BASES

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

The reactor protection system automatically initiates a reactor scram to:

a. Preserve the integrity of the fuel cladding.

b. Preserve the integrity of the reactor coolant system.

c. Minimize the energy which must be adsorbed following a loss-of-coolant accident, and

d. 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 surveillance.

The reactor protection system is made up of two independent trip systems. There are usually four channels to monitor each parameter with two channels in each trip system. The outputs of the channels in a trip system are combined in a logic so that either channel will trip that trip system. The tripping of both trip systems will produce a reactor scram. The system meets the intent of IEEE-279 for nuclear power plant protection systems. The bases for the trip settings of the RPS are discussed in the bases for Specification 2.2.1.

The measurement of response time at the specified frequencies provides assurance that the protective functions associated with each channel are completed within the time limit assumed in the accident analysis. No credit was taken for those channels with response times indicated as not applicable. Response time may be demonstrated by any series of sequential, overlapping or total channel test measurement, provided such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either (1) in place, onsite or offsite test measurements, or (2) utilizing replacement sensors with certified response times. (☆) — This change

CHANNEL FUNCTIONAL TEST frequencies and allowed outage times (AOTs) for repair and surveillance testing are based on General Electric report NEDC-30851-P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," dated March, 1988. The conclusion of this report is that fewer challenges to safety-related equipment, due to less frequent testing of the RPS, conservatively results in a decrease in core damage frequency. The 6 hour AOT for testing and the 12 hour AOT for repair of one trip system provide enough margin so as not to create an undue stress on personnel. The more restrictive 6 hour repair AOT (Action 1.a) reflects the potential that both trip systems are degraded.

☆ Reactor Protection System Response Times have been removed from the Technical Specifications and relocated to Chapter 7 of the FSAR in accordance with the provisions of NRC Generic Letter 93-08.

This change

3/4.3.2 ISOLATION ACTUATION INSTRUMENTATION

This change

This specification ensures the effectiveness of the instrumentation used to mitigate the consequences of accidents by prescribing the OPERABILITY trip setpoints and response times for isolation of the reactor systems. When necessary, one channel may be inoperable for brief intervals to conduct required surveillance. Some of the trip settings may have tolerances explicitly stated where both the high and low values are critical and may have a substantial effect on safety. The setpoints of other instrumentation, where only the high or low end of the setting have a direct bearing on safety, are established at a level away from the normal operating range to prevent inadvertent actuation of the systems involved.

Leak detection temperature setpoints are selected to prevent a high energy line break by detecting and isolating leakage below the flow rate corresponding to critical crack size for the respective system piping. The setpoints are also set below fire suppression setpoints (HPCI and RCIC) and high enough to avoid inadvertent isolation caused by normal temperature transients or abnormal transients caused by non-leak conditions (such as loss of ventilation).

The Reactor Vessel Water Level - Low, Level 3 Function that isolates the RHR System Shutdown Cooling is only required to be OPERABLE in OPERATIONAL CONDITIONS 3, 4, and 5 to prevent this potential flow path from lowering the reactor vessel level to the top of the fuel. If an inoperable channel is not restored to OPERABLE status or placed in trip within the allowed completion time, the associated penetration flow path should be closed. However, if the shutdown cooling function is needed to provide core cooling, ACTION 27 allows the penetration flow path to remain unisolated provided action is immediately initiated to restore the channel to OPERABLE status or to isolate the RHR Shutdown Cooling System (i.e., provide alternate decay heat removal capabilities so the penetration flow path can be isolated). ACTION 27 must continue until the channel is restored to OPERABLE status or the RHR Shutdown Cooling System is isolated. Only one trip system is required in OPERATIONAL CONDITIONS 4 and 5 when RHR shutdown cooling system integrity is maintained meaning piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system.

