JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.1

Emergency Core Cooling System (ECCS) Instrumentation

JUSTIFICATION FOR DIFFERENCES (JFDs) FROM NUREG-1433, REVISION 1

JUSTIFICATION FOR DIFFERENCES FROM NUREG-1433, REVISION 1
ITS: 3.3.5.1 - ECCS INSTRUMENTATION

RETENTION OF EXISTING REQUIREMENT (CLB)

CLB1 ECCS Response Time is not required in the CTS. Generic studies have shown that instrumentation response time changes (increasing times), that could impact safety, do not normally vary such that they would not be detected during other required surveillances (e.g., Channel Calibrations). Since the addition of these tests would be a major burden, with little gain in safety, the SRs associated with these tests have not been added for any test associated with instrumentation.

CLB2 The bracketed Surveillance Frequency of SR 3.3.5.1.2 (CHANNEL FUNCTIONAL TEST) has been retained as 92 days consistent with CTS Table 4.2-2 Note 15.

CLB3 The bracketed ISTS SR 3.3.5.1.3 (trip unit calibration) has been retained since the JAFNPP design includes trip units. The bracketed 92 day Frequency has been extended to 184 days consistent with CTS Table 4.2-2 and approved in JAFNPP Technical Specification Amendment No. 89. This Surveillance has been renumbered as SR 3.3.5.1.4 and therefore subsequent SRs have been reordered and renumbered to reflect this change. In addition, the appropriate changes have been made to the Surveillance Requirements column of Table 3.3.5.1-1, to reflect this change.

CLB4 The brackets have been removed and the 18 month Frequency of SR 3.3.5.2.6 (LOGIC SYSTEM FUNCTIONAL TEST) has been increased to 24 months.

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PLANT-SPECIFIC WORDING PREFERENCE OR MINOR EDITORIAL IMPROVEMENT (PA)

PA1 Changes have been made (additions, deletions and/or changes to the NUREG) to reflect plant specific nomenclature.

PA2 Required Action G.1 Note has been deleted since it does not provide any useful guidance.

PLANT-SPECIFIC DIFFERENCE IN THE DESIGN (DB)

DB1 Two additional Functions have been added to Table 3.3.5.1-1 to ensure the Core Spray and High Pressure Coolant Injection (HPCI) System minimum flow control valves operate as required. These Functions are:

1.f Core Spray Pump Discharge Pressure-High (Bypass)
3.g High Pressure Coolant Injection Pump Discharge Pressure-High (Bypass)

PLANT-SPECIFIC DIFFERENCE IN THE DESIGN (DB)

DB1 (continued)

Appropriate Actions and Surveillance Requirements have also been added. This instrumentation serves to protect the system pumps from overheating when the pump is operating and the associated injection valve is not open. This will ensure the associated Emergency Core Cooling Systems are Operable and will function properly during a design basis accident. In addition, Required Action E.1 Note 2 has been revised, as applicable to reflect this change.

DB2 An additional Function has been added to Table 3.3.5.1-1 to ensure the Core Spray pump will start within the time constraints required by the ECCS analysis and when required to preclude excess loading on the emergency buses and emergency diesel generators. This Function was added as:

1.d Core Spray Pump Start-Time Delay Relay

Appropriate Actions and Surveillance Requirements have also been added. Subsequent Functions have been renumbered, as applicable. In addition, Required Actions C.1 and E.1 Note 2 has been revised.

DB3 The brackets have been removed from Table 3.3.5.1-1 Functions 1.d, 2.f, 2.g, and 3.f and the Functions retained consistent with M2. (Function 1.d has been renumbered as 1.e)

DB4 Bracketed Table 3.3.5.1-1 Functions 1.e (CS Manual Initiation), 2.h (LPCI Manual Initiation), 3.g (HPCI Manual Initiation), 4.b (ADS Trip System A Drywell High Pressure), 4.g (ADS Trip System A Low Water Level Actuation Timer), 4.h (ADS Trip System A Manual Initiation), 5.b (ADS Trip System B Drywell High Pressure), 5.g (ADS Trip System B Low Water Level Actuation Timer), and 5.h (ADS Trip System B Manual Initiation) do not apply to the JAFNPP design and therefore are not retained in the ITS.

DB5 The brackets have been removed from ISTS SR 3.3.5.1.4 (SR 3.3.5.1.3) and from the Surveillance Frequency of SR 3.3.5.1.5, consistent with the requirements in CTS Table 4.2-2 and the calibration methodology for the associated channels of each Function. The Surveillance Frequency in SR 3.3.5.1.5 has been extended to 24 months.

DB6 The brackets have been removed and the proper number of channels included for each Function in Table 3.3.5.1-1. The values are consistent with the JAFNPP design.

