be completed avoids situations where interpretation is necessary, and simplifies training in the use of the new AOTs.

The values for the proposed test and repair AOTs are based on the Licensing Topical Reports previously referenced. The AOT text proposed for the five instrument groups (RPS, PCIS, ECCS, CRB, and ATWS RPT) differ to reflect: (1) each instrument group's unique AOT value as presented in the Topical Reports , (2) the action statements associated with the function of the instrument group, and (3) distinctions in the trip logic of each instrument group. The objective of the proposed Technical Specifications is to optimize consistency in the AOT text for the different instrument groups to the extent possible. Compliance with this objective minimizes the complexity of the TS which will improve operator understanding of the AOTs, reduce the potential for a TS violation resulting from a misinterpretation, and simplify operator training in the use of the TS.

Accordingly, a similar repair AOT text was applied to four of the instrument groups (all except the CRB). The text conforms to the AOT approved for the RPS AOT for Duane Arnold (Reference 23), and Nine Mile Point 1 and 2 (References 33 and 34), except for some minor editorial changes. The AOT recognizes the impact of multiple channel failures on trip function operability. The LCO for the AOT precludes the use of an AOT in excess of one hour for those situations where the multiple channel

failures render the trip function inoperable. Only when the failure does not prevent trip function capability will the full AOT recommended by the Topical Reports be permitted. In this manner, the application of the AOT is maximized without jeopardizing the operability of the trip function. Additionally, this approach minimizes the potential for operation with an instrument channel or trip system in the tripped condition which increases the potential for a plant transient. The LCO for the AOT meets these objectives by requiring, within one hour of a multiple instrument channel failure, confirmation of trip function capability. If confirmation cannot be satisfied within the one hour period, the action statement is entered. This AOT concept is not applicable to the CRB instrument group due to its unique design; i.e., only one trip system and no action required beyond placing the channel in the tripped condition.

The restrictions on the use of the repair AOT for multiple channel failures conforms to the STS in NUREG-1433 (Reference 18). The STS limits the AOT to one hour if multiple channel failures results in loss of trip capability. Refer to the following sections of NUREG-1433.

RPS	LCO 3.3.1.1.C
PCIS	LCO 3.3.6.1.B
ATWS-RPT	LCO 3.3.4.2.B
ECCS	LCO 3.3.5.1.B, C, D, E, F, and G

All of the instrument groups use the 6 hour test AOT based on the Topical Reports previously referenced. The text of the test AOT conforms to the text used in NUREG-1433 (Reference 18), and approved for Duane Arnold (Reference 23) and NMP-2, except as noted below. For multiple channel trip systems, the AOT is permitted only when the removal of the channel from service to test does not prevent trip function capability. Only single channel trip systems, and trip systems based on a two-out-of-two-taken-once logic, as specified in the AOT statement, are excluded from this restriction. Several deviations from the AOT text used in NUREG-1433 are proposed for the PCIS trip functions. These deviations are described, along with their bases, in change description O.7.

2. <u>Relocation of Instrument Response Time Limits - Category 2</u>

The change deletes the RPS and MSIV isolation instrumentation response time limits from the Technical Specifications. The July 1995 UFSAR update will incorporate the response time limit requirements. These changes conform with the NRC guidance presented in Generic Letter 93-08 (Reference 24). The surveillance requirement in TS 4.1.A and TS 4.2.A that confirms the response time limits every eighteen months remains unchanged. The plant surveillance procedures for response time testing (ISP-102 through ISP-111) include acceptance criteria that reflects the response time limits in Tables 3.1-2 and 3.2-9.

Incorporation of these requirements into the UFSAR will assure that the NRC is maintained informed of this design feature. Any changes to the response time limits contained in the UFSAR will be evaluated under 10 CFR 50.59.

There are no safety considerations associated with this change since it does not involve any changes to the response time limits, surveillance requirements, or procedural changes that impact plant operations.

3. Delete APRM Downscale Scram Function - Category 3

Although the APRM downscale trip is listed as an RPS scram (Tables 3.1-1 and 4.1-1), it does not directly initiate a reactor trip. The trip performs an interlock function associated with the IRM high flux scram. The interlock prevents the IRM high flux scram function from being defeated in the Run operating mode until the APRM downscale setpoint has cleared (power above 2.5%).

The bases for deleting the APRM downscale scram function is presented in a General Electric evaluation performed for the Dresden and Quad Cities plants (Reference 22) and is repeated in the following paragraphs. This evaluation is applicable to the FitzPatrick plant based on similarity to the Dresden design. This function existed on several early plants but has been deleted from later plant designs. It is no longer required by the STS and has been deleted from the Technical Specifications of several plants that originally included it in their design. References 20 and 21 identify two license amendments that removed this scram feature from other BWR plants.

Deletion of the APRM downscale scram function will permit all available combinations of inoperable IRM and APRM channels to be simultaneously bypassed, as intended by the plant design (UFSAR 7.5.5.3 and 7.5.7.4). Due to the different number of APRM and IRM channels (six vs. eight), some IRM channels share the same APRM channel in the APRM downscale scram logic. Consequently, some bypass combinations of inoperable IRM and APRM channels would result in less than the minimum number of required operable APRM downscale scram trips, precluding bypass capability for one of the inoperable channels. Under these circumstances, the plant must remain in a "half scram" condition. Removal of this trip function will avoid the need to operate the plant in the "half scram" condition, with the associated risk of a plant transient, for certain inoperable IRM/APRM combinations.

Removal of the APRM downscale scram function from the Technical Specifications is not a safety concern for the following reasons:

a. The design basis accident in this region of operation is the control rod drop accident (CRDA). The only scram function that the FSAR takes credit for in the mitigation of the CRDA is the APRM 15% power fixed high neutron flux scram (startup mode) which is assumed to occur at 120% power (UFSAR 14.6.1.2).

b. If the mode switch is changed to the Run mode prematurely during startup, or if the reactor power is reduced too far before changing the mode switch to the Startup mode, the control rod block associated with the APRM downscale trip will activate, precluding further control rod withdrawal. This control rod block feature is required by the Technical Specifications (Table 3.2-3), and is not altered by the requested change.

c. During cold plant startups, prematurely changing to the Run mode will likely result in MSIV closure and consequent scram due to insufficient steam pressure.

Currently, the plans are to implement a modification to remove the APRM downscale scram function, contingent on NRC approval of this amendment request, during refueling outage Reload 12/Cycle 13 (scheduled to start in early 1997). The surveillance requirements currently specified for the APRM downscale scram function will continue during the period between the issuance of the amendment and the completion of the modification removing this function.

4. Miscellaneous Changes - Category 4

The miscellaneous changes are grouped into four subcategories and evaluated as follows:

a. Editorial Changes

Editorial changes include the relocation of text, renumbering of table notes, and corrections in nomenclature. These changes are necessitated by other text changes in this application, and do not change any Technical Specification requirement. Changes: A.1, A.2, B.2, D.2, D.5, F.9, F.10, F.11, F.12, F.13, F.14, G.2, G.4, G.10, I.3, O.1, O.10, P.1, Q.3, Q.8, R.4, T.4, U.4, V.3, W.2 and X.2.

b. Clarifications

The clarification changes either (1) establish consistency with the actual design of the plant instrumentation as described in the UFSAR, (2) establish consistency between different TS requirements, or (3) define TS requirements more explicitly. By enhancing the accuracy and clarity of the text, the changes will assure a correct interpretation of the TS instrumentation requirements, essential to the safe operation of the plant. The changes in this group are as follows:

(1) Use of notations for the surveillance frequencies assures a precise and clearly defined time interval. The change conforms to the STS (Reference 17). Change: B.1.

(2) Establish consistency among the Limiting Conditions For Operation (LCO) for related systems by conforming to the more conservative LCO. Changes: P.5.b, and P.7.

(3) Changes to reflect the actual design of instrumentation described in the UFSAR.

This includes the change that relates the requirement for the minimum number of operable control rod block channels to "trip function" rather

than "trip system." While the rod block logic circuitry is arranged as two similar logic circuits, (i.e., one-half of the sensors provide inputs to one logic circuit, that other half to the other logic circuit), either logic circuit independently provides a rod block signal to inhibit rod withdrawal. The current Technical Specifications splits the channels into two groups for each CRB function for the purpose of establishing the minimum number of operable instrument channels per trip system. This prohibits the bypass of more than one channel per group. Under the proposed change, the total number of channels within a CRB function that may be bypassed will remain at two. However, any two of the channels could be bypassed without consideration of its grouping. Therefore, the reliability of the CRB function will not be compromised by the change.

The change will permit the bypass of all available combinations of two IRM channels or two APRM channels using their associated bypass switches, as intended by the plant design (UFSAR 7.5.5.3 and 7.5.7.4). As wired, certain combinations of bypassed IRM or APRM channels are not permitted by the current CRB Table 3.2-3. For these combinations, inoperable channels resulting in a "half-scram" condition cannot be bypassed. This constraint on the ability to bypass all available combinations of two IRM channels, or two APRM channels, increases the potential for an unnecessary plant transient. The change is consistent with the design of the control rod block system (UFSAR 7.7.4.3), and with the STS (Reference 17), Table 3.3.6-1, page 3-51.

Changes: F.4, G.3, M.1, M.2, M.3, O.3, O.4, O.5, O.6, P.3, P.4, P.5.a, Q.1, Q.4, U.3, V.2 and W.3.

(4) Limiting Condition for Operation 3.0.F is added to clearly define the conditions under which inoperable equipment, or equipment removed from service, may be returned to service for the sole purpose to perform testing to demonstrate its operability or operability of other equipment. The LCO requires the application of administrative controls to limit the time to that necessary to perform the testing. Use of this provision permits the repair and return of equipment to service following the appropriate testing, and reduces the potential of plant transients that result from operation with instrument channels in the tripped condition. Changes: C, D.4.

(5) A note is added to the quarterly calibration requirement for the RWCU Area High Temperature instrument channel in Table 4.2-1 to describe the calibration method for the temperature sensors. The method consists of comparing the active temperature signal with a redundant temperature signal.

Injection of a known temperature signal into RTD's and thermocouples to perform a calibration cannot be performed from a remote location due to the nature of these devices. The temperature sensors for most instrument and controls systems are calibrated by removing the sensor and placing it into a known temperature bath. However, this method of calibration for the eight RWCU Area High Temperature sensors conflicts with ALARA

practices since entry into high radiation areas (ranges from 100 to 500 mr/hr in the general area of the temperature sensor) would be required to remove, test, and replace the sensors. For this reason, a comparison method of calibration is used. This involves a comparison of the output of the temperature sensors used for the trip function with another temperature sensor that monitors the same parameter. The acceptance criteria currently used is ≤ 10°F differential. Change: T.3 and W.1

c. Relocate Instrumentation Requirements From the ECCS Section to the PCIS Section.

This change relocates the operability and surveillance requirements for the HPCI and RCIC isolation actuation instrumentation from the ECCS tables (Tables 3.2-2 and 4.2-2) to the Primary Containment Isolation tables (Tables 3.2-1 and 4.2-1). The proposed location is the appropriate location for these instruments, and conforms to the STS (Reference 17). The change resolves an NRC concern expressed in Reference 19 that the current location does not assure that the instruments are operable when primary containment integrity is required. While the Authority interprets the current TS as requiring the operability of the HPCI / RCIC isolation instruments when containment integrity is required, the change will enhance the clarity of this requirement. Changes: O.2, P.8, T.1, and U.1.

III. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

Operation of the FitzPatrick plant in accordance with the proposed Amendment would not involve a significant hazards consideration as defined in 10 CFR 50.92, since it would not:

1. involve a significant increase in the probability or consequences of an accident previously evaluated because:

a. Incorporate STI and AOT Improvement - Category 1

The proposed changes are limited to an extension of the surveillance testing intervals and allowable out-of-service times of plant instrumentation. The changes do not introduce any new modes of plant operation, make any physical changes, or alter any operational setpoints. Therefore, the changes do not degrade the performance of any safety system assumed to function in the accident analysis. Consequently, there is no effect on the probability of occurrence of an accident.

Regarding the consequences of an accident, the GE Licensing Topical Reports (References 1 through 7) concluded that the proposed extensions in the STI and AOT for the safety system instrumentation results in an insignificant change in the core damage frequency. The extension of the STI / AOTs results in a slight increase in the unavailability of the safety functions. However, this effect is offset by a reduction in the probability of inadvertent plant trips due to

reduced testing. The overall effect on the probability of an accident is negligible. While the effects of reducing unnecessary cycles on safety system instrumentation is not quantifiable, the effect will be to further reduce the core damage frequency. The NRC concurred in their SERs (References 8 through 15) with these conclusions. Consequently, there is not a significant increase in the consequences of an accident.

b. Relocation of the Instrument Response Time Limits - Category 2

The change involves the use of an alternate regulatory process for controlling the instrument response time limits. The change does not introduce any new modes of plant operation, make any physical changes, alter any operational setpoints, or change the surveillance requirements.

c. Delete APRM Downscale Scram - Category 3

The design basis accident applicable to the startup power region is the Control Rod Drop Accident (CRDA). The FSAR does not credit the APRM downscale scram in the termination of this accident. Accident mitigation is provided by the APRM fixed high neutron flux scram. Therefore, elimination of this scram function has no adverse affect on previously evaluated accidents.

d. Miscellaneous Changes - Category 4

The changes do not introduce any new modes of plant operation, make any physical changes, or alter any operational setpoints. The changes involve enhancements that clarify the Technical Specification requirements.

2. create the possibility of a new or different kind of accident from those previously evaluated because:

a. Incorporate STI and AOT Improvements - Category 1

The proposed changes do not introduce any new accident initiators or failure mechanisms since the changes do not introduce any new modes of plant operation, make any physical changes, or alter any operational setpoints. The changes reduce the probability of accidents initiated by test-induced plant trips.

b. Relocation of the Response Time Limits - Category 2

The change involves the use of an alternate process for controlling the instrument response time limits. The change does not introduce any accident initiators since it does not involve any new modes of plant operation, make any physical changes, alter any operational setpoints, or change the surveillance requirements.

c. Delete APRM Downscale Scram - Category 3

Scram functions are intended to shutdown the reactor following transients or

accidents and their removal does not introduce an accident initiator. The limiting accident evaluated in the FSAR for the startup power region is the control rod drop accident. This accident is assumed to occur irrespective of the scram functions provided to terminate this accident.

d. Miscellaneous Changes - Category 4

The changes do not introduce any new accident initiators or failure mechanisms since the changes do not alter the physical characteristics of any plant system or component. The changes involve enhancements that clarify the Technical Specification requirements.

3. involve a significant reduction in the margin of safety because:

a. Incorporate STI and AOT Improvements - Category 1

The proposed changes do not alter the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined. The affected instrumentation setpoints already account for the effects of drift and include sufficient allowance for an extension in the STIs. The evaluations presented in the referenced Licensing Topical Reports concluded that the overall effect of the proposed changes provides a net increase in plant safety. The improvement is achieved by reducing the potential for: (a) test related plant scrams (reduced challenges to plant shutdown systems and improved plant availability); (b) excessive test cycles on equipment (reduced wear-out potential); (c) operator errors (AOT provides reasonable time for making repairs and tests); (d) scrams that occur when inoperable channels are tripped because insufficient repair time exists; and (e) diversion of plant personnel and resources on unnecessary testing (potential safety and operational improvement).

b. Relocation of the Response Time Limits - Category 2

The change involves the use of an alternate regulatory process for controlling the instrument response time limits. The change does not introduce any new modes of plant operation, make any physical changes, alter any operational setpoints, or change the surveillance requirements.

c. Delete APRM Downscale Scram - Category 3

The only scram function that the UFSAR takes credit for in the mitigation of the limiting accident (control rod drop accident) is the APRM 15% power fixed high neutron flux scram. This scram function, as well as the IRM high flux scram function in the startup mode which could also terminate this accident, are not affected by this change. Only the APRM downscale scram, for which the UFSAR takes no credit in the termination of any analyzed event, is eliminated by this change. The APRM downscale control rod block is not affected by this change. Elimination of the APRM downscale scram will avoid the need to operate the plant in a "half scram" condition for certain IRM/APRM channel bypass combinations, therefore eliminating the potential for an inadvertent plant

transient. For these reasons, the change does not involve a significant reduction in the safety margin.

d. Miscellaneous Changes - Category 4

The changes assure compliance with the Technical Specifications by improving its clarity and accuracy. For these reasons the changes will improve the plant's margin of safety.