Except for the MSIVs, the safety analysis does not address individual sensor response times or the response times of the logic systems to which the sensors are connected. For DC. operated valves, a 3 second delay is assumed before the valve starts to move. For A.C. operated valves, it is assumed that the A.C. power supply is lost and is restored by startup of the emergency diesel generators. In this event, a time of 13 seconds is assumed before the valve starts to move. In addition to the pipe break, the failure of the D.C. operated valve is assumed; thus the signal delay sensor response is concurrent with the 10 second diesel startup. The safety analysis considers an allowable inventory loss in each case which in turn determines the valve speed in conjunction with the 10 second delay. It follows that checking the valve speeds and the 10 second time for emergency power establishment will establish the response time for the isolation functions. However, to enhance overall system reliability and to monitor instrument channel response time trends, the isolation actuation instrumentation response time shall be measured and recorded as a part of the ISOLATION SYSTEM RESPONSE TIME.*

This change

* Isolation System Instrumentation Response Times have been removed from the Technical Specifications and relocated to Chapter 7 of the FSAR in accordance with the Provisions of NRC Generic Letter 93-08.

CHANNEL FUNCTIONAL TEST frequencies and allowed out of service times for repair and surveillance testing have been determined in accordance with General Electric reports NEDC-30851P-A, Supplement 2, "Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," and NEDC-31677P-A, "Technical Specification Improvement Analyses for BWR Isolation Actuation Instrumentation."

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is equal to or less than the drift allowance assumed for each trip in the safety analyses.

3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

This change

The emergency core cooling system actuation instrumentation is provided to initiate actions to mitigate the consequences of accidents that are beyond the ability of the operator to control. This specification provides the OPERABILITY requirements, trip setpoints and response times* that will ensure effectiveness of the systems to provide the design protection. Although the instruments are listed by system, in some cases the same instrument may be used to send the actuation signal to more than one system at the same time.

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Valve is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is equal to or less than the drift allowance assumed for each trip in the safety analyses.

CHANNEL FUNCTIONAL TEST frequencies and allowed out of service times for repair and surveillance testing have been determined in accordance with General Electric reports NEDC-30936P-A, "BWR Owners' Group Technical Specification Improvement Methodology with Demonstration for BWR ECCS Actuation Instrumentation," Parts 1 and 2, and RE-022, "Technical Specification Improvement Analysis for the Emergency Core Cooling System Actuation Instrumentation for Susquehanna Steam Electric Station, Units 1 and 2."

* Emergency Core Cooling System Response Times have been removed from the Technical Specifications and relocated to Chapter 7 of the FSAR in accordance with the provisions of NRC Generic Letter 93-08.

This change

BASES

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

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a. Preserve the integrity of the fuel cladding.

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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 surveillance.

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* Reactor Protection System Response Times have been removed from the Technical Specifications and relocated to Chapter 7 of the FSAR in accordance with the provisions of NRC Generic Letter 93-08. This change

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This specification ensures the effectiveness of the instrumentation used to mitigate the consequences of accidents by prescribing the OPERABILITY trip setpoints and response times for isolation of the reactor systems. When necessary, one channel may be inopeable for brief intervals to conduct required surveillance. Some of the trip settings may have tolerances explicitly stated where both the high and low values are critical and may have a substantial effect on safety. The setpoints of other instrumentation, where only the high or low end of the setting have a direct bearing on safety, are established at a level away from the normal operating range to prevent inadvertent actuation of the systems involved. (*) This change

Leak detection temperature setpoints are selected to prevent a high energy line break by detecting and isolating leakage below the flow rate corresponding to critical crack size for the respective system piping. The setpoints are also set below fire suppression setpoints (HPCI and RCIC) and high enough to avoid inadvertent isolation caused by normal temperature transients or abnormal transients caused by non-leak conditions (such as loss of ventilation).

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This change

* Emergency Core Cooling System Response Times have been removed from the Technical Specifications and relocated to Chapter 7 of the FSAR in accordance with the Provisions of NRC Generic Letter 93-08.