PLANT-SPECIFIC DIFFERENCE IN THE DESIGN (DB)

DB7 All Functions which include a switch (rather than transmitter and trip unit) in the required channel design will be calibrated in accordance with the 92 day CHANNEL CALIBRATION SR 3.3.5.1.3. The only other Surveillance associated with these Functions will be the LSFT (SR 3.3.5.1.6). Therefore all other SRs associated with these Functions have been deleted.

DB8 All Functions which include Timers will be calibrated in accordance with SR 3.3.5.1.5 (the 24 month CHANNEL CALIBRATION) and SR 3.3.5.1.6 (the LSFT). The Calibration Frequency is consistent with the results of the setpoint calculation for these channels.

Amd 263

DB9 Footnote (b) has been revised to be consistent with the JAFNPP design and consistent with CTS Table 3.2-2 Item 2 Remarks.

DB10 The bracketed Applicability in Table 3.3.5.1-1 Footnote (d) has been revised consistent with the current design requirements as discussed in A10.

DB11 The brackets have been removed from the Allowable Values and the proper plant specific value has been included in accordance with the setpoint calculation methodology.

DB12 A new Function has been added to Table 3.3.5.1-1 to ensure the Low Pressure Coolant Injection subsystems are not diverted unless adequate core cooling is assured and containment spray is needed. This Function is:

2.h Containment Pressure-High

Appropriate Actions and Surveillance Requirements have also been added. This addition is consistent with the current licensing requirements and is consistent with NEDO-31466 (Technical Specification Screening Criteria Application And Risk Assessment), Supplement 1, February 1990.

DIFFERENCE BASED ON AN APPROVED TRAVELER (TA)

TA1 The changes presented in Technical Specification Task Force (TSTF) Technical Specification Change Traveler number 275, Revision 0 have been incorporated into the revised Improved Technical Specifications.

TSTF-275

JUSTIFICATION FOR DIFFERENCES FROM NUREG-1433, REVISION 1
ITS: 3.3.5.1 - ECCS INSTRUMENTATION

DIFFERENCE BASED ON A SUBMITTED, BUT PENDING TRAVELER (TP)

None

DIFFERENCE FOR ANY REASON OTHER THAN THE ABOVE (X)

None

JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.1

Emergency Core Cooling System (ECCS) Instrumentation

MARKUP OF NUREG-1433, REVISION 1, BASES

DBI unless otherwise noted

B 3.3 INSTRUMENTATION

B 3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

BASES

BACKGROUND The purpose of the ECCS instrumentation is to initiate appropriate responses from the systems to ensure that the fuel is adequately cooled in the event of a design basis accident or transient.

PA1

abnormal transients

For most anticipated operational occurrences and Design Basis Accidents (DBAs), a wide range of dependent and independent parameters are monitored.

PA2 and LCO 3.8.1, "AC Sources—Operating."

The ECCS instrumentation actuates core spray (CS), low pressure coolant injection (LPCI), high pressure coolant injection (HPCI), Automatic Depressurization System (ADS), and the diesel generators (DGs). The equipment involved with each of these systems is described in the Bases for LCO 3.5.1, "ECCS—Operating."

emergency E PA1

for both PA2

although manual initiation requires manipulation of individual pump and valve control switches

Core Spray System

The CS System may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level—Low Low Low, Level 1, or Drywell Pressure—High. Each of these diverse variables is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the eight trip units are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic (i.e., two trip systems) for each Function.

PA1

associated with each diverse variable

four

provide input to two trip systems.

Each trip system is

Insert CS-1

The high drywell pressure initiation signal is a sealed in signal and must be manually reset. The CS System can be reset if reactor water level has been restored, even if the high drywell pressure condition persists. The logic can also be initiated by use of a manual push button (one push button per subsystem). Upon receipt of an initiation signal, the CS pumps are started immediately after power is available.

Insert CS-2

PA2 normally closed

The CS test line isolation valve, which is also a primary containment isolation valve (PCIV), is closed on a CS initiation signal to allow full system flow assumed in the

(continued)

DBI

INSERT CS-1

Each trip system initiates one of two CS pumps and provides an open signal to both injection valves associated with the same CS pump. Once an initiation signal is received by the CS control circuitry, the signal is sealed in until manually reset.

DBI

INSERT CS-2

Upon receipt of an initiation signal, if preferred power is available, both CS pumps start after approximately an 11 second time delay. If a CS initiation signal is received when preferred power is not available, the CS pumps start after approximately 11 seconds after the bus is energized by the EDGs.

DBI unless otherwise noted

BASES

BACKGROUND

Core Spray System (continued)

accident analyses and maintain primary containment isolated in the event CS is not operating.

The CS pump discharge flow is monitored by a flow transmitter. When the pump is running and discharge flow is low enough so that pump overheating may occur, the minimum flow return line valve is opened. The valve is automatically closed if flow is above the minimum flow setpoint to allow the full system flow assumed in the accident analysis.