IV. IMPLEMENTATION OF THE PROPOSED CHANGES

Implementation of the proposed changes will not adversely affect the ALARA or Fire Protection Program at the FitzPatrick plant, nor will the changes impact the environment.

V. CONCLUSION

The changes, as proposed, do not constitute an unreviewed safety question as defined in 10 CFR 50.59. That is, they:

1. will not increase the probability nor the consequences of an accident or malfunction of equipment important to safety as previously evaluated in the Safety Analysis Report;

2. will not increase the possibility of an accident or malfunction of a type different from any previously evaluated in the Safety Analysis Report; and

3. will not reduce the margin of safety as defined in the basis for any technical specification.

The changes involve no significant hazards consideration, as defined in 10 CFR 50.92.

VI. REFERENCES

1. GE Topical Report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," March 1988.

2. GE Topical Report NEDC-30851P-A, Supplement 1 "Technical Specification Improvement Analyses for BWR Control Rod Block Instrumentation," October 1988.

3. GE Topical Report NEDC-30851P-A, Supplement 2 "Technical Specification Improvement Analyses for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," March 1989.

4. GE Topical Report NEDC-30936P-A , Parts 1 and 2, "BWR Owners Group Technical Specification Improvement Methodology (with Demonstration for BWR ECCS Actuation Instrumentation)," December 1988.

5. GE Topical Report NEDC-31677P-A , "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation)," July 1990.

6. GE Topical Report GENE-770-06-1-A, "Bases for Changes to Surveillance Test Intervals and Allowed Out-Of-Service Times For Selected Instrumentation Technical Specifications," December 1992.

7. GE Topical Report GENE-770-06-2-A, "Addendum to Bases for Changes to Surveillance Test Intervals and Allowed Out-Of-Service Times For Selected Instrumentation Technical Specifications," December 1992.

8. NRC Safety Evaluation Report, letter from Ashok C. Thadani, NRC to T. A. Pickens, BWR Owners Group, "General Electric Co. Topical Reports NEDC-30844, BWR Owners Group Response to NRC Generic Letter 83-28, and NEDC-30851P, Technical Specification Improvement Analysis for BWR RPS," July 15, 1987.

9. NRC Safety Evaluation Report, letter from Charles E. Rossi, NRC to D. N. Grace, BWR Owners Group, "General Electric Company Topical Report NEDC-30851P, Supplement 1, Technical Specification Improvement Analysis for BWR Control Rod Block Instrumentation," September 22, 1988.

10. NRC Safety Evaluation Report, letter from Charles E. Rossi, NRC to D. N. Grace, BWR Owners Group, "General Electric Company Topical Report NEDC-30851P-A, Supplement 2, Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," January 6, 1989.

11. NRC Safety Evaluation Report, letter from A. Thadani, NRC to D. N. Grace, BWR Owners Group, "General Electric Company Topical Report NEDC-30936P, BWR Owners Group Technical Specification Improvement Methodology (With Demonstration for BWR ECCS Actuation Instrumentation), Part 1," December 9, 1988.

12. NRC Safety Evaluation Report, letter from Charles E. Rossi, NRC to D. N. Grace, BWR Owners Group, "General Electric Company Topical Report NEDC-30936P, BWR Owners Group Technical Specification Improvement Methodology (with Demonstration for BWR ECCS Actuation Instrumentation), Part 2," December 9. 1988.

13. NRC Safety Evaluation Report, letter from Charles E. Rossi, NRC to S. D. Floyd, BWR Owners Group, "General Electric Company Topical Report NEDC-31677P, Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation", June 18, 1990.

14. NRC Safety Evaluation Report, letter from Charles E. Rossi, NRC to R. D. Binz, BWR Owners Group, "General Electric Company Topical Report GENE-770-06-1, Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," July 21, 1992.

15. NRC Safety Evaluation Report, letter from Charles E. Rossi, NRC to G. J. Beck, BWR Owners Group, "General Electric Company Topical Report GENE-770-06-2,

Addendum to Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications (BWR RCIC Instrumentation), July 30, 1992.

16. NRC letter, C. Rossi, NRC to G. Beck, BWROG, dated July 26, 1992.

17. NUREG-0123 "Standard Technical Specifications in General Electric Boiling Water Reactors (BWR/5)," Revision 3, dated Fall 1980.

18. NUREG-1433, "Standard Technical Specifications for General Electric Boiling Water Reactors (BWR/4)", Revision 0, dated September 1992.

19. NRC Inspection 50-333/88-01 - January 12 to March 7, 1988 - Routine Inspection of Plant Activities, dated March 29, 1988.

20. NRC letter, D. C. Scaletti, NRC to D. M. Musolf, Northern States Power Co., regarding issuance of Amendment 100 to Monticello, dated August 26, 1987.

21. NRC letter, B. Siegal, NRC to H. E. Bliss, Commonwealth Edison Co., regarding issuance of Amendment 50 to Dresden, dated August 24, 1988.

22. GE letter, J. A. Miller, Services Project Manager, to E. D. Enigenburg, Dresden Nuclear Station, dated August 26, 1987.

23. NRC letter, R. M. Pulsifer, NRC to L. Liu, Iowa Electric Light and Power Co., regarding issuance of Amendment 193 for Duane Arnold Energy Center, dated April 14, 1993.

24. NRC Generic Letter 93-08, "Relocation of Technical Specification Tables of Instrument Response Time Limits," December 29, 1993.

25. James A. FitzPatrick Nuclear Power Plant Updated Final Safety Analysis Report, Chapter 7.

26. JAFNPP Plant Specific Evaluation: "RPS Reliability Based Surveillance Test Improvements," Report No. JAF-RPT-RPS-01384, Rev. 1, dated May 6, 1994.

27. JAFNPP Plant Specific Evaluation: "ECCS Actuation Instrumentation Reliability Based Surveillance Test Improvements," Report No. JAF-RPT-MULTI-01426, Rev. 1, dated March 28, 1994.

28. JAFNPP Plant Specific Evaluation: "Miscellaneous Instrumentation Surveillance Test Improvements," Report No. JAF-RPT-MISC-01477, Rev. 0, dated March 28, 1994.

29. JAFNPP Plant Specific Evaluation: "PCIS Reliability Based Surveillance Test Improvements," Report No. JAF-RPT-PC-01425, Rev. 0, dated January 19, 1994.

30. JAFNPP Plant Specific Evaluation: "CRB Instrumentation Surveillance Test Improvements," Report No. JAF-RPT-MULTI-01420, Rev. 0, dated January 12, 1994.

31. JAFNPP Plant Specific Evaluation: "Recirculation Pump Trip Instrumentation Reliability Based Surveillance Test Improvements," Report No. JAF-RPT-RWR-01434, Rev. 1, dated March 29, 1994.

32. NRC letter, C. E. Rossi to R. F. Janecek, BWR owners Group, "Staff Guidance For Licensee Determination That The Drift Characteristics For Instrumentation Used In RPS Channels Are Bounded By NEDC-3085P Assumptions When The Functional Test Interval Is Extended From Monthly To Quarterly," dated April 27, 1988.

33. NRC letter, D. S. Brinkman to B. R. Sylvia, Niagara Mohawk Power Co., regarding issuance of Amendment 139 for Nine Mile Point Nuclear Station Unit No. 1, dated February 24, 1993.

34. NRC letter, J. E. Menning to B. R. Sylvia, Niagara Mohawk Power Co., regarding issuance of Amendment 41 for Nine Mile Point Nuclear Station Unit No. 2, dated May 11, 1993.

ATTACHMENT III to JPN-94-050

MARKED-UP TECHNICAL SPECIFICATION PAGES FOR PROPOSED TECHNICAL SPECIFICATION CHANGES

INSTRUMENTATION SURVEILLANCE TEST INTERVALS, ALLOWABLE OUT-OF-SERVICE TIMES, AND OTHER CHANGES

JPTS-90-010

New York Power Authority

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

INSERTS FOR MARKED-UP TECHNICAL SPECIFICATION PAGES

Insert A

Surveillance Frequency Notations / Intervals

The surveillance frequency notations / intervals used in these specifications are defined as follows:

Notations	Intervals	Frequency
D	Daily	At least once per 24 hours
W	Weekly	At least once per 7 days
M	Monthly	At least once per 31 days
Q	Quarterly or every 3 months	At least once per 92 days
SA	Semiannually or every 6 months	At least once per 184 days
A	Annually or Yearly	At least once per 366 days
R	Note 1	At least once per 18 months (550 days)
S/U		Prior to each reactor startup
NA		Not applicable

Note 1: "Once each operating cycle," "once per operating cycle," "each refueling outage," "at least once during each operating cycle," "once each operating cycle not to exceed 18 months", or similar phrases, are equivalent to the definition for frequency notation "R".

Insert B

PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION REQUIREMENTS

Insert C

The response time of the reactor protection system trip functions listed below shall be demonstrated to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing.

Insert D

The basis for the allowable out-of-service times is provided in GE Topical Report NEDC-30851P-A, "Technical Specification Improvement Analysis for BWR Reactor Protection System," March 1988.

Insert E

The basis for a three-month functional test interval for group (A) sensors is provided in NEDC-30851P-A, "Technical Specification Improvement Analysis for BWR Reactor Protection Systems."

Insert F

Group (B) devices utilize an analog sensor coupled with a bi-stable trip (either the solid-state analog transmitter trip system (ATTS) or the more conventional arrangement of instrument amplifier and bi-stable).

Insert G

A three month surveillance interval has been determined in accordance with NEDC-30851P-A, "Technical Specification Improvement analyses for BWR Reactor Protection System."

Insert H

The channel response time must include all component delays in the response chain to the ATTS output relay plus the design allowance for RPS logic system response time. A response time for the RPS logic relays in excess of the design allowance is acceptable provided the overall response time does not exceed the response time limits specified in the UFSAR.

Insert I

1. There shall be two operable or tripped trip systems for each Trip Function, except as provided for below:

   a. For each Trip Function with one less than the required minimum number of operable instrument channels, place the inoperable instrument channel and/or its associated trip system in the tripped condition* within 12 hours. Otherwise, initiate the ACTION required by Table 3.1-1 for the Trip Function.

   b. For each Trip Function with two or more channels less than the required minimum number of operable instrument channels:

      1) Within one hour, verify sufficient instrument channels remain operable or tripped* to maintain trip capability in the Trip Function, and

      2) Within 6 hours, place the inoperable instrument channel(s) in one trip system and/or that trip system** in the tripped condition*, and

      3) Within 12 hours, restore the inoperable instrument channel(s) in the other trip system to an operable status, or place the inoperable instrument channel(s) in the

trip system and/or that trip system in the tripped condition*.

If any of these three conditions cannot be satisfied, initiate the ACTION required by Table 3.1-1 for the affected Trip Function.

* An inoperable instrument channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable instrument channel is not restored to operable status within the required time, the ACTION required by Table 3.1-1 for that Trip Function shall be taken.

** This action applies to that trip system with the greatest number of inoperable instrument channels. If both systems have the same number of inoperable instrument channels, the ACTION can be applied to either trip system.

2. When a channel is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions For Operation and required actions may be delayed for up to 6 hours provided the associated Trip Function maintains RPS trip capability.

3. Action Statements:

A. Insert all operable control rods within four hours.
B. Reduce power level to IRM range and place Mode Switch in the Startup position within eight hours.
C. Reduce power level to less than 30 percent of rated within four hours.

Insert J

The automatic scram contactors shall be exercised once every week by either using the RPS channel test switches or performing a functional test of any automatic scram function. If the contactors are exercised using a functional test of a scram function, the weekly test using the RPS channel test switch is considered satisfied. The automatic scram contactors shall also be exercised after maintenance on the contactors.

Insert K

The response time of the main steam isolation valve actuation instrumentation isolation trip functions listed below shall be demonstrated to be within their limit at least once per 18 months.

Insert L

The surveillance test interval for the instrumentation channel functional tests are once/three months for most instrumentation. This surveillance interval is based on the following NRC approved licensing topical reports:

1. GE Topical Report NEDC-30851P-A, "Technical Specification Improvement Analysis for

BWR Reactor Protection System," March 1988.

2. GE Topical Report NEDC-30851P-A, Supplement 1, "Technical Specification Improvement Analysis for BWR Control Rod Block Instrumentation," October 1988.

3. GE Topical Report NEDC-30851P-A, Supplement 2, "Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," July 1986.

4. GE Topical Report NEDC-31677P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation, " July 1990.

5. GE Topical Report NEDC-30936P-A, Parts 1 and 2, "BWR Owners Group Technical Specification Improvement Methodology (With Demonstration for BWR ECCS Actuation Instrumentation)," December 1988.

6. GE Topical Report GENE-770-06-1-A, "Bases for Changes to Surveillance Test Intervals and Allowed Out-Of-Service Times For Selected Instrumentation Technical Specifications," December 1992.

7. GE Topical Report GENE-770-06-2-A, "Addendum to Bases for Changes to Surveillance Test Intervals and Allowed Out-Of-Service Times For Selected Instrumentation Technical Specifications," December 1992.

The measurement of the response time interval for the Main Steam Isolation Valve (MSIV) isolation actuation instrumentation begins when the monitored parameter exceeds the isolation actuation setpoint at the channel sensor and ends when the MSIV pilot solenoid relay contacts open.

Insert M

1. Whenever Primary Containment integrity is required by Specification 3.7.A.2, there shall be two operable or tripped trip systems for each Trip Function, except as provided for below:

   a. For each Trip Function with one less than the required minimum number of operable instrument channels, place the inoperable instrument channel and/or its associated trip system in the tripped condition* within:

      1) 12 hours for trip functions common to RPS instrumentation, and

      2) 24 hours for trip functions not common to RPS instrumentation,

      or, initiate the ACTION required by Table 3.2-1 for the affected trip function.

   b. For each Trip Function with two or more channels less than the required minimum number of operable instrument channels:

      1) Within one hour, verify sufficient instrument channels remain operable or tripped* to maintain trip capability in the Trip Function, and

2) Within 6 hours, place the inoperable instrument channel(s) in one trip system and/or that trip system** in the tripped condition*, and

3) Restore the inoperable instrument channel(s) in the other trip system to an operable status, or place the inoperable instrument channel(s) in the trip system and/or that trip system in the tripped condition* within:

(a) 12 hours for trip functions common to RPS instrumentation, and

(b) 24 hours for trip functions not common to RPS instrumentation.

If any of these three conditions cannot be satisfied, initiate the ACTION required by Table 3.2-1 for the affected Trip Function.

Asterisk shown on next page

* An inoperable instrument channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable instrument channel is not restored to operable status within the required time, the ACTION required by Table 3.2-1 for that Trip Function shall be taken.

** This action applies to that trip system with the greatest number of inoperable instrument channels. If both systems have the same number of inoperable instrument channels, the ACTION can be applied to either trip system.

2. When a channel, and/or the affected primary containment isolation valve, is placed in an inoperable status solely for performance of required instrumentation surveillances, entry into associated Limiting Conditions for Operation and required actions may be delayed as follows:

   a) for up to 6 hours for Trip Functions utilizing a two-out-of-two-taken-once logic; or

   b) for up to 6 hours for the remaining Trip Functions provided the associated Trip Function maintains PCIS initiation capability for at least one containment isolation valve in the affected penetration.

3. Actions:

   A. Place the reactor in the cold condition within 24 hours.
   B. Isolate the main steam lines within eight hours.
   C. Isolate Reactor Water Cleanup System within four hours.
   D. Isolate shutdown cooling within four hours.
   E. Isolate the main steam line drain valves, the recirculation loop sample valves, and the mechanical vacuum pump, within eight hours.
   F. Isolate the affected penetration flow path(s) within one hour and declare the affected system inoperable.
   G. Isolate the affected main steam line within eight hours.

Insert N

Instrumentation common to RPS.