The CS System also monitors the pressure in the reactor to ensure that, before the injection valves open, the reactor pressure has fallen to a value below the CS System's maximum design pressure. The variable is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the trip units are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic.

Low Pressure Coolant Injection System

The LPCI is an operating mode of the Residual Heat Removal (RHR) System, with two LPCI subsystems. The LPCI subsystems may be initiated by automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level—Low Low Low, (Level 1); Drywell Pressure—High; or both. Each of these diverse variables is monitored by four redundant transmitters, which, in turn, are connected to four trip units. The outputs of the trip units are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic (i.e., two trip systems) for each Function. Once an initiation signal is received by the LPCI control circuitry, the signal is sealed in until manually reset.

Upon receipt of an initiation signal, the LPCI A pump starts after a 0.5 second delay when power is available. The LPCI A, B, and D pumps are started after a 10 seconds delay to limit the loading of the standby power sources.

Each LPCI subsystem's discharge flow is monitored by a flow transmitter. When a pump is running and discharge flow is

(continued)

DB1

INSERT LPCI-1

Each trip system initiates two of the four LPCI pumps, provides an open signal to each LPCI inboard injection valve, provides an open signal to the associated LPCI outboard injection valve, provides an open signal to the associated LPCI heat exchanger bypass valve, and provides a close signal to both recirculation pump discharge valves. The open signal for the heat exchanger bypass valve is maintained for three minutes to ensure the valve fully opens.

DB1

INSERT LPCI-2

With a loss of preferred power, LPCI pumps A and D start in approximately one second after the bus is energized by the EDGs, and LPCI pumps B and C start 6 seconds after the bus is energized by the EDGs to limit the loading of the EDGs. If one EDG should fail to force parallel, an associated LPCI pump will not start (LPCI pump B or C) to ensure the other EDG is not overloaded.

BASES

BACKGROUND

Low Pressure Coolant Injection System (continued)

low enough so that pump overheating may occur, the respective minimum flow return line valve is opened. If flow is above the minimum flow setpoint, the valve is automatically closed to allow the full system flow assumed in the analyses.

The RHR ~~test line~~ suppression pool cooling isolation valve, suppression pool spray isolation valves, and containment spray isolation valves (which are also PCIVs) are also closed on a LPCI initiation signal to allow the full system flow assumed in the accident analyses and maintain primary containment isolated in the event LPCI is not operating.

The LPCI System monitors the pressure in the reactor to ensure that, before an injection valve opens, the reactor pressure has fallen to a value below the LPCI System's maximum design pressure. The variable is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the trip units are connected to relays whose contacts ~~are~~ arranged in a one-out-of-two taken twice logic. Additionally, instruments are provided to close the recirculation pump discharge valves to ensure that LPCI flow does not bypass the core when it injects into the recirculation lines. The variable is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the trip units are connected to relays whose contacts ~~are arranged in a one-out-of-two taken twice logic~~.

Low reactor water level in the shroud is detected by two additional instruments to automatically isolate other modes of RHR (e.g., suppression pool cooling) ~~when LPCI is~~ required. Manual overrides for these isolations are provided.

High Pressure Coolant Injection System

The HPCI System may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level—Low Low, Level 2, or Drywell Pressure—High. Each of these variables is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the trip units are

(continued)

DBI

INSERT LPCI-3

Each trip system provides an open signal to both inboard injection valves and provides an open permissive signal to the associated outboard injection valve. The open permissive signal for the outboard injection valve is maintained for five minutes to ensure the valve fully opens.

DBI

INSERT LPCI-4

provide input to two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic. Each trip system provides a closure signal to both recirculation pump discharge valves.

DBI

INSERT LPCI-5

The variable is monitored by two transmitters, which are, in turn, connected to two trip units. The outputs of the trip units are connected to relays whose contacts provide input to one of two trip systems. Each trip system provides a permissive signal to open the associated subsystems containment spray and suppression pool cooling isolation valves.

DBI0

INSERT LPCI-6

Containment high pressure is detected by four instruments to automatically isolate the containment spray mode of RHR when containment depressurization is not required. This Function also precludes inadvertent diversion of LPCI flow unless containment overpressurization is indicated. This variable is monitored by four pressure switches, whose contacts provide input to two trip systems. The outputs of the contacts are arranged in a one-out-of-two taken twice logic for each trip system. Each trip system provides an input to the associated subsystems containment spray valves.

DBI unless otherwise noted

BASES

BACKGROUND High Pressure Coolant Injection System (continued)

connected to relays whose contacts are arranged in a one-out-of-two taken twice logic for each Function.

The HPCI pump discharge flow and pressure are monitored by a flow transmitter and pressure switch, respectively. When the pump is running and discharge flow is low enough so that pump overheating may occur, the minimum flow return line valve is opened. The valve is automatically closed if flow is above the minimum flow setpoint to allow the full system flow assumed in the accident analysis.

The HPCI test line isolation valve which is also a PCIV is closed upon receipt of a HPCI initiation signal to allow the full system flow assumed in the accident analysis and maintain primary containment isolated in the event HPCI is not operating.

The HPCI System also monitors the water levels in the condensate storage tank (CST) and the suppression pool because these are the two sources of water for HPCI operation. Reactor grade water in the CST is the normal source. Upon receipt of a HPCI initiation signal, the CST suction valve is automatically signaled to open (it is normally in the open position) unless both suppression pool suction valves are open. If the water level in the CSTs falls below a preselected level, first the suppression pool suction valves automatically open, and then the CST suction valve automatically closes. Two level switches are used to detect low water level in the CST. Either switch can cause the suppression pool suction valves to open and the CST suction valve to close. The suppression pool suction valves also automatically open and the CST suction valve closes if high water level is detected in the suppression pool. To prevent losing suction to the pump, the suction valves are interlocked so that one suction path must be open before the other automatically closes.

The HPCI provides makeup water to the reactor until the reactor vessel water level reaches the Reactor Vessel Water Level—High, Level 8 trip, at which time the HPCI turbine trips, which causes the turbine's stop valve and the injection valves to close. The logic is two-out-of-two to provide high reliability of the HPCI System. The HPCI

(continued)

BASES

BACKGROUND

High Pressure Coolant Injection System (continued)

System automatically restarts if a Reactor Vessel Water Level—Low Low, Level 2 signal is subsequently received.

Automatic Depressurization System

The ADS may be initiated by either automatic or manual means. Automatic initiation occurs when signals indicating Reactor Vessel Water Level—Low Low Low, Level 1; Drywell Pressure—High or ADS Bypass Low Water Level Actuation Timer; confirmed Reactor Vessel Water Level—Low, Level 3; and CS or LPCI Pump Discharge Pressure—High are all present and the ADS Initiation Timer has timed out. There are two transmitters each for Reactor Vessel Water Level—Low Low Low, Level 1 and Drywell Pressure—High, and one transmitter for confirmed Reactor Vessel Water Level—Low, Level 3 in each of the two ADS trip systems. Each of these transmitters connects to a trip unit, which then drives a relay whose contacts form the initiation logic.

Each ADS trip system includes a time delay between satisfying the initiation logic and the actuation of the ADS valves. The ADS Initiation Timer time delay setpoint chosen is long enough that the HPCI has sufficient operating time to recover to a level above Level 1, yet not so long that the LPCI and CS Systems are unable to adequately cool the fuel if the HPCI fails to maintain that level. An alarm in the control room is annunciated when either of the timers is timing. Resetting the ADS initiation signals resets the ADS Initiation Timers.

The ADS also monitors the discharge pressures of the four LPCI pumps and the two CS pumps. Each ADS trip system includes two discharge pressure permissive transmitters from both CS and from two LPCI pumps in the associated Division (i.e., Division 1 LPCI subsystems A and C input to ADS trip system A, and Division 2 LPCI subsystems B and D input to ADS trip system B). The signals are used as a permissive for ADS actuation, indicating that there is a source of core coolant available once the ADS has depressurized the vessel. Any one of the six low pressure pumps is sufficient to permit automatic depressurization.

The switches associated with one ADS trip system also provide signals to the other ADS trip system, but these signals are not required for the other ADS trip system to be considered OPERABLE.

(continued)

DB1 unless otherwise noted

BASES

BACKGROUND

Automatic Depressurization System (continued)

The ADS logic in each trip system is arranged in two strings. Each string has a contact from each of the following variables: Reactor Vessel Water Level—Low Low Low, Level 1; Drywell Pressure—High; or Low Water Level Actuation Timer. One of the two strings in each trip system must also have a confirmed Reactor Vessel Water Level—Low Low Low, Level 3. All contacts in both logic strings must close, the ADS initiation timer must time out, and a CS or LPCI pump discharge pressure signal must be present to initiate an ADS trip system. Either the A or B trip system will cause all the ADS relief valves to open. Once the Drywell Pressure—High signal, the ADS Low Water Level Actuation Timer, or the ADS initiation signal is present, it is individually sealed in until manually reset.

DB2 DB2 PA1 C D C D

Manual inhibit switches are provided in the control room for the ADS; however, their function is not required for ADS OPERABILITY (provided ADS is not inhibited when required to be OPERABLE).