Insert O

1. Whenever any ECCS subsystem is required by Specification 3.5 to be operable, there shall be two operable or tripped trip systems (or in the case of single trip system instrument logics, one operable trip system), except as provided for below:

   a. For each Trip Function with one less than the required minimum number of operable instrument channels, place the inoperable instrument channel in the tripped condition* within 24 hours. Otherwise, declare the associated ECCS inoperable.

   b. For each Trip Function with two or more channels less than the required minimum number of operable instrument channels:

      1) Within one hour, verify sufficient instrument channels remain operable or tripped* to maintain trip capability in the Trip Function, and

      2) Within 6 hours, place the inoperable instrument channel(s) in one trip system** in the tripped condition*, and

      3) Within 24 hours, restore the inoperable instrument channel in the other trip system to an operable status.

      If any of these three conditions cannot be satisfied, declare the associated ECCS inoperable.

   * An inoperable instrument channel need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable instrument channel is not restored to operable status within the required time, declare the associated ECCS inoperable.

   ** This action applies to that trip system with the greatest number of inoperable instrument channels. If both systems have the same number of inoperable instrument channels, the ACTION can be applied to either trip system.

2. When a channel is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions For Operation and required actions may be delayed as follows: (a) for up to 6 hours for single channel Trip Functions; or (b) for up to 6 hours for the remaining Trip Functions provided the associated Trip Function maintains ECCS initiation capability.

3. Refer to Technical Specification 3.5 for Limiting Conditions for Operation. Failure of one (1) instrument channel disables automatic initiation of one (1) pump.

Insert P

1. The trip functions shall be operable in the Startup and Run modes except as follows:

   a) SRM and IRM: Startup mode only.
   b) RBM: Run mode and $\geq$ 30% reactor power only.
   c) APRM Neutron Flux-Startup: Startup mode only.
   d) APRM Flow Referenced Neutron Flux: Run mode only.

2. Actions:

   Action A: If the number of operable instrument channels is:

   a) one less than the required minimum number of operable instrument channels per trip function, restore the inoperable instrument channel to operable status within 7 days, or place the inoperable instrument channel in the tripped condition within the next hour.

   b) two or more channels less than the required minimum number of operable instrument channels per trip function, place at least one inoperable instrument channel in the tripped condition within one hour.

   Action B: If the number of operable instrument channels is:

   a) one less than the required minimum number of operable instrument channels per trip function, verify that the reactor is not operating on a Limiting Control Rod Pattern, and within 7 days restore the inoperable instrument channel to operable status; otherwise, place the inoperable instrument channel in the tripped condition within the next hour. See Specification 3.3.B.5.

   b) two channels less than the required minimum number of operable instrument channels per trip function, place at least one inoperable instrument channel in the tripped condition within one hour. See Specification 3.3.B.5.

   Action C:

   If the number of operable instrument channels is less than the required minimum number of operable instrument channels per trip function, place the inoperable instrument channel in the tripped condition within 12 hours.

3. When a channel is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required actions may be delayed for up to 6 hours provided the associated Trip Function maintains CRB initiation capability.

Insert Q

1. There shall be two operable or tripped trip systems for each Trip Function, except as provided for below:

   a. For each Trip Function with one less than the required minimum number of operable instrument channels, place the inoperable instrument channel and/or its associated trip system in the tripped condition* within 72 hours. Otherwise, place the reactor in the start-up/hot standby mode within the next 6 hours.

   b. For each Trip Function with two or more channels less than the required minimum number of operable instrument channels:

      1) Within one hour, verify sufficient instrument channels remain operable or tripped* to maintain trip capability in the Trip Function, and

      2) Within 6 hours, place the inoperable instrument channel(s) in one trip system and/or that trip system** in the tripped condition*, and

      3) Within 24 hours, restore the inoperable instrument channel in the other trip system to an operable status.

   If any of these three conditions cannot be satisfied, place the reactor in the start-up/hot standby mode within the next 6 hours.

   * An inoperable instrument channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable instrument channel is not restored to operable status within the required time, place the reactor in the start-up/hot standby mode within the next 6 hours.

   ** This action applies to that trip system with the greatest number of inoperable instrument channels. If both systems have the same number of inoperable instrument channels, the ACTION can be applied to either trip system.

2. When a channel is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required actions may be delayed for up to 6 hours provided the associated Trip Function maintains ATWS RPT initiation capability.

Insert R

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND
CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

Insert S

CONTROL ROD BLOCK INSTRUMENTATION REQUIREMENTS

Insert T

ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION REQUIREMENTS

Insert U

PRIMARY CONTAINMENT ISOLATION SYSTEM INSTRUMENTATION
TEST AND CALIBRATION REQUIREMENTS

Insert V

CORE AND CONTAINMENT COOLING SYSTEM INSTRUMENTATION
TEST AND CALIBRATION REQUIREMENTS

Insert W

CONTROL ROD BLOCK INSTRUMENTATION
TEST AND CALIBRATION REQUIREMENTS

Insert X

ATWS RECIRCULATION PUMP TRIP INSTRUMENTATION
TEST AND CALIBRATION REQUIREMENTS

Insert Y

Equipment removed from service or declared inoperable to comply with required actions may be returned to service under administrative control solely to perform testing required to demonstrate its operability or the operability of other equipment. This is an exception to LCO 3.0.B.

Insert Z

LCO 3.0.F establishes the allowance for restoring equipment to service under administrative controls when it has been removed from service or declared inoperable to comply with required actions. The sole purpose of this Specification is to provide an exception to LCO 3.0.B to allow testing to demonstrate: (a) the operability of the equipment being returned to service; or (b) the operability of other equipment.

The administrative controls ensure the time the equipment is returned to service in conflict with the requirements of the required actions is limited to the time absolutely necessary to perform the allowed testing. This Specification does not provide time to perform any other preventive or corrective maintenance.

An example of demonstrating the operability of the equipment being returned to service is reopening a containment isolation valve that has been closed to comply with the required actions and must be reopened to perform the testing.

An example of demonstrating the operability of other equipment is taking an inoperable channel or trip system out of the tripped condition to prevent the trip function from occurring during the performance of testing on another channel in the other trip system. A similar example of demonstrating the operability of other equipment is taking an inoperable channel or trip system out of the tripped condition to permit the logic to function and indicate the appropriate response during the performance of testing on another channel in the same trip system.

Insert AA

1. Reactor High Pressure (02-3PT-55A, B, C, D)
2. Drywell High Pressure (05PT-12A, B, C, D)
3. Reactor Water Level-Low (L3) (02-3LT-101A, B, C, D)
4. Main Steam Line Isolation Valve Closure
   (29PNS-80A2, B2, C2, D2)
   (29PNS-86A2, B2, C2, D2)
5. Turbine Stop Valve Closure (94PNS-101, 102, 103, 104)
6. Turbine Control Valve Fast Closure (94PS-200A, B, C, D)
7. APRM Fixed High Neutron Flux
8. APRM Flow Referenced Neutron Flux

Insert BB

Initiates ADS (if not inhibited by ADS override switches), in conjunction with Confirmatory Low Level, 120 second delay and RHR (LPCI) or Core Spray pump discharge pressure interlock.

Insert CC

The quarterly calibration of the temperature sensor consists of comparing the active temperature signal with a redundant temperature signal.

Insert DD

The instrumentation which initiates primary containment isolation is connected in a dual bus (two trip systems) arrangement. Main Steam Line Isolation Valve (MSIV) isolation utilizes a one-out-of-two-taken-twice logic arrangement which closes the four inboard and four outboard MSIVs. Other penetrations which have both inboard and outboard automatic isolation valves

(except for the primary containment hydrogen and oxygen concentration sample, and the gaseous and particulate radioactivity sample systems) utilize logic arrangements in which one trip system closes inboard isolation valves and the other trip system closes outboard isolation valves. The primary containment hydrogen and oxygen concentration sample supply and return lines, as well as the gaseous and particulate sample supply and return lines, utilize inboard and outboard isolation valves that are both closed by a single trip system. Hydrogen and oxygen concentration sample supply and return isolation valve control circuits are provided with the capability to override automatic isolation to allow sampling during and following an accident. Penetrations which are isolated by a single automatic isolation valve (and a remote manual or check valve) utilize a single trip system to effect closure of the automatic isolation valve.

Insert EE

The main steam line high temperature isolation function utilizes 16 sensors (instrument channels), with 4 sensors located at each of 4 different areas in the vicinity of the main steam lines. The 4 instrument channels associated with each of the 4 areas are arranged in a 1-out-of-2-taken-twice logic. Thus a main steam line break in any of the 4 areas will effect closure of all 8 main steam line isolation valves.

Insert FF

The HPCI high temperature isolation function utilizes 16 sensors (instrument channels) located in the vicinity of the HPCI equipment and piping. The 16 instrument channels provide inputs into two trip systems, eight instrument channels per trip system. One trip system is associated with the inboard isolation valve and the other trip system is associated with the outboard isolation valves. Trip logic for each trip system is one-out-of-eight-taken-once logic for the high temperature isolation function. The logic for the RCIC high temperature isolation function is the same as the HPCI logic, except 8 instrument channels, 4 per trip system provide input to the high temperature isolation logic circuits.

Insert GG

The measurement of the response time interval for the Main Steam Isolation Valve (MSIV) isolation actuation instrumentation begins when the monitored parameter exceeds the isolation actuation setpoint at the channel sensor and ends when the MSIV pilot solenoid relay contacts open.

Insert HH

Trip Function utilizes a two-out-of-two-taken-once logic for isolation of both primary containment isolation valves on the hydrogen and oxygen sample, and gaseous and particulate sample supply and return lines.

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

LIST OF TABLES

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LIST OF FIGURES

Insert "Deleted"

1.0 (cont'd)

opened to perform necessary operational activities.

2. At least one door in each airlock is closed and sealed.

3. All automatic containment isolation valves are operable or de-activated in the isolated position.

4. All blind flanges and manways are closed.

N. Rated Power - Rated power refers to operation at a reactor power of 2,436 MWt. This is also termed 100 percent power and is the maximum power level authorized by the operating license. Rated steam flow, rated coolant flow, rated nuclear system pressure, refer to the values of these parameters when the reactor is at rated power.

O. Reactor Power Operation - Reactor power operation is any operation with the Mode Switch in the Startup/Hot Standby or Run position with the reactor critical and above 1 percent rated thermal power.

P. Reactor Vessel Pressure - Unless otherwise indicated, reactor vessel pressures listed in the Technical Specifications are those measured by the reactor vessel steam space sensor.

Q. Refueling Outage - Refueling outage is the period of time between the shutdown of the unit prior to refueling and the startup of the Plant subsequent to that refueling.

Nuclear Regulatory Commission.

R. Safety Limits - The safety limits are limits within which the reasonable maintenance of the fuel cladding integrity and the reactor coolant system integrity are assured. Violation of such a limit is cause for unit shutdown and review by the Atomic Energy Commission before resumption of unit operation. Operation beyond such a limit may not in itself result in serious consequences but it indicates an operational deficiency subject to regulatory review.

S. Secondary Containment Integrity - Secondary containment integrity means that the reactor building is intact and the following conditions are met:

1. At least one door in each access opening is closed.

2. The Standby Gas Treatment System is operable.

3. All automatic ventilation system isolation valves are operable or secured in the isolated position.

T. Deleted

Insert A

3.0 Continued

D. Entry into an OPERATIONAL CONDITION (mode) or other specified condition shall not be made when the conditions for the Limiting Condition for Operation are not met and the associated ACTION requires a shutdown if they are not met within a specified time interval. Entry into an OPERATIONAL CONDITION (mode) or specified condition may be made in accordance with ACTION requirements when conformance to them permits continued operation of the facility for an unlimited period of time. This provision shall not prevent passage through OPERATIONAL CONDITIONS (modes) required to comply with ACTION requirements. Exceptions to these requirements are stated in the individual specifications.

E. When a system, subsystem, train, component or device is determined to be inoperable solely because its emergency power source is inoperable, or solely because its normal power source is inoperable, it may be considered OPERABLE for the purpose of satisfying the requirements of its applicable Limiting Condition for Operation provided: (1) its corresponding normal or emergency power source is OPERABLE; and (2) all of its redundant system(s), subsystem(s), train(s), component(s) and device(s) are OPERABLE, or likewise satisfy the requirements of this specification. Unless both conditions (1) and (2) are satisfied, the unit shall be placed in COLD SHUTDOWN within the following 24 hours. This specification is not applicable when in Cold Shutdown or Refuel Mode.

F. Insert Y

4.0 Continued

that a Surveillance Requirement has not been performed. The ACTION requirements may be delayed for up to 24 hours to permit the completion of the surveillance when the allowable outage time limits of the ACTION requirements are less than 24 hours. Surveillance requirements do not have to be performed on inoperable equipment.

D. Entry into an OPERATIONAL CONDITION (mode) shall not be made unless the Surveillance Requirement(s) associated with the Limiting Condition for Operation have been performed within the applicable surveillance interval or as otherwise specified. This provision shall not prevent passage through or to Operational Modes as required to comply with ACTION Requirements.

4.0 BASES

A. This specification provides that surveillance activities necessary to insure the Limiting Conditions for Operation are met and will be performed during the OPERATIONAL CONDITIONS (modes) for which the Limiting Conditions for Operation are applicable. Provisions for additional surveillance activities to be performed without regard to the applicable OPERATIONAL CONDITIONS (modes) are provided in the individual Surveillance Requirements.

B. Specification 4.0.B establishes the limit for which the specified time interval for Surveillance Requirements may be extended. It permits an allowable extension of the normal surveillance interval to facilitate surveillance scheduling and consideration of plant operating conditions that may not be suitable for conducting the surveillance (e.g., transient conditions or other ongoing surveillance or maintenance activities). It also provides flexibility to accommodate the length of a fuel cycle for surveillances that are performed at each refueling outage and are specified with an 18 month surveillance interval. It is not intended that this provision be used repeatedly as a convenience to extend surveillance intervals beyond that specified for surveillances that are not performed during refueling outages. The limitation of this specification is based on engineering judgement and the recognition that the most probable result of any particular surveillance being performed is the verification of conformance with the Surveillance Requirements. The limit on extension of the normal surveillance interval ensures that the reliability confirmed by surveillance activities is not significantly reduced below that obtained from the specified surveillance interval.

C. This specification establishes the failure to perform a Surveillance Requirement within the allowed surveillance

C. Continued

interval, defined by the provisions of Specification 4.0.B, as a condition that constitutes a failure to meet the OPERABILITY requirements for a Limiting Condition for Operation. Under the provisions of this specification, systems and components are assumed to be OPERABLE when Surveillance Requirements have been satisfactorily performed within the specified time interval. However, nothing in this provision is to be construed as implying that systems or components are OPERABLE when they are found or known to be inoperable although still meeting the Surveillance Requirements. This specification also clarifies that the ACTION requirements are applicable when Surveillance Requirements have not been completed within the allowed surveillance interval and that the time limits of the ACTION requirements apply from the point in time it is identified that a surveillance has not been performed and not at the time that the allowed surveillance was exceeded. Completion of the Surveillance Requirement within the allowable outage time limits of the ACTION requirements restores compliance with the requirements of Specification 4.0.C. However, this does not negate the fact that the failure to have performed the surveillance within the allowed surveillance interval, defined by the provisions of Specification 4.0.B, was a violation of the OPERABILITY requirements of a Limiting Condition for Operation that is subject to enforcement action. Further, the failure to perform a surveillance within the provisions of Specification 4.0.B is a violation of a Technical Specification requirement and is, therefore, a reportable event under the requirements of 10 CFR 50.73(a)(2)(i)(B) because it is a condition prohibited by the plant Technical Specifications.

4.0 BASES - Continued

C. Continued

If the allowable outage time limits of the ACTION requirements are less than 24 hours or a shutdown is required to comply with ACTION requirements, a 24-hour allowance is provided to permit a delay in implementing the ACTION requirements. This provides an adequate time limit to complete Surveillance Requirements that have not been performed. The purpose of this allowance is to permit the completion of a surveillance before a shutdown is required to comply with ACTION requirements or before other remedial measures would be required that may preclude completion of a surveillance. The basis for this allowance includes consideration for plant conditions, adequate planning, availability of personnel, the time required to perform the surveillance and the safety significance of the delay in completing the required surveillance. This provision also provides a time limit for the completion of Surveillance Requirements that become applicable as a consequence of OPERATIONAL CONDITION (mode) changes imposed by ACTION requirements and for completing Surveillance Requirements that are applicable when an exception to the requirements of Specification 4.0.C is allowed. If a surveillance is not completed within the 24-hour allowance, the time limits of the ACTION requirements are applicable at that time. When a surveillance is performed within the 24-hour allowance and the Surveillance Requirements are not met, the time limits of the ACTION requirements are applicable at the time the surveillance is terminated.

C. Continued

Surveillance Requirements do not have to be performed on inoperable equipment because the ACTION requirements define the remedial measures that apply. However, the Surveillance Requirements have to be met to demonstrate that inoperable equipment has been restored to OPERABLE status.

D. This specification establishes the requirement that all applicable surveillances must be met before entry into an OPERATIONAL CONDITION or other condition of operation specified in the Applicability statement. The purpose of this specification is to ensure that system and component OPERABILITY requirements or parameter limits are met before entry into an OPERATIONAL CONDITION or other specified condition associated with plant shutdown as well as startup.

Under the provisions of this specification, the applicable Surveillance Requirements must be performed within the specified surveillance interval to ensure that the Limiting Conditions for Operation are met during initial plant startup or following a plant outage.

When a shutdown is required to comply with ACTION requirements, the provisions of this specification do not apply because this would delay placing the facility in a lower CONDITION of operation.

Replace with 49, 64, 83, 109, 162, 183

3.1 LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the instrumentation and associated devices which initiate the reactor scram.

Objective:

To assure the operability of the Reactor Protection System.

Specification:

"per trip system"

A. The setpoints, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch, shall be as shown in Table 3.1-1. The reactor protection system instrumentation response time shall be within the limits in Table 3.1-2.

Replace with Insert C

B. Minimum Critical Power Ratio (MCPR)

During reactor power operation, the MCPR operating limit shall not be less than that shown in the Core Operating Limits Report.

1. During Reactor power operation with core flow less than 100% of rated, the MCPR operating limit shall be multiplied by the appropriate K_f as specified in the Core Operating Limits Report.

4.1 SURVEILLANCE REQUIREMENTS

4.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram.

Objective:

To specify the type of frequency of surveillance to be applied to the protection instrumentation.

Specification:

A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1-1 and 4.1-2 respectively.

The response time for each reactor protection system trip function listed in Table 3.1-2 shall be demonstrated to be within the limits in the table during each 18 month test interval. Each test shall include at least one channel in each trip system. All channels in both trip systems shall be tested within two test intervals. Insert AA

B. Maximum Fraction of Limiting Power Density (MFLPD)

The MFLPD shall be determined daily during reactor power operation at $\geq$25% rated thermal power and the APRM high flux scram and Rod Block trip settings adjusted if necessary as specified in the Core Operating Limits Report.

Move text to page 31

3.1 (cont'd)

2. If anytime during reactor operation at greater than 25% of rated power it is determined that the operating limit MCPR is being exceeded, action shall then be initiated within fifteen (15) minutes to restore operation to within the prescribed limits. If the MCPR is not returned to within the prescribed limits within two (2) hours, an orderly reactor power reduction shall begin immediately. The reactor power shall be reduced to less than 25% of rated power within the next four hours, or until the MCPR is returned to within the prescribed limits.

4.1 (cont'd)

C. MCPR shall be determined daily during reactor power operation at $\geq$25% of rated thermal power and following any change in power level or distribution that would cause operation with a limiting control rod pattern as described in the bases for Specification 3.3.B.5.

D. When it is determined that a channel has failed in the unsafe condition, the other RPS channels that monitor the same variable shall be functionally tested immediately before the trip system containing the failure is tripped. The trip system containing the unsafe failure may be placed in the untripped condition during the period in which surveillance testing is being performed on the other RPS channels.

D ~~E~~. Verification of the MCPR operating limits shall be performed as specified in the Core Operating Limits Report.

3.1 BASES

A. The reactor protection system automatically initiates a reactor scram to:

1. Preserve the integrity of the fuel cladding.

2. Preserve the integrity of the Reactor Coolant System.

3. Minimize the energy which must be absorbed following a loss of coolant accident, and prevent inadvertent criticality.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Insert D

The Reactor Protection System is of the dual channel type (Reference subsection 7.2 FSAR). The System is made up of two independent trip systems, each having two subchannels of tripping devices. Each subchannel has an input from at least one instrument channel which monitors a critical parameter.

The outputs of the subchannels are combined in a 1 out of 2 logic; i.e., an input signal on either one or both of the subchannels will cause a trip system trip. The outputs of the trip systems are arranged so that a trip on both systems is required to produce a reactor scram.

This system meets the intent of IEEE-279 (1971) for Nuclear Power Plant Protection Systems. The system has a reliability greater than that of a 2 out of 3 system and somewhat less than that of a 1 out of 2 system.

With the exception of the average power range monitor (APRM) channel the intermediate range monitor (IRM) channels, the scram discharge volume, the main steam isolation valve closure and the turbine stop valve closure, each subchannel has one instrument channel. When the minimum condition for operation on the number of operable instrument channels per untripped protection trip system is met or if it cannot be met and the affected protection trip system is placed in a tripped condition, the effectiveness of the protection system is preserved.

Three APRM instrument channels are provided for each protection trip system. APRM's A and E operate contacts in one subchannel and APRM's C and E operate contacts in the other

4.1 BASES

A. The minimum functional testing frequency used in this specification is based on a reliability analysis using the concepts developed in Reference (6). This concept was specifically adapted to the 1 out of 2X2 logic of the Reactor Protection System. The analysis shows that the sensors are primarily responsible for the reliability of the Reactor Protection System. This analysis makes use of unsafe failure rate experience at conventional and nuclear power plants in a reliability model for the system. An unsafe failure is defined as one which negates channel operability and which, due to its nature, is revealed only when the channel is functionally tested or attempts to respond to a real signal. Failures such as blown fuses, ruptured bourdon tubes, faulted amplifiers, and faulted cables, which result in upscale or downscale readings on the reactor instrumentation are safe and will be easily recognized by the operators during operation because they are revealed by an alarm or a scram.

e

The channels listed in Tables 4.1-1 and 4.1-2 are divided into three groups for functional testing. These are:

Group A. On-off sensors that provide a scram trip function.

Group B. Analog devices coupled with bi-stable trips that provide a scram function.

Group C. Devices which only serve a useful function during some restricted mode of operation, such as startup or shutdown, or for which the only practical test is one that can be performed at shutdown.

The sensors that make up Group (A) are specifically selected from among the whole family of industrial on-off sensors that have earned an excellent reputation for reliable operation. During design, a goal of 0.99999 probability of success (at the 50 percent confidence level) was adopted to assure that a balanced and adequate design is achieved. The probability of success is primarily a function of the sensor failure rate and the test interval. A three-month test interval is planned for group (A) sensors. This is in keeping with good operating practices, and satisfies the design goal for the logic configuration.

e

e

Replace with Insert E

Amendment No. ~~14~~

utilized in the Reactor Protection System.

To satisfy the long-term objective of maintaining an adequate level of safety throughout the plant life-time, a minimum goal of 0.9999 at the 95 percent confidence level is proposed. With the 1 out of 2X2 logic, this requires that each sensor have an availability of 0.993 at the 95 percent confidence level. This level of availability may be maintained by adjusting the test interval as a function of the observed failure history (6). To facilitate the implementation of this technique, Figure 4.1-1 is provided to indicate an appropriate trend in test interval. The procedure is as follows:

1. Like sensors are pooled into one group for the purpose of data acquisition.

2. The factor M is the exposure hours and is equal to the number of sensors in a group, n, times the elapsed time, T (M = nT).

3. The accumulated number of unsafe failures is plotted as an ordinate against M as an abscissa on Figure 4.1-1.

4. After a trend is established, the appropriate monthly test interval to satisfy the goal will be the test interval to the left of the plotted points.

5. A test interval of 1 month will be used initially until a trend is established, which is based on system availability analysis and good engineering judgment plus operating experience.

a

Group (3) devices utilize an analog sensor followed by an amplifier and a bi-stable trip circuit. The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. In the event of failure, repair or substitution can start immediately. An as-is failure is one that sticks mid-scale and is not capable of going either up or down in response to an out-of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track ~~the~~ other Channel(s) ~~three~~. For purpose of analysis, it is assumed that this rare failure will be detected within 2 hr.

Replace with Insert F

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a

4.1 BASES (cont'd)

"functionally" during testing "every three months"

① The bi-stable trip circuit which is a part of the Group (B) devices can sustain ~~unsafe~~ failures which are revealed only ~~on test~~. Therefore, it is necessary to test them periodically. Insert G

A study was conducted of the instrumentation channels included in the Group (B) devices to calculate their unsafe failure rates. The non-ATTS (Analog Transmitter Trip System) analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 20×10^{-6} failures/hr. The non-ATTS bi-stable trip circuits are predicted to have unsafe failure rate of less than 2×10^{-6} failures/hr. The ATTS analog devices (sensors), bi-stable devices (master and slave trip units) and power supplies have been evaluated for reliability by Mean Time Between Failure analysis or state-of-the-art qualification type testing meeting the requirements of IEEE 323-1974. Considering the 2 hour monitoring interval for analog devices as assumed above, the instrument checks and functional tests as well as the analyses and/or qualification type testing of the devices, the design reliability goal for system reliability of 0.9999 will be attained with ample margin.

The bi-stable devices are monitored during plant operation to record their failure history and establish a test interval using the curve of Figure 4.1-1. There are numerous identical bi-stable devices used throughout the Plant's instrumentation system. Therefore, significant data on the failure rates for the bi-stable devices should be accumulated rapidly.

② The frequency of calibration of the APRM flow biasing network has been established as each refueling outage. The flow biasing network is functionally tested at least once/~~month and~~, in addition, cross calibration checks of the flow input to the flow biasing network can be made during the functional test by direct meter reading. There are several instruments which must be calibrated and it will take several days to perform the calibration of the entire network. While the calibration is being performed, a zero flow signal will be sent to half of the APRM's resulting in a half scram and rod block condition. Thus, if the calibration were performed during operation, flux shaping would not be possible. Based on experience at other generating stations, drift of instruments, such as those in the flow biasing network, is not significant and therefore, to avoid spurious scrams, a calibration frequency of each refueling outage is established.

The measurement of response time within the specified intervals provides assurance that the Reactor Protection System trip functions are completed within the time limits assumed in the transient and accident analyses.

The Reactor Protection System trip functions in Table 3.1-2 are those fuctions for which the transient and accident analyses described in Chapter 14 of the FSAR take credit for the response time of instrument channels.

4.1 BASES (cont'd)

(NUREG-0123, Rev. 3)

In terms of the transient analysis, the Standard Technical Specifications define individual trip function response time as "the time interval from when the monitored parameter exceeds its trip setpoint at the channel sensor until de-energization of the scram pilot valve solenoids." The individual sensor response time defined as "operating time" in General Electric (GE) design specification data sheet 22A3083AJ, note (8), is "the maximum allowable time from when the variable being measured just exceeds the trip setpoint to opening of the trip channel sensor contact during a transient." A transient is defined in note (4) of the same data sheet as "the maximum expected rate of change of the variable for the accident or the abnormal operating condition which is postulated in the safety analysis report.

The individual sensor response time may be measured by simulating a step change of the particular parameter. This method provides a conservative value for the sensor response time, and confirms that the instrument has retained its specified electromechanical characteristics. When sensor response time is measured independently, it is necessary to also measure the remaining portion of the response time in the logic train up to the time at which the scram pilot valve solenoids de-energize. The channel response time must include all component delays in the response chain to the ATTS output relay plus the 50 ms design allowance for RPS logic system response time. A response time for the RPS logic relays in excess of 50 ms is acceptable provided the overall response time does not exceed the response time limits of Table 3.1-2 which includes allowances for sensors, relays, and switches as follows:

Insert H

High Reactor Pressure sensor	500 ms
High Drywell Pressure sensor	550 ms
Low Reactor Water Level sensor	1000 ms
Main Steam Isolation Valve Closure and Turbine Stop Valve Closure switches	10 ms
Turbine Control Valve Fast Closure from the first movement of the main turbine control valves until actuation of pressure switches which detect the loss of hydraulic control oil pressure.	30 ms

The 10 ms limit for the MSIV and TSV position switch response time is defined by GE design specification data sheet 22A3083AJ. It requires that after MSIV or TSV moves to the set point corresponding to 10% closure from full open, the position switch contacts should open in less than or equal to 10 ms. When the correct set point is verified by surveillance testing for the position switch, the response time requirement is considered to be satisfied. The maximum permissible TCV fast closure channel, logic, and scram contactor response time is 70 ms rather than the sum of TCV fast closure logic (30 ms) and the trip logic and scram contactor response time (50 ms). This provides a 10 ms margin to allow for uncertainty in the test method.

"The maximum permissible APRM channel, logic, and scram contactor response time is 90 ms rather than the sum of the APRM channel response time (60 ms) and the trip logic and scram contactor response time (50 ms)..." (GE design specification data sheet 22A3083AJ), note (12). This measurement is applicable to both the APRM fixed high neutron flux and the flow referenced simulated thermal power channels and requires measuring the time delay through the LPRM cards. The latter case does not include the time constant of approximately six seconds which is calibrated separately. The basis for excluding the neutron detectors from response time testing is provided by NRC Regulatory Guide 1.118, Revision 2, section C.5.

4.1 BASES (cont'd)

The 18 month response time testing interval is based on NRC NUREG-0123, Revision 3, "Standard Technical Specifications," surveillance requirement 4.3.1.3.

Move to ① on page 38

certain modes

Group (C) devices are active only during ~~a given portion~~ of the operational~~al cycle~~. For example, the IRM is active during start-up and inactive during full power operation. Thus the only test that is meaningful is the one performed just prior to shutdown or start-up; i.e., the tests that are performed just prior to use of the instrument.

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.
2. Vacuum tube or semiconductor devices and detectors that drift or lose sensitivity.

Experience with passive type instruments in generating stations and substations indicates that the specified calibrations are adequate. For those devices which employ amplifiers, etc., drift specifications call for drift to be less than 0.4 percent/month; i.e., in the period of a month a maximum drift of 0.4 percent could occur, thus providing for adequate margin.

Move to ② on page 38

For the APRM System, drift of electronic apparatus is not the only consideration in determining a calibration frequency. Change in power distribution and loss of chamber sensitivity dictate a calibration every 7 days.

Calibration on this frequency assures plant operation at or below thermal limits.

"in Table 4.1-1" "Table 4.1-2"

~~A comparison of Tables 4.1-1 and 4.1-2 indicates that~~ two instrument channels have not been included in ~~the latter table~~. These are: mode switch in shutdown and manual scram. All of the devices or sensors associated with these scram functions are simple on-off switches and, hence, calibration during operation is not applicable.

B. The MFLPD is checked once per day to determine if the APRM scram requires adjustment. Only a small number of control rods are moved daily and thus the MFLPD is not expected to change significantly and thus a daily check of the MFLPD is adequate.

The sensitivity of LPRM detectors decreases with exposure to neutron flux at a slow and approximately constant rate. This is compensated for in the APRM system by calibrating twice a week using heat balance data and by calibrating individual LPRM's every 1000 effective full power hours, using TIP traverse data.