PA1 Emergency

Diesel Generators

The DGs may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level—Low Low Low, Level 1 or Drywell Pressure—High. The DGs are also initiated upon loss of voltage signals. (Refer to the Bases for LCO 3.3.8.1, "Loss of Power (LOP) Instrumentation," for a discussion of these signals.) Each of these diverse variables is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the four trip units are connected to relays whose contacts are connected to a one-out-of-two taken twice logic to initiate all three DGs (2A, 1B, and 2C). The DGs receive their initiation signals from the CS System initiation logic. The DGs can also be started manually from the control room and locally from the associated DG room. The DG initiation signal is a sealed in signal and must be manually reset. The DG initiation logic is reset by resetting the associated ECCS initiation logic. Upon receipt of a loss of coolant accident (LOCA) initiation signal, each DG is automatically started, is ready to load in approximately 10 seconds, and will run in standby conditions (rated voltage and speed, with the DG output

E PA1 PA2 PA1 C D associated with each diverse variable

provide input to two trip systems. Each trip system is arranged in a For each Function.

One trip system will start EDG-A and EDG-C. The other trip system will start EDG-B and EDG-D.

LPCI and

E PA1 E E PA1 an ECCS PA2

10

(continued)

BASES

BACKGROUND

Diesel Generators (continued)

breaker open). The DGs will only energize their respective Engineered Safety Feature buses if a loss of offsite power occurs. (Refer to Bases for LCO 3.3.8.1.)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The actions of the ECCS are explicitly assumed in the safety analyses of References 1, 2, 3, and 4. The ECCS is initiated to preserve the integrity of the fuel cladding by limiting the post LOCA peak cladding temperature to less than the 10 CFR 50.46 limits.

ECCS instrumentation satisfies Criterion 3 of the NRC Policy Statement. Certain instrumentation Functions are retained for other reasons and are described below in the individual Functions discussion.

The OPERABILITY of the ECCS instrumentation is dependent upon the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.5.1-1. Each Function must have a required number of OPERABLE channels, with their setpoints within the specified Allowable Values, where appropriate. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Each ECCS subsystem must also respond within its assumed response time. Table 3.3.5.1-1, footnote (b) is added to show that certain ECCS instrumentation Functions are also required to be OPERABLE to perform DG initiation and actuation of other Technical Specifications (TS) equipment.

Allowable Values are specified for each ECCS Function specified in the table. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (e.g., reactor vessel water level), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g.,

(continued)

TA2

INSERT ASA-1

Table 3.3.5.1-1 is modified by two footnotes. Footnote (a) is added to clarify that the associated functions are required to be OPERABLE in MODES 4 and 5 only when their supported ECCS are required to be OPERABLE per LCO 3.5.2, ECCS-Shutdown.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

trip unit) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis. The Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints are then determined, accounting for the remaining instrument errors (e.g., drift). The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and severe environment errors (for channels that must function in harsh environments as defined by 10 CFR 50.49) are accounted for.

In general, the individual Functions are required to be OPERABLE in the MODES or other specified conditions that may require ECCS (or DG) initiation to mitigate the consequences of a design basis transient or accident. To ensure reliable ECCS and DG function, a combination of Functions is required to provide primary and secondary initiation signals.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

Core Spray and Low Pressure Coolant Injection Systems

1.a, 2.a. Reactor Vessel Water Level—Low Low Low, Level 1

Low reactor pressure vessel (RPV) water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. The low pressure ECCS and associated DGs are initiated at Level 1 to ensure that core spray and flooding functions are available to prevent or minimize fuel damage. The Reactor Vessel Water Level—Low Low Low, Level 1, is one of the Functions assumed to be OPERABLE and capable of initiating the ECCS during the transients analyzed in References 1, 2, and 3. In addition, the Reactor Vessel Water Level—Low Low Low, Level 1, Function is directly assumed in the analysis of the recirculation line break (Ref. 2). The core cooling function of the ECCS, along with the scram action of the Reactor Protection System (RPS), ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

(continued)

DBJ

INSERT ASA-2

TSTF-425

The trip setpoints are derived from the analytical limits and account for all worst case instrumentation uncertainties as appropriate (e.g., drift, process effects, calibration uncertainties, and severe environmental errors (for channels that must function in harsh environments as defined by 10 CFR 50.49)). The trip setpoints derived in this manner provide adequate protection because all expected uncertainties are accounted for. The Allowable Values are then derived from the trip setpoints by accounting for normal effects that would be seen during periodic surveillance or calibration. These effects are instrumentation uncertainties observed during normal operation (e.g., drift and calibration uncertainties).

(RAI 3.3.5.1-1)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.a, 2.a. Reactor Vessel Water Level—Low Low Low, Level 1 (continued)

Reactor Vessel Water Level—Low Low Low, Level 1 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel.

The Reactor Vessel Water Level—Low Low Low, Level 1 Allowable Value is chosen to allow time for the low pressure core flooding systems to activate and provide adequate cooling.

Four channels of Reactor Vessel Water Level—Low Low Low, Level 1 Function are only required to be OPERABLE when the ECCS or DG(s) are required to be OPERABLE to ensure that no single instrument failure can preclude ECCS and DG initiation. Refer to LCO 3.5.1 and LCO 3.5.2, "ECCS—Shutdown," for Applicability Bases for the low pressure ECCS subsystems; LCO 3.8.1, "AC Sources—Operating"; and LCO 3.8.2, "AC Sources—Shutdown," for Applicability Bases for the DGs.