TABLE 3.1-1

Add

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT S

Minimum No. of Operable Instrument Channels Per Trip System (1)(2)	Trip Function	Trip Level Setting	Mode in Which Function Must be Operable			Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action ~~(1)~~ (3)
			Refuel ~~(6)(16)~~ (7)	Startup	Run		
1	Mode Switch in Shutdown		X	X	X	1 Mode Switch ~~(4 Selections)~~	A
1	Manual Scram		X	X	X	2 Instrument Channels	A
3	IRM High Flux	96% $\leq$ (120/125) of full scale	X	X		8 Instrument Channels	A
3	IRM Inoperative		X	X		8 Instrument Channels	A
2	APRM Neutron Flux-Startup (15)	$\leq$ 15% Power	X	X		6 Instrument Channels	A
2	APRM Flow Referenced Neutron Flux (Not to exceed 117%) (13)(14)	(12)			X	6 Instrument Channels	A or B
2	APRM Fixed High Neutron Flux (14)	$\leq$ 120% Power			X	6 Instrument Channels	A or B
2	APRM Inoperative	(10)	X	X	X	6 Instrument Channels	A or B

Amendment No. ~~18, 30, 48, 72, 87, 98, 124, 182~~

Replace with 14, 18, 183

TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT S Add

Minimum No. of Operable Instrument Channels per Trip System (1)(2)	Trip Function	Trip Level Setting'	Modes in Which Function Must be Operable: Refuel ~~(6)~~ (7)	Startup	Run	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action ~~(11)~~ (3)
2	APRM Downscale	≥ 2.5 indicated on scale (9)			X	6 Instrument Channels	A or B
2	High Reactor Pressure	≤ 1045 psig	X(~~8~~) 9	X	X	4 Instrument Channels	A
2	High Drywell Pressure (Note 16)	≤ 2.7 psig	X(~~7~~) 8	X(~~7~~) 8	X	4 Instrument Channels	A
2	Reactor Low Water Level (Note 16)	≥ 177 in. above TAF	X	X	X	4 Instrument Channels	A
3	High Water Level in Scram Discharge Volume	≤ 34.5 gallons per Instrument Volume	X(~~2~~) (4)	X	X	8 Instrument Channels	A
4	Main Steam Line Isolation Valve Closure	≤ 10% valve closure			X(~~5~~) 6	8 Instrument Channels	A

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TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Minimum No. of Operable Instrument Channels per Trip System (1)	Trip Function	Trip Level Setting	Modes in Which Function Must be Operable			Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (1)
			Refuel (6) (16)	Startup	Run		
2	Turbine Control Valve Fast Closure	$500 < P < 850$ psig Control oil pressure between fast closure solenoid and disc dump valve			X(~~6~~ 5)	4 Instrument Channels	A or C

Move text to revised page 41

Amendment No. ~~65~~, ~~81~~, ~~134~~

TABLE 3.1-1 (cont'd)
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Minimum No. of Operable Instrument Channels per Trip System (1)	Trip Function	Trip Level Setting	Modes in Which Function Must be Operable: Refuel (6))16)	Startup	Run	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (1)
Move to revised page 41 4	Turbine Stop Valve Closure	≤10% valve closure			5 6 X(~~4~~)(~~5~~)	8 Instrument Channels	A or C

NOTES OF TABLE 3.1-1

Replace with Insert I

1. There shall be two operable or tripped trip systems for each function, except as specified in 4.1.D. From and after the time that the minimum number of operable instrument channel for a trip system cannot be met, that affected trip system shall be placed in the safe (tripped) condition, or the appropriate actions listed below shall be taken.

   A. Insert all operable control rods within four hours.
   B. Reduce power level to IRM range and place Mode Switch in the Startup Position within eight hours.
   C. Reduce power level to less than 30 percent of rated within four hours.

4 ~~2~~. Permissible to bypass, if is in the Refuel ~~and~~ or Shutdown positions ~~of~~ the Reactor Mode Switc.
~~3. Deleted~~.
5 ~~4~~. Bypassed when turbine first stage pressure is less than 217 psig or less than 30 percent of rated power.
6 ~~5~~. The design permits closure of any two lines without a scram being initiated.
7 ~~6~~. When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be operable:

   A. Mode Switch in Shutdown.
   B. Manual Scram.

* Move to revised page 43

Amendment No. ~~43~~, ~~81~~, 1~~22~~, 1~~34~~, 1~~62~~

TABLE 3.1-1 (cont'd)
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

NOTES OF TABLE 3.1-1X (cont'd)

C. High Flux IRM.

D. Scram Discharge Volume High Level when any control rod in a control cell containing fuel is not fully inserted.

E. APRM 15% Power Trip.

8 ~~7~~. Not required to be operable when primary containment integrity is not required.

9 ~~8~~. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

9. The APRM downscale trip is automatically bypassed when the IRM Instrumentation is operable and not high.

10. An APRM will be considered operable if there are at least 2 LPRM inputs per level and at least 11 LPRM inputs of the normal complement.

11. ~~See Section 3.1.A.1~~. "Deleted"

12. The APRM Flow Referenced Neutron Flux Scram setting shall be less than or equal to the limit specified in the Core Operating Limits Report.

13. The Average Power Range Monitor scram function is varied as a function of recirculation flow (W). The trip setting of this function must be maintained as specified in the Core Operating Limits Report.

*

14. The APRM flow biased high neutron flux signal is fed through a time constant circuit of approximately 6 seconds. The APRM fixed high neutron flux signal does not incorporate the time constant, but responds directly to instantaneous neutron flux.

15. This Average Power Range Monitor scram function is fixed point and is increased when the reactor mode switch is place in the Run position.

16. Instrumentation common to PCIS

* Move to page 43a

Amendment No. ~~40~~, ~~62~~, ~~64~~, ~~67~~, ~~68~~, ~~72~~, ~~74~~, ~~109~~, ~~117~~, ~~159~~, ~~162~~ ~~207~~

TABLE 3.1-2

REACTOR PROTECTION SYSTEM INSTRUMENTATION RESPONSE TIMES

TABLE DELETED

	TRIP FUNCTION	REACTOR TRIP SYSTEM RESPONSE TIME (Seconds)	
1)	Reactor Vessel Pressure - High (02-3PT-55A, B, C, D)	$\leq$ 0.550	
2)	Drywell Pressure - High (05PT-12A, B, C, D)	$\leq$ 0.600	
3)	Reactor Water Level - Low (L3) (02-3LT-101A, B, C, D)	$\leq$ 1.050	
4)	Main Steam Isolation Valve Closure (29PNS-80A2, B2, C2, D2) (29PNS-86A2, B2, C2, D2)	$\leq$ 0.060	
5)	Turbine Stop Valve Closure (94PNS-101, 102, 103, 104)	$\leq$ 0.060	
6)	Turbine Control Valve Fast Closure (94PS-200A, B, C, D)	$\leq$ 0.070	
7)	APRM Fixed (120%) High Neutron Flux	$\leq$ 0.090	(2)
8)	APRM Flow Referenced Simulated Thermal Power	$\leq$ 0.090	(1) (2)

Notes for Table 3.1-2:

1. Trip system response time does not include the simulated thermal power time constant of approximately six seconds which is calibrated separately.
2. Trip system response time is the measured time interval from trip signal input to the first electronic component in the channel after the LPRM detector until the scram pilot valve solenoids de-energize (05A-K14 scram contactors open).

Table 4.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION TEST REQUIREMENTS

~~MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS~~

Trip Function ~~Instrument Channel~~	Group (2)	Functional Test	Functional Test ~~Minimum~~ Frequency (1)	
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each refueling outage	R
Manual Scram	A	Trip Channel and Alarm	Every 3 months	Q
RPS Channel Test Switch	A	Trip Channel and Alarm	Every refueling outage or after channel maintenance	W(1)
IRM High Flux	C	Trip Channel and Alarm (4)	Once per week during refueling or startup and before each startup.	S/U and W(5)
IRM Inoperative	C	Trip Channel and Alarm (4)	Once per week during refueling or startup and before each startup.	S/U and W(5)
APRM High Flux	B	Trip Output Relays (4)	Once/week	Q
Inoperative	B	Trip Output Relays (4)	Once/week	Q
~~Downscale~~	~~B~~	~~Trip Output Relays (4)~~	~~Once/week~~	
Flow Biased High Flux	B	~~Calibrate Flow Bias Signal~~ (4) Trip Output Relays (4)	Once/month (1)	Q
High Flux in Startup or Refuel	C	Trip Output Relays (4)	Once per week during refueling or startup and before each startup.	S/U and W(5)
High Reactor Pressure	B	Trip Channel and Alarm (4)	Once/month. (1)(8)	Q
High Drywell Pressure	B	Trip Channel and Alarm (4)	Once/month. (1)(8)	Q
Reactor Low Level	B	Trip Channel and Alarm (4)	Once/month. (1)(8)	Q
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel	Once/month. (7)	Q(6)
High Water Level in Scram Discharge Instrument Volume	B	Trip Channel and Alarm (4)	Once/month. (1)(8)	Q

Replace note 8 with "D" in a new column titled "Instrument Checks"

TABLE 4.1-1 (Cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION TEST REQUIREMENTS
~~MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS~~

Trip Function ~~Instrument Channel~~	Group ~~(2)~~ (Note 2)	Functional Test	Functional Test ~~Minimum~~ Frequency ~~(3)~~ (Note 3)	Instrument Check
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Once/month.(1) → Q	NA
Turbine Control Valve Fast Closure ~~EHC Oil Pressure~~	A	Trip Channel and Alarm	Once/month. → Q	NA
Turbine First Stage Pressure Permissive	B	Trip Channel and Alarm ~~(4)~~ (Note 4)	Once/month.(1)(8) → Q	D
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Once/month.(1) → Q	NA

NOTES FOR TABLE 4.1-1

Replace with Insert J

1. Initially once every month until acceptable failure rate data are available; thereafter, a request may be made to the NRC to change the test frequency. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of JAFNPP.

2. A description of the three groups is included in the Bases of this Specification.

3. Functional tests are not required on the part of the system that is not required to be operable or are tripped.

   If tests are missed on parts not required to be operable or are tripped, then they shall be performed prior to returning the system to an operable status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the instrument channels.

Amendment No. ~~24~~, ~~62~~, ~~80~~, ~~136~~ 2??

Table 4.1-1 (Cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TEST
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

NOTES FOR TABLE 4.1-1 (cont'd)

Move to Revised page 45

5. ~~Deleted~~ "Weekly Functional test required only during refuel and startup mode"

~~6. Deleted~~.

6 ~~7~~. The functional test shall be performed utilizing a water column or similar device to provide assurance that damage to a float or other portions of the float assembly will be detected.

~~7 8. Instrument check once per day.~~

Amendment No. ~~21~~, ~~61~~, ~~75~~, ~~89~~, ~~128~~

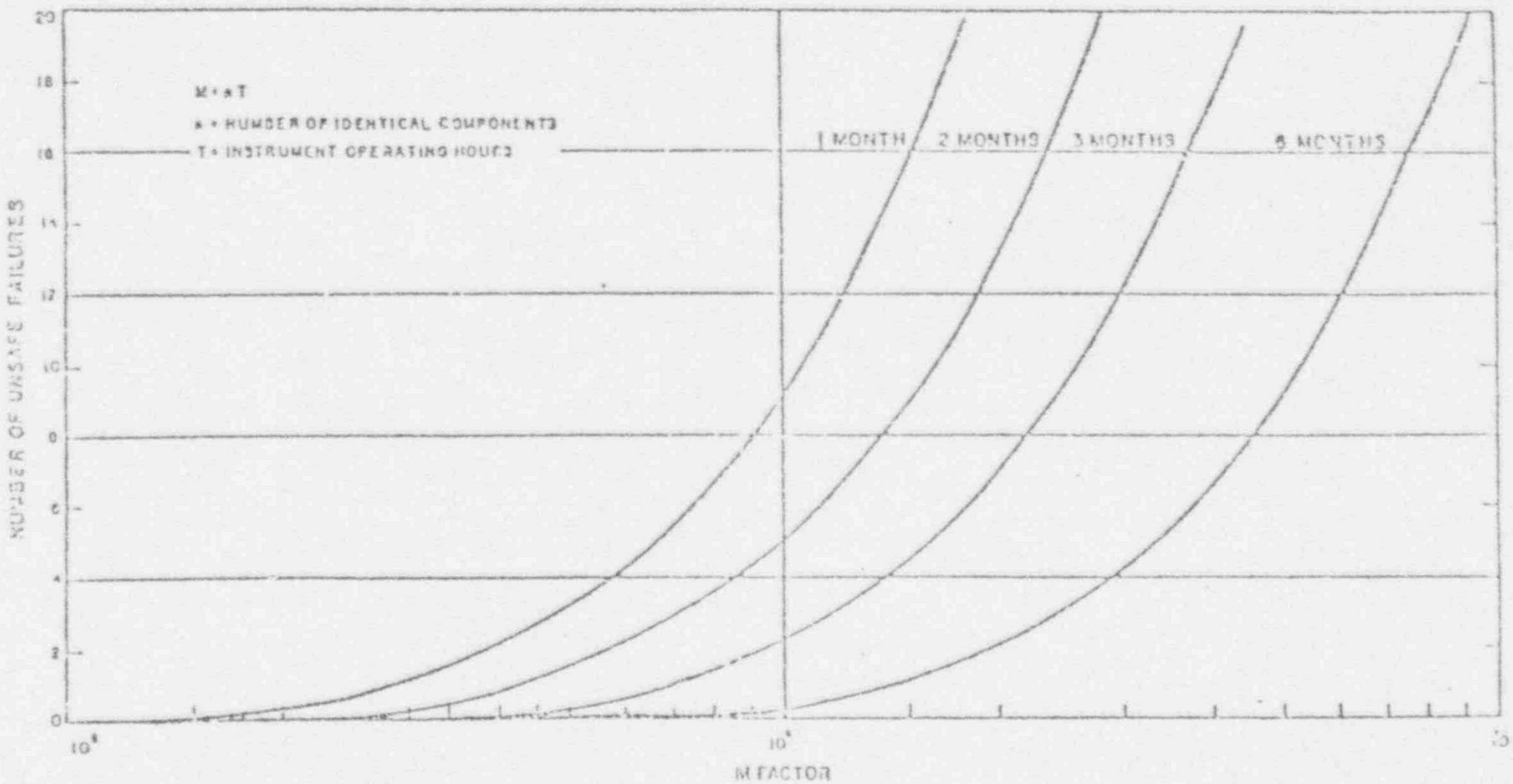

FIG. 4.1-1

GRAPHICAL AID IN THE SELECTION OF AN ADEQUATE INTERVAL BETWEEN TESTS

Delete Figure

Amendment No. 14

3.2 LIMITING CONDITIONS FOR OPERATION

3.2 INSTRUMENTATION

Applicability:

Applies to the plant instrumentation which either (1) initiates and controls a protective function, or (2) provides information to aid the operator in monitoring and assessing plant status during normal and accident conditions.

Objective:

To assure the operability of the aforementioned instrumentation.

Specifications:

A. Primary Containment Isolation Functions

When primary containment integrity is required, the limiting conditions of operation for the instrumentation that initiates primary containment isolation are given in Table 3.2-1.

When primary containment integrity is required, the primary containment isolation actuation instrumentation response time for MSIV closure shall be within the limits in Table 3.2-9.

4.2 SURVEILLANCE REQUIREMENTS

4.2 INSTRUMENTATION

Applicability:

Applies to the surveillance requirement of the instrumentation which either (1) initiates and controls protective function, or (2) provides information to aid the operator in monitoring and assessing plant status during normal and accident conditions.

Objective:

To specify the type and frequency of surveillance to be applied to the aforementioned instrumentation.

Specifications:

A. Primary Containment Isolation Functions

Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2-1.

System logic shall be functionally tested as indicated in Table 4.2-1.

The response time of each primary containment isolation actuation instrumentation isolation trip function listed in Table 3.2-9 shall be demonstrated to be within the limits in the table during each 18 month test interval. Each test shall include at least one channel in each trip system. All channels in both trip systems shall be tested within two test intervals.

Replace with Insert K

Add
1. MSIV Closure - Reactor Low Water Level (L1) (02-3LT-57A,B and 02-3LT-58A,B)
2. MSIV Closure - Low Steam Line Pressure (02PT-134A,B,C,D)
3. MSIV Closure - High Steam Line Flow (02DPT-116A-D, 117A-D, 118A-D, 119A-D)

Amendment No. ~~120~~, ~~183~~

3.2 (cont'd)

B. Core and Containment Cooling Systems - Initiation and Control

The limiting conditions for operation for the instrumentation that initiates or controls the Core and Containment Cooling Systems are given in Table 3.2-2. This instrumentation must be operable when the system(s) it initiates or controls are required to be operable as specified in Specification 3.5.

C. Control Rod Block Actuation

1. The limiting conditions of operation for the instrumentation that initiates control rod block are given in Table 3.2-3.

2. The minimum number of operable instrument channels specified in Table 3.2-3 for the rod block monitor may be reduced by one in one of the trip systems for maintenance and/or testing, provided that this condition does not last longer than 24 hours in any 30 day period.