1.b, 2.b. Drywell Pressure—High

High pressure in the drywell could indicate a break in the reactor coolant pressure boundary (RCPB). The low pressure ECCS and associated DGs are initiated upon receipt of the Drywell Pressure—High Function in order to minimize the possibility of fuel damage. The Drywell Pressure—High Function, along with the Reactor Water Level—Low Low Low, Level 1 Function, is directly assumed in the analysis of the recirculation line break (Ref. 4). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

High drywell pressure signals are initiated from four pressure transmitters that sense drywell pressure. The Allowable Value was selected to be as low as possible and be indicative of a LOCA inside primary containment.

The Drywell Pressure—High Function is required to be OPERABLE when the ECCS or DG are required to be OPERABLE in conjunction with times when the primary containment is

(continued)

DB1

INSERT Function 1.a, 2.a-1

The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

TA2

INSERT Function 1a, 2.a-2

Per Footnote (a) to Table 3.3.5.1-1, this ECCS Function is only required to be OPERABLE in MODES 4 and 5 whenever the associated ECCS is required to be OPERABLE per LCO 3.5.2.

TSTF-275(a)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.b, 2.b. Drywell Pressure—High (continued)

required to be OPERABLE. Thus, four channels of the CS and LPCI Drywell Pressure—High Function are required to be OPERABLE in MODES 1, 2, and 3 to ensure that no single instrument failure can preclude ECCS and DG initiation. In MODES 4 and 5, the Drywell Pressure—High Function is not required, since there is insufficient energy in the reactor to pressurize the primary containment to Drywell Pressure—High setpoint. Refer to LCO 3.5.1 for Applicability Bases for the low pressure ECCS subsystems and to LCO 3.8.1 for Applicability Bases for the DGs.

1.c, 2.c. Reactor Steam Dome Pressure—Low (Injection Permissive)

Low reactor steam dome pressure signals are used as permissives for the low pressure ECCS subsystems. This ensures that, prior to opening the injection valves of the low pressure ECCS subsystems, the reactor pressure has fallen to a value below these subsystems' maximum design pressure. The Reactor Steam Dome Pressure—Low is one of the Functions assumed to be OPERABLE and capable of permitting initiation of the ECCS during the transients analyzed in References 1 and 3. In addition, the Reactor Steam Dome Pressure—Low Function is directly assumed in the analysis of the recirculation line break (Ref. 2). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

The Reactor Steam Dome Pressure—Low signals are initiated from four pressure transmitters that sense the reactor dome pressure.

The Allowable Value is low enough to prevent overpressuring the equipment in the low pressure ECCS, but high enough to ensure that the ECCS injection prevents the fuel peak cladding temperature from exceeding the limits of 10 CFR 50.46.

Four channels of Reactor Steam Dome Pressure—Low Function are only required to be OPERABLE when the ECCS is required to be OPERABLE to ensure that no single instrument failure can preclude ECCS initiation. Refer to LCO 3.5.1 and

INSERT FUNCTION 1.c, 2.c

TA2

(continued)

TSTF 275 RO

TA2

INSERT Function 1.c, 2.c

Per Footnote (a) to Table 3.3.5.1-1, this ECCS Function is only required to be OPERABLE in MODES 4 and 5 whenever the associated ECCS is required to be OPERABLE per LCO 3.5.2.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.c, 2.c. Reactor Steam Dome Pressure—Low (Injection Permissive) (continued)

LCO 3.5.2 for Applicability Bases for the low pressure ECCS subsystems.

1.e, 2.g. Core Spray and Low Pressure Coolant Injection Pump Discharge Flow—Low (Bypass)

The minimum flow instruments are provided to protect the associated low pressure ECCS pump from overheating when the pump is operating and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump. The LPCI and CS Pump Discharge Flow—Low Functions are assumed to be OPERABLE and capable of closing the minimum flow valves to ensure that the low pressure ECCS flows assumed during the transients and accidents analyzed in References 1, 2, and 3 are met. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

One flow transmitter per CS pump is used to detect the associated subsystems' flow rates. The logic is arranged such that each transmitter causes its associated minimum flow valve to open. The logic will close the minimum flow valve once the closure setpoint is exceeded. The LPCI minimum flow valves are time delayed such that the valves will not open for 10 seconds after the switches detect low flow. The time delay is provided to limit reactor vessel inventory loss during the startup of the RHR shutdown cooling mode. The Pump Discharge Flow—Low Allowable Values are high enough to ensure that the pump flow rate is sufficient to protect the pump, yet low enough to ensure that the closure of the minimum flow valve is initiated to allow full flow into the core.