D. Radiation Monitoring Systems - Isolation and Initiation Functions

Refer to the Radiological Effluent Technical Specifications (Appendix B).

4.2 (cont'd)

B. Core and Containment Cooling Systems - Initiation and Control

Instrumentation shall be functionally tested, calibrated, and checked as indicated in Table 4.2-2.

System logic shall be functionally tested as indicated in Table 4.2-2.

C. Control Rod Block Actuation

Instrumentation shall be functionally tested, calibrated, and checked as indicated in Table 4.2-3.

System logic shall be functionally tested as indicated in Table 4.2-3.

D. Radiation Monitoring Systems - Isolation and Initiation Functions

Refer to the Radiological Effluent Technical Specifications (Appendix B).

3.2 BASES

Besides reactor protection instrumentation which initiates a reactor scram, additional protective instrumentation is also provided. This protective instrumentation initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the Core Cooling Systems, Control Rod Block and Standby Gas Treatment Systems. The objectives of the specifications are to assure the effectiveness of the protective instrumentation when required, even during periods when portions of such systems are out of service for maintenance, and to prescribe the trip settings required to assure adequate performance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2-1 which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary system isolation is connected in a dual bus arrangement.

Insert DD

The low water level instrumentation set to trip at 177 in. above the top of the active fuel closes all isolation valves except those in Group 1. Details of the isolation valve grouping are given in Section 7.3 of the updated FSAR. For valves which isolate at this level, this trip setting is adequate to prevent uncovering the core in the case of a break in the largest line.

The low-low reactor water level instrumentation is set to trip when reactor water level is 126.5 in. above the top of active fuel. This trip

3.2 BASES (cont'd)

initiates the HPCI and RCIC systems and trips the recirculation pumps. The low-low-low reactor water level instrumentation is set to trip when the water level is 18 in. above the top of active fuel. This trip activates the remainder of the ECCS subsystems, closes the main steam isolation valves, main steam line drain valves and reactor water sample line isolation valves, and starts the emergency diesel generators. These trip level settings were chosen to be high enough to prevent spurious actuation but low enough to initiate ECCS operation and primary system isolation so that post-accident cooling can be accomplished and the guidelines of 10 CFR 100 will not be exceeded. For large breaks up to the complete circumferential break of a 24 in. recirculation line and with the trip setting given above, ECCS initiation and primary system isolation are initiated in time to meet the above criteria. Reference paragraph 6.5.3.1 of the updated FSAR.

The high drywell pressure instrumentation is a diverse signal for malfunctions to the water level instrumentation and in addition to initiating ECCS, it causes isolation of Groups B and C isolation valves. For the breaks discussed above, this instrumentation will generally initiate ECCS operation before the low-low-low water level instrumentation; thus the results given above are applicable here also. Details of the isolation valve closure group are given in Section 7.3 of the updated FSAR. The water level instrumentation initiates protection for the full spectrum of loss-of-coolant accidents.

Venturis are provided in the main steam lines as a means of measuring steam flow and also limiting the loss of mass inventory from the vessel during a steam line break accident. The primary function of the instrumentation is to detect a break in the main steam line. For the worst case accident, main steam line break outside the drywell, a trip setting of 140 percent of rated steam flow in conjunction with the flow limiters and main steam line valve closure, limits the mass inventory loss such that fuel is not uncovered, fuel temperature peak at approximately 1,000°F and release of radioactivity to the environs is below 10 CFR 100 guidelines. Reference Section 14.6.5 of the updated FSAR.

Insert EE

3.2 BASES (cont'd)

High radiation monitors in the area of the main steam lines have been provided to detect gross fuel failure as in the control rod drop accident. A trip setting of 3 times normal full-power background is established to close the main steam line drain valves, the recirculation loop sample valves, the mechanical vacuum pump isolation valves, and trip the pumps, to limit fission product release. For changes in the Hydrogen Water Chemistry hydrogen injection rate, the trip setpoint may be adjusted based on a calculated value of the expected radiation level. Hydrogen addition will result in an increase in the N-16 carryover in the main steam.

Pressure instrumentation is provided to close the main steam isolation valves in the run mode when the main steam line pressure drops below 825 psig. The reactor pressure vessel thermal transient due to an inadvertent opening of the turbine bypass valves when not in the run mode is less severe than the loss of feedwater analyzed in Section 14.5 of the FSAR, therefore, closure of the main steam isolation valves for thermal transient protection when not in the run mode is not required.

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI steam piping. Tripping of this instrumentation results in actuation of HPCI isolation valves. Tripping logic for the high flow is a 1 out of 2 logic.

The trip settings of approximately 300 percent of design flow for this high flow or 40°F above maximum ambient for high temperature are such that uncovering the core is prevented and fission product release is within limits.

The RCIC high flow and temperature instrumentation are arranged the same as that for the HPCI. The trip settings of approximately 300 percent for high flow or 40°F above maximum ambient for temperature are based on the same criteria as the HPCI.

Insert FF

The reactor water cleanup system high temperature instrumentation are arranged similar to that for the HPCI. The trip settings are such that uncovering the core is prevented and fission product release is within limits.

The instrumentation which initiates ECCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion, the specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed. An exception to this is when logic functional testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to the Safety Limit. The trip

4.2 BASES

The instrumentation listed in Tables 4.2-1 through 4.2-8 will be functionally tested and calibrated at regularly scheduled intervals. The same design reliability goal as the Reactor Protection System is generally applied. Sensors, trip devices and power supplies are tested, calibrated and checked at the same frequency as ~~comparable devices~~ in the Reactor Protection System. Insert L

The response times for MSIV isolation in Table 3.2-9 include the primary sensor and all components of the logic which must function to de-energize the MSIV pilot valve solenoids. Electrolytic filter capacitors are installed on the input to the main steam line flow ATTS trip units. General Electric analysis (MDE-278-1285 December 1985) accounts for the delay caused by the capacitors and justifies the increase in response time to 2.5 seconds for the main steam line high flow actuation signal. With the exception of the MSIVs, response time testing is not required for any other primary containment isolation actuation instrumentation. The safety analyses results are not sensitive to individual sensor response times of the logic systems to which the sensors are connected for isolation actuation instrumentation.

Insert GG

Those instruments which, when tripped, result in a rod block have their contacts arranged in a 1 out of n logic, and all are capable of being bypassed. For such a tripping arrangement with bypass capability provided, there is an optimum test interval that should be maintained in order to maximize the reliability of a given channel (7). This takes account of the fact that testing degrades reliability and the optimum interval between tests is approximately given by:

$$i = \sqrt{\frac{2t}{r}}$$

Where:

i = the optimum interval between tests.

t = the time the trip contacts are disabled from performing their function while the test is in progress.

r = the expected failure rate of the relays.

To test the trip relays requires that the channel be bypassed, the test made, and the system returned to its initial state. It is assumed this task requires an estimated 30 minutes to complete in a thorough and workmanlike manner and that the relays have a failure rate of 10^{-6} failures per hour. Using this data and the above operation, the optimum test interval is:

$$i = \sqrt{\frac{2(0.5)}{10^{-6}}} = 1x\,10^{3}\ hr.$$

$$= 40\ days$$

For additional margin a test interval of once/month will be used initially.

The sensors and electronic apparatus have not been included here as these are analog devices with readouts in the control room and the sensors and electronic apparatus can be checked by comparison with other like instruments. The checks which are made on a daily basis are adequate to assure operability of the sensors and electronic apparatus, and the test interval given above provides for optimum testing of the relay circuits.

The above calculated test interval optimizes each individual channel, considering it to be independent of all others. As an example, assume that there are two channels with an individual technician assigned to each. Each technician tests his channel at the optimum frequency, but the two technicians are not allowed to communicate so that one can advise the other that his channel is under test. Under these conditions, it is possible for both channels to be under test simultaneously. Now, assume that the technicians are required to communicate and that two channels are never tested at the same time.

Forbidding simultaneous testing improves the availability of the system over that which would be achieved by testing each channel independently. These 1 out of n trip systems will be tested one at a time in order to take advantage of this inherent improvement in availability.

Optimizing each channel independently may not truly optimize the system considering the overall rules of system operation. However, true system optimization is a complex problem. The optimums are broad, not sharp, and optimizing the individual channels is generally adequate for the system.

The formula given above minimizes the unavailability of a single channel which must be bypassed during testing. The minimization of the availability is illustrated by Curve No. 1 of Fig. 4.2-1 which assumes that a channel has a failure rate of 0.1×10^{-6}/hr and that 0.5 hr is required to test it. The unavailability is a minimum at a test interval i, of 3.16×10^{3} hr.

If two similar channels are used in a 1 out of 2 configuration, the test interval for minimum unavailability changes as a function of the rules for testing. The simplest case is to test each one independent of the other. In this case, there is assumed to be a finite probability that both may be by-passed at one time. This case is shown by Curve No. 2. Note that the unavailability is lower as expected for a redundant system and the minimum occurs at the same test interval. Thus, if the two channels are tested independently, the equation above yields the test interval for minimum unavailability.

A more usual case is that the testing is not done independently. If both channels are bypassed and tested at the same time, the result is shown in Curve No. 3. Note that the minimum occurs at about 40,000 hr., much longer than for Cases 1 and 2. Also, the minimum is not nearly as low as Case 2 which indicates that this method of testing does not take full advantage of the redundant

Delete entire text on page 62

4.2 Bases (cont'd)

channel. Bypassing both channels for simultaneous testing should be avoided.

The most likely case would be to stipulate that one channel be bypassed, tested, and restored, and then immediately following, the second channel be bypassed, tested, and restored. This is shown by Curve No. 4. Note that there is no true minimum. The curve does have a definite knee and very little reduction in system unavailability is achieved by testing at a shorter interval than computed by the equation for a single channel.

The best test procedure of all those examined is to perfectly stagger the tests. That is, if the test interval is four months, test one or the other channel every two months. This is shown in Curve No. 5. The difference between Cases 4 and 5 is negligible. There may be other arguments, however, that more strongly support the perfectly staggered tests, including reduction in human error.

The conclusions to be drawn are these:

1. A 1 out of n system may be treated the same as a single channel in terms of choosing a test interval; and

2. More than one channel should not be bypassed for testing at any one time.

The automatic pressure relief instrumentation can be considered to be a 1 out of 2 logic system and the bases given above for the rod blocks apply here also and were used to arrive at the functional testing frequency.

TABLE 3.2-1 Insert B

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Minimum No. of Operable Instrument Channels Per Trip System (1)(2)	Trip Function ~~Instrument~~	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action ~~(2)~~ 3
2 ~~(6)~~ 4	Reactor Low Water Level (7)	≥ 177 in. above TAF	4	A
Insert → 2	Reactor Low Water Level (Notes 7&8)	≥ 177 in. above TAF	2	A
1	Reactor High Pressure (Shutdown Cooling Isolation)	≤ 75 psig	2	D
2	Reactor Low-Low-Low Water Level	≥ 18 in. above the TAF	4	A
2 ~~(6)~~ 4	High Drywell Pressure (7)	≤ 2.7 psig	4	A
Insert 2	Drywell High Pressure (Notes 7&8)	≤ 2.7 psig	2	A
2	High Radiation Main Steam Line Tunnel	≤ 3 x Normal Rated Full Power Background	4	E
2	Low Pressure Main Steam Line	≥ 825 psig ~~(7)~~ 5	4	B
2	High Flow Main Steam Line	≤ 140% of Rated Steam Flow	4	~~B~~ G
8 ~~2~~	Main Steam Line Leak Detection High Temperature	≤ 40°F above max ambient	16 ~~4~~	B
4	Reactor Water Cleanup System Equipment Area High Temperature	≤ 40°F above max ambient	8	C
2	Low Condenser Vacuum ~~Closes MSIV's~~	≥ 8" Hg. Vac ~~(7)(8)~~ 6	4	B

TABLE 3.2-1 (Cont'd)

Insert B

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

NOTES FOR TABLE 3.2-1

Insert M (starts on revised page 64)

1. Whenever Primary Containment integrity is required by Section 3.7, there shall be two operable or tripped trip systems for each function.

2. From and after the time it is found that the first column cannot be met for one of the trip systems, that trip system shall be tripped or the appropriate action listed below shall be taken.

   A. Place the reactor in the cold condition within 24 hours.
   B. Isolate the main steam lines within eight hours.
   C. Isolate Reactor Water Cleanup System within four hours.
   D. Isolate shutdown cooling within four hours.
   E. Isolate the main steam line drain valves, the recirculation loop sample valves, and the mechanical vacuum pumps, within eight hours.

3. Deleted

4. Deleted

5. Two required for each steam line.

4 ~~6~~. These signals also start S~~B~~GTS and initiate secondary containment isolation.

5 ~~7~~. Only required in run mode (interlocked with Mode Switch).

6 ~~8~~. Only required in the run mode and turbine stop valves are open. ~~Bypassed when mode switch is not in run mode and turbine stop valves are closed.~~

7. Insert N

8. Insert HH

Amendment No. ~~5~~, ~~48~~, ~~67~~, ~~90~~, ~~142~~, ~~159~~, ~~192~~ 2~~0~~7

JAFNPP

TABLE 3.2-2

Insert R

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (1)(2) Add	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
1	2	Reactor Low-Low Water Level	$\geq$126.5 in. above TAF	4 (HPCI & RCIC) Inst. Channels	Initiates HPCI, RCIC & SGTS.
2	2	Reactor Low-Low-Low Water Level	$\geq$18 in. above TAF	4 (Core Spray & RHR) Instrument Channels	Initiates Core Spray, RHR (LPCI), and Emergency Diesel Generators.
				4 (ADS) Instrument Channels	Insert BB Initiates ADS in conjunction with confirmatory low level, 120 second time delay and LPCI or Core Spray pump discharge pressure interlock if not inhibited by ADS override switches.
3	2	Reactor High Water Level	$\leq$222.5 in. above TAF	Add "Note 8" 2 Inst. Channels	Trips HPCI turbine. ~~and closes RCIC steam line isolation valve~~.
~~4~~ 5	1 (Note 9)	Reactor Low Level (inside shroud)	$\geq$0 in. above TAF	2 Inst. Channels	Prevents inadvertent operation of containment spray during accident condition.
4.	2	Reactor High Water Level	$\leq$222.5 in. above TAF	2 (Note 8)	Closes RCIC steam supply valve.

Amendment No. ~~15~~, ~~48~~, ~~67~~, ~~84~~, ~~1~~9

JAFNPP

TABLE 3.2-2 (cont'd)

Insert R

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Add "Notes 1 and 2"

Item No.	Minimum No. of Operable Instrument Channels Per Trip System ~~(1)~~	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
6	2	Containment High Pressure	1<p<2.7 psig	4 Inst. Channels	Prevents inadvertent operation of containment spray during accident condition.
7	1 (Note 9)	Reactor ~~Confirmatory~~ Low Level	≥177 in. above TAF	2 Inst. Channels	~~ADS Permissive in conjunction with Reactor Low Low Low Water Level~~. Confirmatory low water level for ADS actuation
8	2	Drywell High Pressure	≤2.7 psig	4 HPCI Inst. Channels	Initiates Core Spray, RHR (LPCI), HPCI and SGTS.
9	2	Reactor Low Pressure	≥450 psig	4 Inst. Channels	Permits ~~Permissive for~~ opening Core Spray and RHR (LPCI) injection ~~Admission~~ valves.

JAFNPP

TABLE 3.2-2 (cont'd)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Insert R

Add "Notes 1 and 2"

Item No.	Minimum No. of Operable Instrument Channels Per Trip System ~~(1)(2)~~	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
~~9~~ 10	1 (Note 9)	Reactor Low Pressure	$50 \leq p \leq 75$ psig	2 Inst. Channels	In conjunction with PCIS signal permits closure of RHR (LPCI) injection valves while in Shutdown Cooling
10	THIS ITEM INTENTIONALLY BLANK				
11	THIS ITEM INTENTIONALLY BLANK				
1~~2~~	1 (See Notes ~~8~~ 9 3)	Core Spray Pump Start Timer (each loop)	11 ± 0.6 sec.	1 Inst. Channel (Note 8)	Initiates starting of core spray pump~~s~~. (each loop)

Amendment No. ~~15~~, ~~38~~, ~~34~~, ~~134~~

TABLE 3.2-2 (Cont'd)

Insert R

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Add "Notes 1 and 2"

Item No.	Minimum No. of Operable Instrument Channels Per Trip System ~~(1)(2)~~	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
12 ~~13~~	1 (See Notes 3 & 9)	(LPCI) RHR Pump Start Timer		(Note 8)	
		1st Pump (A Loop)	1.0 + 0.5 (-) 0 sec.	1 Inst. Channel	Starts 1st Pump (A Loop)
		1st Pump (B Loop)	1.0 + 0.5 (-) 0 sec.	1 Inst. Channel	Starts 1st Pump (B Loop)
		2nd Pump (A Loop)	6.0 $\pm$ 0.5 sec.	1 Inst. Channel	Starts 2nd Pump (A Loop)
		2nd Pump (B Loop)	6.0 $\pm$ 0.5 sec.	1 Inst. Channel	Starts 2nd Pump (B Loop)
13 ~~14~~	1 (Note 9)	Auto Blowdown Timer	120 sec $\pm$ 5 sec.	2 Inst. Channels	Initiates ADS, ~~in conjunction with Low Low Low Reactor Water Level, and LPCI or Core Spray Pump discharge pressure interlock,~~ (if not inhibited by ADS override switches)
14 ~~15~~	~~1~~ 4	RHR (LPCI) Pump Discharge Pressure Interlock	125 psig $\pm$ 20 psig	8 ~~1~~ Inst. Channels	Permits ~~Before~~ ADS actuation. ~~pending confirmation of low pressure core cooling system operation.~~

TABLE 3.2-2 (Cont'd)

Insert R

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Add "Notes 1 and 2"

"Spray or RHR (LPCI)"

Item No.	Minimum No. of Operable Instrument Channels Per Trip System ~~(1)~~	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
~~16~~ 15	2	Core Spray Pump Discharge Pressure Interlock	100 psig ± 10 psig	4 Inst. Channels	Permits ~~Defers~~ ADS actuation. pending ~~confirmation of low pressure core cooling system operation~~
~~17~~ 16	1 (Note 9)	RHR (LPCI) Trip System bus power monitor	Loss of Voltage	2 Inst. Channels	Monitors availability of power to logic systems.
~~18~~ 17	1 (Note 9)	Core Spray Trip System bus power monitor	Loss of Voltage	2 Inst. Channels	Monitor availability of power to logic systems.
~~19~~ 18	1 (Note 9)	ADS Trip System bus power monitor	Loss of Voltage	2 Inst. Channels	Monitors availability of power to logic systems.
~~20~~ 19	1 (Note 9)	HPCI Trip System bus power monitor	Loss of Voltage	2 Inst. Channels	Monitors availability of power to logic systems.
~~21~~ 20	1 (Note 9)	RCIC Trip System bus power monitor	Loss of Voltage	2 Inst. Channels	Monitors availability of power to logic systems.

TABLE 3.2-2 (cont'd)

Insert R

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (1)(2) Add	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
~~22~~ 22	2	Condensate Storage Tank Low Level	≥59.5 inches above tank bottom (= 15,600 gal. avail)	2 Inst. Channels Note 8	Transfers RCIC pump suction to suppression chamber
23		This Item Intentionally Blank			
24		This Item Intentionally Blank			
~~25~~ 21	1 (Note 9)	Core Spray Sparger to Reactor Pressure vessel d/p	≤0.5 psid	2 Inst. Channels	Alarms ~~to detect~~ to indicate core spray sparger pipe break.
~~26~~ 23	2	Condensate storage Tank Low Level	≥59.5 in. above tank bottom (=15,600 gal avail)	2 Inst. Channels Note 8	Transfers HPCI pump suction to suppression chamber.
~~27~~ 24	2	Suppression Chamber High Level	≤6 in. above normal level	2 Inst. Channels	Transfers HPCI pump suction to suppression chamber.
~~28~~	1	RCIC Turbine Steam Line High Flow	≤282 in. H_2O dp	2 Inst. Channels	~~Close Isolation Valves in RCIC Subsystem.~~ F

Move to Table 3.2-1

TABLE 3.2-2 (Cont'd) Insert R

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (1)(2) Add	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
~~29~~	1	RCIC Steam Line/ Area Temperature	$\leq$40°F Above max. ambient	2 Inst. Channels	~~Close Isolation Valve in RCIC Subsystem~~ → F
~~30~~	1	RCIC Steam Line Low Pressure	100 > P > 50 psig	2 Inst. Channels	~~Close Isolation Valves in RCIC Subsystem~~ → F
~~31~~ *	1	HPCI Turbine Steam Line High Flow	$\leq$160 in H_2O dp	2 Inst. Channels	~~Close Isolation Valves in HPCI Subsystem~~ → F
~~32~~	1	RCIC Turbine High Exhaust Diaphragm Pressure	$\leq$10 psig	2 Inst. Channels	~~Close Isolation Valves in RCIC Subsystem~~ → F
~~33~~	1	HPCI Turbine High Exhaust Diaphragm Pressure	$\leq$10 psig	2 Inst. Channels	~~Close Isolation Valves in HPCI Subsystem~~ → F
25 ~~34~~	1 (Note 9)	LPCI Cross-Connect Valve Position	NA	(Note 8) 1 Inst. Channels	Alarms ~~Initiates annunciation~~ when valve is not closed.
~~35~~	1	HPCI Steam Line Low Pressure	100 > P > 50 psig	2 Inst. Channels	~~Close Isolation Valve in HPCI Subsystems~~ → F
~~36~~ *	1	HPCI Steam Line/ Area Temperature	$\leq$40°F above max. ambient	2 Inst. Channels	~~Close Isolation Valve in HPCI Subsystem~~ → F

* Move instruments and their requirements to Table 3.2-1

TABLE 3.2-2 (Cont'd)

Insert R

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Item No.	Minimum No. of Operable Instrument Channels Per Trip System (1)(2) Add	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
26 ~~37~~	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Relay (Degraded Voltage)	110.6 ± 1.2 secondary volts	2 Inst. Channels	~~1.~~ Initiates both 4kV Emergency Bus Undervoltage Timers. (Degraded Voltage LOCA and non-LOCA) ~~2.~~ (Notes 4 and 6)
27 ~~38a~~	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Timer (Degraded Voltage LOCA)	9.0 ± 1.0 sec.	2 Inst. Channels	~~1.~~ (Note 5)
28 ~~38b~~	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Timer (Degraded Voltage non-LOCA)	45 ± 5.0 sec.	2 Inst. Channels	~~1.~~ (Note 5)
29 ~~39~~	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Relay (Loss of Voltage)	85 ± 4.25 secondary volts	2 Inst. Channels	~~1.~~ Initiates [illegible] Emergency Bus Undervoltage Loss of Voltage Timer. ~~2.~~ (Notes 4 and 7)
30 ~~40~~	(1 per 4kV bus) (Note 9)	4kV Emergency Bus Undervoltage Timer (Loss of Voltage)	2.50 ± 0.05 sec.	2 Inst. Channels	~~1.~~ (Note 5)
31 ~~41~~	2	Reactor Low Pressure	285 to 335 psig	4 Inst. Channels	Permits closure of ~~Permissive for closing~~ recirculation pump discharge valves

Amendment No. 14, 48, 106, 120 1[illegible]0

TABLE 3.2-2 (Cont'd)

Insert R

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Replace with Insert O

NOTES FOR TABLE 3.2-2

1. Whenever any ECCS subsystem is required by specification 3.5 to be operable, there shall be two operable trip systems. From and after the time it is found that the first column cannot be met for one of the trip systems, that trip system shall be placed in the tripped condition or the reactor shall be placed in the cold condition within 24 hours.
2. "Deleted"
3. Refer to Technical Specification 3.5.A for limiting conditions for operation, failure of one (1) instrument channel disables one (1) pump.
4. Tripping of 2 out of 2 sensors is required for an undervoltage trip. With one operable sensor, operation may continue with the inoperable sensor in the tripped condition.
5. The 4kV Emergency Bus Undervoltage Timers (degraded voltage LOCA, degraded voltage non-LOCA,and loss-of-voltage) initiate the following: starts the Emergency Diesel-Generators; trips the normal/reserve tie breakers and trips all 4kV motor breakers (in conjunction with 75 percent Emergency Diesel-Generator voltages); initiates diesel-generator breaker close permissive (in conjunction with 90 percent Emergency Diesel-Generator voltages) and; initiates sequential starting of vital loads in conjunction with low-low-low reactor water level or high drywell pressure.
6. A secondary voltage of 110.6 volts corresponds to approximately 93% of 4160 volts on the bus.
7. A secondary voltage of 85 volts corresponds to approximately 71.5% of 4160 volts on the bus.

Add → 8. Only one trip system

Add → 9. Single channel trip system.

TABLE 3.2-3

INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

Insert S

Minimum No. of Operable Instrument Channels Per Function Trip ~~System~~ (Notes 1 and 3)	~~Instrument~~ Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Channels	Action (Note 2)
4 ~~2~~	APRM ~~Upscale (Flow Biased)~~ Flow Referenced Neutron Flux	~~(8)~~ (Note 9)	6 ~~Inst. Channel~~s	~~(1)~~ A
4 ~~2~~	APRM ~~Upscale (Start-up Mode)~~ Neutron Flux-Startup	≤ 12%	6 ~~Inst. Channel~~s	~~(1)~~ A
4 ~~2~~	APRM Downscale	≥ 2.5 indicated on scale	6 ~~Inst. Channel~~s	~~(1)~~ A
2 ~~1~~ ~~(8)~~ (Note 7)	Rod Block Monitor (Flow Biased)	~~(8)~~ (Note 9)	2 ~~Inst. Channels~~	~~(1)~~ B
2 ~~1~~ ~~(8)~~ (Note 7)	Rod Block Monitor (Downscale)	≥ 2.5 indicated on scale	2 ~~Inst. Channels~~	~~(1)~~ B
6 ~~3~~	IRM Downscale ~~(2)~~ (Note 4)	≥ 2% (2.5/125) of full scale	8 ~~Inst. Channels~~	~~(1)~~ A
6 ~~3~~	IRM Detector not in Start-up Position	~~(7)~~ (Note 8)	8 ~~Inst. Channels~~	~~(1)~~ A
6 ~~3~~	IRM Upscale	≤ 86.4% (108/125) of full scale	8 ~~Inst. Channels~~	~~(1)~~ A
3 ~~2~~ ~~(4)~~	SRM Detector not in Start-up Position	~~(6)~~ (Note 5)	4 ~~Inst. Channels~~	~~(1)~~ A
3 ~~2~~ ~~(4)~~ ~~(5)~~ (Note 6)	SRM Upscale	≤ 10^5 counts/sec	4 ~~Inst. Channels~~	~~(1)~~ A
2 ~~1~~	Scram Discharge Instrument Volume High Water Level	≤ 26.0 gallons per instrument volume	2 ~~Inst. Channels~~	~~(9)(10)~~ C (Note 10)

NOTES FOR TABLE 3.2-3

1. For the Start-up and Run positions of the Reactor Mode Selector Switch, there shall be two operable or tripped trip systems for each function. The SRM and IRM block need not be operable in run mode, and

Replace with Insert P and move to page 73.

Amendment No. ~~48~~, ~~62~~, ~~75~~, ~~98~~ 1~~0~~2

TABLE 3.2-3 (Cont'd)

Inserts

INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

NOTES FOR TABLE 3.2-3

the RBM rod block need not be operable in start-up mode. When the reactor is in the start-up mode, the APRM upscale (start-up mode) rod block shall be operable. When the reactor is in the run mode, the APRM upscale (flow biased) and APRM downscale rod blocks shall be operable. From and after the time it is found that the first column cannot be met for one of the two trip systems, this condition may exist for up to seven days provided that during that time the operable system is functionally tested immediately and daily thereafter; if this condition lasts longer than seven days, the system shall be tripped. From and after the time it is found that the first column cannot be met for both trip systems, the systems shall be tripped.

Replace with Insert P

~~2.~~ 4 IRM downscale is bypassed when it is on its lowest range.

~~3.~~ 5 This function is bypassed when the count rate is $\geq$ 100 cps.

~~4.~~ 6 ~~One of the four SRM inputs may be bypassed.~~

~~5.~~ 6 This SRM Function is bypassed when the IRM range switches are on range 8 or above.

~~6.~~ 7 ~~The trip is bypassed when the reactor power is $\leq$ 30%.~~ RBM is required when reactor power is greater than or equal to 30%.

~~7.~~ 8 This function is bypassed when the Mode Switch is placed in Run.

9 ~~8.~~ The ~~Flow Biased APRM Upscale~~ APRM Flow Referenced Neutron Flux and Rod Block Monitor trip level setpoint shall be less than or equal to the limit specified in the Core Operating Limits Report.

10 ~~9.~~ When the reactor is subcritical and the reactor water temperature is less than 212°F, the control rod block is required to be operable only if any control rod in a control cell containing fuel is not fully inserted.

10. When one of the instruments associated with scram discharge instrument volume high water rod blocks is not operable, the trip system shall be tripped.

Move to page 74

TABLE 3.2-7

ATWS RECIRCULATION PUMP TRIP ~~ACTUATION~~ INSTRUMENTATION Requirements

Trip Function	Applicable Modes	Minimum ~~Required~~ Number of Operable Channels per Trip System (Notes 1&2) Instrument	Trip Level Setting ~~Setpoint~~	~~Action~~
1 Reactor Pressure - High	Run	2	≤ 1120 psig	~~A, B, or C~~
2 Reactor Water Level - Low Low	Run	2	≥ 126.5 in. above TAF	~~A, B, or C~~

Notes for Table 3.2-7

See next page for Notes 1 and 2

Insert Q (locate on revised page 77)

Action A.

When the number of operable channels is one less than the required number of operable channels per trip system for one or both trip systems, restore the inoperable channel to an operable condition within 72 hours. If not restored within 72 hours, place the inoperable channel in a tripped condition within one hour. If placing the inoperable channel in the tripped condition would result in a recirculation pump trip, take Action C.

Action B.

When the number of operable channels is two less than the required number of operable channels per trip system for one or both trip systems, either restore at least one channel per trip system to an operable status within one hour or place the inoperable channels in the tripped condition within one hour. If placing the inoperable channel in the tripped condition would result in recirculation pump trip, take Action C.

Action C.

If Action A or B is not completed within the allowed time, be in the start-up/hot standby mode within the next six hours.

TABLE 3.2-9

PRIMARY CONTAINMENT ISOLATION SYSTEM ACTUATION INSTRUMENTATION RESPONSE TIMES

	TRIP FUNCTION	RESPONSE TIME (Seconds)
1)	MSIV Closure - Reactor Low Water Level (L1) (02-3LT-57A, B and 02-3LT-58A, B)	$\leq$ 1.0
2)	MSIV Closure - Low Steam Line Pressure (02PT-134A, B, C, D)	$\leq$ 1.0
3)	MSIV Closure - High Steam Line Flow (02DPT-116A-D, 117A-D, 118A-D, 119A-D)	$\leq$ 2.5

Note for Table 3.2-9:

The measurement of the response time interval begins when the monitored parameter exceeds the isolation actuation set point at the channel sensor and ends when the Main Steam Isolation Valve pilot solenoid relay contacts open. The pilot solenoid relay contacts to be used for determination of the end point of the response time measurement are:

For the Inboard MSIV pilot solenoid relays:	16A-K14	(ac solenoids)
	16A-K51	(dc solenoids)
For the Outboard MSIV pilot solenoid relays:	16A-K16	(ac solenoids)
	16A-K52	(dc solenoids)

Delete Table

TABLE 4.2-1

Insert U

MINIMUM TEST AND CALIBRATION FREQUENCY FOR PCIS

add "Note"

	Instrument Channel ~~(8)~~ (Note 8)	Instrument Functional Test	Calibration Frequency	Instrument Check ~~(4)~~ (Note 4)
1)	Reactor High Pressure (Shutdown Cooling ~~Permissive~~ Isolation)	Q ~~(1)~~	Q ~~Once/3 months~~	NA ~~None~~
2)	Reactor Low-Low-Low Water Level	Q ~~(1)~~ (5)	R (15)	D ~~Once/day~~
3)	Main Steam High Temp.	Q ~~(1)~~ (5)	R (15)	D ~~Once/day~~
4)	Main Steam High Flow	Q ~~(1)~~ (5)	R (15)	D ~~Once/day~~
5)	Main Steam Low Pressure	Q ~~(1)~~ (5)	R (15) (Note 16)	D ~~Once/day~~
6)	~~Reactor Water Cleanup~~ RWCU Area High Temp.	Q ~~(1)~~	Q, ~~Once/3 months~~	NA ~~None~~
7)	Condenser Low Vacuum	Q ~~(1)~~ (5)	R (15)	D ~~Once/day~~
8)	Main Steam Line High Radiation	Q ~~(1)~~ (5)	Q/R (11)	D ~~Once/day~~

Insert ②

Move to page 79

	Logic System Functional Test ~~(7) (9)~~ (Notes 7 & 9)	Frequency
1)	Main Steam Line Isolation Valves Main Steam Line Drain Valves Reactor Water Sample Valves	SA ~~Once/6 months~~
2)	RHR - Isolation Valve Control Shutdown Cooling Valves	SA ~~Once/6 months~~
3)	Reactor Water Cleanup Isolation	SA ~~Once/6 months~~
4)	Drywell Isolation Valves TIP Withdrawal Atmospheric Control Valves	SA ~~Once/6 months~~
5)	Standby Gas Treatment System Reactor Building Isolation	SA ~~Once/6 months~~

Insert ③

NOTE: See notes following Table 4.2-5.