Each channel of Pump Discharge Flow—Low Function (two CS channels and four LPCI channels) is only required to be OPERABLE when the associated ECCS is required to be OPERABLE to ensure that no single instrument failure can preclude the ECCS function. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the low pressure ECCS subsystems.

(continued)

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D136 INSERT Functions 1.d, 2.f

1.d, 2.f. Core Spray and Low Pressure Coolant Injection Pump Start-Time Delay Relay

The purpose of these time delay relays is to stagger the start of the CS and LPCI pumps to enable sequential loading of the appropriate AC source. The CS and LPCI Pump Start-Time Delay Relays are assumed to be OPERABLE in the accident analyses requiring ECCS initiation. That is, the analyses assumes that the pumps will initiate when required and no excess loading of the power sources will occur.

There are two CS and four LPCI Pump Start-Time Delay Relays, one in each of the CS and LPCI pump start circuits. While each time delay relay is dedicated to a single pump start circuit, a single failure of a CS or LPCI Pump Start-Time Delay Relay could result in the failure of a CS pump and both the LPCI pumps powered from the same emergency bus to perform their intended function within the assumed ECCS response time (e.g., as in the case where one inoperable time delay relay results in more than one pump starting at nearly the same time). In the worst case this would still leave the other three low pressure ECCS pumps OPERABLE; thus, the single failure of one instrument does not preclude ECCS initiation. The Allowable Values for the CS and LPCI Pump Start-Time Delay Relays are chosen to be short enough so that ECCS operation is within the time period assumed in the accident analyses.

Each CS and LPCI Pump Start-Time Delay Relay Function is required to be OPERABLE only when the associated CS and LPCI subsystem is required to be OPERABLE. Per Footnote (a) to Table 3.3.5.1-1, this ECCS Function is only required to be OPERABLE in MODES 4 and 5 whenever the associated ECCS is required to be OPERABLE per LCO 3.5.2. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the CS and LPCI subsystems.

D138 INSERT 1.f

The Core Spray Pump Discharge Pressure-High (Bypass) Allowable Value is less than the pump discharge pressure when the pump is operating in a full flow mode and high enough to avoid any condition that results in a discharge pressure permissive when the CS pump is aligned for injection and the pump is not running.

TA2

INSERT Function 1.e, 2.g, 1.f

Per Footnote (a) to Table 3.3.5.1-1, this ECCS Function is only required to be OPERABLE in MODES 4 and 5 whenever the associated ECCS is required to be OPERABLE per LCO 3.5.2.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

1.e, 2.h. Manual Initiation

The Manual Initiation push button channels introduce signals into the appropriate ECCS logic to provide manual initiation capability and are redundant to the automatic protective instrumentation. There is one push button for each of the CS and LPCI subsystems (i.e., two for CS and two for LPCI).

The Manual Initiation Function is not assumed in any accident or transient analyses in the FSAR. However, the Function is retained for overall redundancy and diversity of the low pressure ECCS function as required by the NRC in the plant licensing basis.

There is no Allowable Value for this Function since the channels are mechanically actuated based solely on the position of the push buttons. Each channel of the Manual Initiation Function (one channel per subsystem) is only required to be OPERABLE when the associated ECCS is required to be OPERABLE. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the low pressure ECCS subsystems.

2.d. Reactor Steam Dome Pressure—Low (Recirculation Discharge Valve Permissive)

Low reactor steam dome pressure signals are used as permissives for recirculation discharge valve closure. This ensures that the LPCI subsystems inject into the proper RPV location assumed in the safety analysis. The Reactor Steam Dome Pressure—Low is one of the Functions assumed to be OPERABLE and capable of closing the valve during the transients analyzed in References 1 and 3. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. The Reactor Steam Dome Pressure—Low Function is directly assumed in the analysis of the recirculation line break (Ref. 2).

The Reactor Steam Dome Pressure—Low signals are initiated from four pressure transmitters that sense the reactor dome pressure.

The Allowable Value is chosen to ensure that the valves close prior to commencement of LPCI injection flow into the core, as assumed in the safety analysis.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.d. Reactor ~~Steam Dome~~ Pressure—Low (Recirculation Discharge Valve Permissive) (continued)

Four channels of the Reactor ~~Steam Dome~~ Pressure—Low Function are only required to be OPERABLE in MODES 1, 2, and 3 with the associated recirculation pump discharge valve open. With the valve(s) closed, the function instrumentation has been performed; thus, the Function is not required. In MODES 4 and 5, the loop injection location is not critical since LPCI injection through the recirculation loop in either direction will still ensure that LPCI flow reaches the core (i.e., there is no significant reactor steam dome back pressure).