Amendment No. ~~37~~, ~~89~~, ~~136~~, ~~181~~, ~~182~~, ~~190~~ 2?7

Insert V

TABLE 4.2-2

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CORE AND CONTAINMENT COOLING SYSTEMS

	Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check ~~(4)~~ (Note 4)
1)	Reactor Water Level	Q ~~(1)(5)~~ (Note 5)	SA/R ~~(5)~~ (Note 15)	D ~~Once/day~~
2a)	Drywell Pressure (non-ATTS)	Q ~~(1)~~	Q ~~Once/3 months~~	NA ~~None~~
2b)	Drywell Pressure (ATTS)	Q ~~(1)(5)~~ (Note 5)	SA/R ~~(5)~~ (Note 15)	D ~~Once/day~~
3a)	Reactor Pressure (non-ATTS)	Q ~~(1)~~	Q ~~Once/3 months~~	NA ~~None~~
3b)	Reactor Pressure (ATTS)	Q ~~(1)(5)~~ (Note 5)	SA/R ~~(5)~~ (Note 15)	D ~~Once/day~~
4)	Auto Sequencing Timers	NA ~~None~~	R ~~Once/operating cycle~~	NA ~~None~~
5)	ADS - LPCI or CS Pump Disch.	Q ~~(1)~~	Q ~~Once/3 months~~	NA ~~None~~
6)	Trip System Bus Power Monitors	Q ~~(1)~~	NA ~~None~~	NA ~~None~~
7 ~~8)~~	Core Spray Sparger d/p	Q ~~(1)~~	Q ~~Once/3 months~~	D ~~Once/day~~
* 9)	Steam Line High Flow HPCI & RCIC	Q ~~(1)(5)~~ (Note 5)	R ~~(5)~~ (Note 15)	D ~~Once/day~~
* 10)	Steam Line/Area High Temp. HPCI & RCIC	Q ~~(1)(5)~~ (Note 5)	R ~~(5)~~ (Note 15)	D ~~Once/day~~
* 11 ~~12)~~	HPCI & RCIC Steam Line Low Pressure	Q ~~(1)(5)~~ (Note 5)	R ~~(5)~~ (Note 15)	D ~~Once/day~~
8 ~~10)~~	HPCI & RCIC Suction Source Levels	Q ~~(1)~~	Q ~~Once/3 months~~	NA ~~None~~
9 ~~14)~~	4kV Emergency Bus Under-Voltage (Loss-of-Voltage, Degraded Voltage LOCA and non-LOCA) Relays and Timers.	R ~~Once/operating cycle~~	R ~~Once/operating cycle~~	NA ~~None~~
* 12 ~~15)~~	HPCI & RCIC Exhaust Diaphragm Pressure High	Q ~~(1)~~	Q ~~Once/3 months~~	NA ~~None~~
10 ~~17)~~	LPCI/Cross Connect Valve Position	R ~~Once/operating cycle~~	NA ~~None~~	NA ~~None~~

NOTE: See notes following Table 4.2-5.

* Move instrument and testing requirement to Insert ② on page 78

Amendment No. ~~14, 48, 53, 89, 106, 120, 160, 181,~~ 190
Replace with 3, 89, 169, 181, 201

TABLE 4.2-2 (Cont'd) — Insert V

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CORE AND CONTAINMENT COOLING SYSTEMS

Logic System Functional Test		Frequency
1) Core Spray Subsystem	~~(7) (9)~~	~~Once/6 months~~ SA (Notes 7 & 9)
2) Low Pressure Coolant Injection Subsystem	~~(7) (9)~~	~~Once/6 months~~ SA (Notes 7 & 9)
3) Containment Cooling Subsystem		~~Once/6 months~~ SA
4) HPCI Subsystem	~~(7) (9)~~	~~Once/6 months~~ SA (Notes 7 & 9)
~~5)~~ * HPCI Subsystem Auto Isolation	~~(7)~~	~~Once/6 months~~ SA (Note 7)
5 ~~6~~) ADS Subsystem	~~(7) (9)~~	~~Once/6 months~~ SA (Notes 7 & 9)
~~7)~~ * RCIC Subsystem Auto Isolation	~~(7)~~	~~Once/6 months~~ SA (Note 7)
~~8) ADS Relief Valve Bellow Pressure Switch~~	~~(7) (9)~~	~~Once/operating cycle~~ (Notes 7 & 9)

1

NOTE: See notes following Table 4.2-5.

* Move to Table 4.2-1
Insert 3

TABLE 4.2-3

Insert W

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CONTROL ROD BLOCKS ACTUATION

	Instrument Channel	Instrument Functional Test (5)	Calibration	Instrument Check (4)
1)	APRM - Downscale	~~(1)~~ Q	~~Once/3 months~~ Q	D ~~Once/day~~
2)	APRM - Upscale	~~(1)~~ Q	~~Once/3 months~~ Q	D ~~Once/day~~
3)	IRM - Upscale	~~(2)~~ S/U (Note 2)	~~(3) (6)~~ Q (Notes 3&6)	D ~~Once/day~~
4)	IRM - Downscale	~~(2)~~ S/U (Note 2)	~~(3) (6)~~ Q (Notes 3&6)	D ~~Once/day~~
6 ~~5~~)	RBM - Upscale	~~(1)~~ Q	~~Once/3 months~~ Q	D ~~Once/day~~
7 ~~6~~)	RBM - Downscale	~~(1)~~ Q	~~Once/3 months~~ Q	D ~~Once/day~~
8 ~~7~~)	SRM - Upscale	~~(2)~~ S/U (Note 2)	~~(3) (6)~~ Q (Notes 3&6)	D ~~Once/day~~
9 ~~8~~)	SRM - Detector Not in Startup Position	~~(2)~~ S/U (Note 2)	~~(3) (6)~~ NA	NA ~~None~~
5 ~~9~~)	IRM - Detector Not in Startup Position	~~(2)~~ S/U (Note 2)	~~(3) (6)~~ NA	NA ~~None~~
10)	Scram Discharge Instrument Volume - High Water Level (Group B Instruments)	~~Once/month (1)~~ Q	~~Once/3 months~~ Q	D ~~Once/day~~

	Logic System Function Test ~~(7) (9)~~ (Notes 7&9)	Frequency
1)	System Logic Check	~~Once/6 months~~ SA

NOTE: See notes following Table 4.2-5.

Replace with 3, 89, 93

Amendment No. 3, 62, 89, 181

NOTES FOR TABLES 4.2-1 THROUGH 4.2-5

1. Initially once every month until acceptance failure rate data are available; thereafter, a request may be made to the NRC to change the test frequency. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instruments operate in a environment similar to that of JAFNPP.

2. Functional tests are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed within seven (7) days prior to each startup.

3. Calibrations are not required when these instruments are not required to be operable or are tripped. Calibration tests shall be performed within seven (7) days prior to each startup or prior to a pre-planned shutdown.

4. Instrument checks are not required when these instruments are not required to be operable or are tripped.

5. This instrumentation is exempt from the functional test definition. The functional test will consist of injecting a simulated electrical signal into the measurement channel.

6. These instrument channels will be calibrated using simulated electrical signals once every three months.

* Add "Deleted"

7. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

8. Reactor low water level, and high drywell pressure are not included on Table 4.2-1 since they are listed on Table 4.1-2.

9. The logic system functional tests shall include a calibration of time delay relays and timers necessary for proper functioning of the trip systems.

10. At least one (1) Main Stack Dilution Fan is required to be in operation in order to isokinetically sample the Main Stack. a *

11. Perform a calibration once per operating cycle using a radiation source. Perform an instrument channel alignment once every 3 months using the built-in current source.

12. (Deleted)

13. Calibration and instrument check surveillance for SRM and IRM Instruments are as specified in Tables 4.1-1, 4.1-2, 4.2-3. a *

14. Functional test is performed once each operating cycle. a *

15. Sensor calibration once per operating cycle. Master/slave trip unit calibration once per 6 months.

16. Insert CC

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TABLE 4.2-7

Insert X

MINIMUM TEST AND CALIBRATION FREQUENCY
FOR ATWS RECIRCULATION PUMP TRIP ACTUATION INSTRUMENTATION

FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	TRIP UNIT CALIBRATION	CHANNEL CALIBRATION	SIMULATED AUTO ACTUATION & LOGIC FUNCTIONAL TEST
a 1 Reactor Pressure-High	D ~~Once/day~~	Q ~~Once/31 days~~	SA ~~Once/6 months~~	R ~~Once/Operating cycle~~	R ~~Once/Operating cycle~~
2 Reactor Water Level-Low Low	D ~~Once/day~~	Q ~~Once/31 days~~	SA ~~Once/6 months~~	R ~~Once/Operating cycle~~	R ~~Once/Operating cycle~~

Delete Fig. 4.2-1

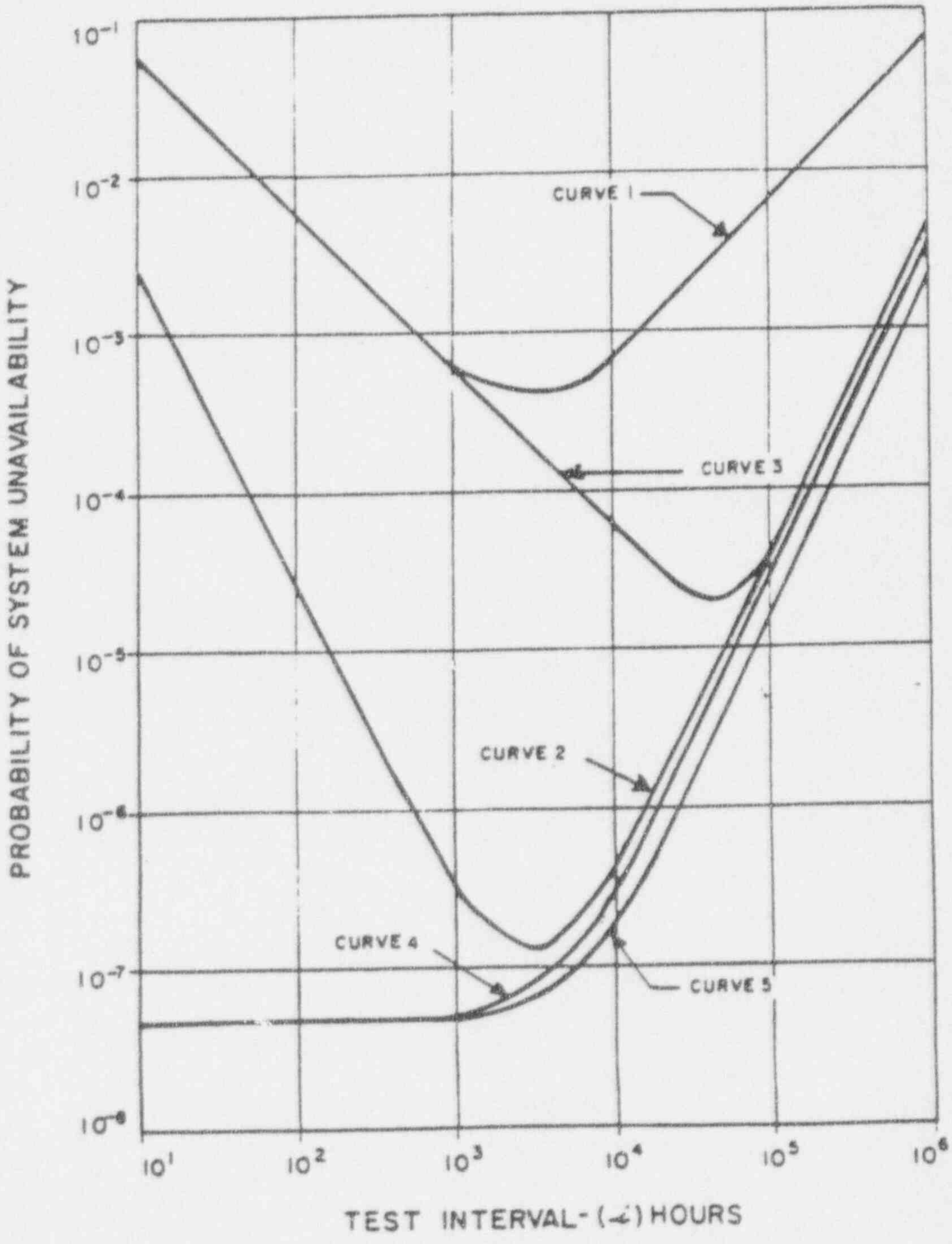

FIG. 4.2-1

TEST INTERVAL VS PROBABILITY OF SYSTEM UNAVAILABILITY

7.0 REFERENCES

(1) E. Janssen, "Multi-Rod Burnout at Low Pressure," ASME Paper 62-HT-26, August 1962.

(2) K.M. Backer, "Burnout Conditions for Flow of Boiling Water in Vertical Rod Clusters," AE-74 (Stockholm, Sweden), May 1962.

(3) FSAR Section 11.2.2.

(4) FSAR Section 4.4.3.

(5) I.M. Jacobs, "Reliability of Engineered Safety Features as a Function of Testing Frequency," Nuclear Safety, Vol. 9, No. 4, July-August 1968, pp 310-312.

(6) Benjamin Epstein, Albert Shiff, UCRL-50451, Improving Availability and Readiness of Field Equipment Through Periodic Inspection, July 16, 1968, p. 10, Equation (24), Lawrence Radiation Laboratory.

Replace with "Deleted"

(7) I.M. Jacobs and P.W. Mariott, APED Guidelines for Determining Safe Test Intervals and Repair Times for Engineered Safeguards - April 1969.

(8) Bodega Bay Preliminary Hazards Report, Appendix 1, Docket 50-205, December 28, 1962.

(9) C.H. Robbins, "Tests of a Full Scale 1/48 Segment of the Humbolt Bay Pressure Suppression Containment," GEAP-3596, November 17, 1960.

(10) "Nuclear Safety Program Annual Progress Report for Period Ending December 31, 1966, Progress Report for Period Ending December 31, 1966, ORNL-4071."

(11) Section 5.2 of the FSAR.

(12) TID 20583, "Leakage Characteristics of Steel Containment Vessel and the Analysis of Leakage Rate Determinations."

(13) Technical Safety Guide, "Reactor Containment Leakage Testing and Surveillance Requirements," USAEC, Division of Safety Standards, Revised Draft, December 15, 1966.

(14) Section 14.6 of the FSAR.

(15) ASME Boiler and Pressure Vessel Code, Nuclear Vessels, Section III. Maximum allowable internal pressure is 62 psig.

(16) 10 CFR 50.54, Appendix J, "Reactor Containment Testing Requirements."

(17) 10 CFR 50, Appendix J, February 13, 1973.