2.e. Reactor Vessel Shroud Level ~~Level 0~~

The ~~Level 0~~ Function is provided as a permissive to allow the RHR System to be manually aligned from the LPCI mode to the suppression pool cooling/spray or drywell spray modes. The permissive ensures that water in the vessel is approximately two thirds core height before the manual transfer is allowed. This ensures that LPCI is available to prevent or minimize fuel damage. This function may be overridden during accident conditions as allowed by plant procedures. Reactor Vessel Shroud Level ~~Level 0~~ Function is implicitly assumed in the analysis of the recirculation line break (Ref. 2) since the analysis assumes that no LPCI flow diversion occurs when reactor water level is below Level 0.

Reactor Vessel Shroud Level ~~Level 0~~ signals are initiated from two level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. The Reactor Vessel Shroud Level ~~Level 0~~ Allowable Value is chosen to allow the low pressure core flooding systems to activate and provide adequate cooling before allowing a manual transfer.

Two channels of the Reactor Vessel Shroud Level ~~Level 0~~ Function are only required to be OPERABLE in MODES 1, 2, and 3. In MODES 4 and 5, the specified initiation time of the LPCI subsystems is not assumed, and other administrative controls are adequate to control the valves ~~that~~ this Function ~~isolates~~ (since the systems that the valves are associated w. th

(continued)

DBI

INSERT Function 2.e

The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.e. Reactor Vessel Shroud Level—Level 0 (continued)

opened for are not required to be OPERABLE in MODES 4 and 5 and are normally not used).

2.f. Low Pressure Coolant Injection Pump Start—Time Delay Relay

The purpose of this time delay is to stagger the start of the LPCI pumps that are in each of Divisions 1 and 2, thus limiting the starting transients on the 4.16 kV emergency buses. This Function is only necessary when power is being supplied from the standby power sources (DG). However, since the time delay does not degrade ECCS operation, it remains in the pump start logic at all times. The LPCI Pump Start—Time Delay Relays are assumed to be OPERABLE in the accident and transient analyses requiring ECCS initiation. That is, the analyses assume that the pumps will initiate when required and excess loading will not cause failure of the power sources.

There are four LPCI Pump Start—Time Delay Relays, one in each of the RHR pump start logic circuits. While each time delay relay is dedicated to a single pump start logic, a single failure of a LPCI Pump Start—Time Delay Relay could result in the failure of the two low pressure ECCS pumps, powered for the same ESF bus, to perform their intended function within the assumed ECCS RESPONSE TIME (e.g., as in the case where both ECCS pumps on one ESF bus start simultaneously due to an inoperable time delay relay). This still leaves four of the six low pressure ECCS pumps OPERABLE; thus, the single failure criterion is met (i.e., loss of one instrument does not preclude ECCS initiation). The Allowable Value for the LPCI Pump Start—Time Delay Relays is chosen to be long enough so that most of the starting transient of the first pump is complete before starting the second pump on the same 4.16 kV emergency bus and short enough so that ECCS operation is not degraded.

Each LPCI Pump Start—Time Delay Relay Function is required to be OPERABLE only when the associated LPCI subsystem is required to be OPERABLE. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the LPCI subsystems.

add Function 2.h

(continued)

DB10

INSERT Function 2.h

2.h. Containment Pressure–High

The Containment Pressure–High Function is provided as an isolation of the containment spray mode of RHR on decreasing containment pressure following manual actuation of the system. This isolation ensures excessive depressurization of the containment does not occur due to containment spray. This Function also serves as an interlock permissive to allow the RHR System to be manually aligned from the LPCI mode to the containment spray mode after containment pressure has exceeded the trip setting. The permissive ensures that containment pressure is elevated before the manual transfer is allowed. This ensures that LPCI is available to prevent or minimize fuel damage until such time that the operator determines that containment pressure control is needed. The Containment Pressure–High Function is implicitly assumed in the analysis of LOCAs inside containment (Ref. 1, 2 and 4) since the analysis assumes that containment spray occurs when containment pressure is high.

Containment Pressure–High signals are initiated from four pressure switches that sense drywell pressure. The Containment Pressure–High Allowable Value lower value is chosen to ensure isolation of containment spray prior to establishing a negative containment pressure; thereby maintaining margin to the negative design pressure, and minimizing operation of the reactor building-to-suppression chamber vacuum breakers, which in turn prevents de-inerting the atmosphere. The upper Allowable Value is chosen to ensure containment spray is not isolated when there may be a need for containment spray.

Four channels of the Containment Pressure–High Function are only required to be OPERABLE in MODES 1, 2, and 3. In MODES 4 and 5, containment spray is not assumed to be initiated, and other administrative controls are adequate to control the valves that this Function isolates (since the systems that the valves are opened for are not required to be OPERABLE in MODES 4 and 5, and are normally not used).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

High Pressure Coolant Injection (PA2)

HPCI System

3.a. Reactor Vessel Water Level—Low Low, Level 2

Low RPV water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, the HPCI System is initiated at Level 2 to maintain level above the top of the active fuel. The Reactor Vessel Water Level—Low Low, Level 2, is one of the Functions assumed to be OPERABLE and capable of initiating HPCI during the transients analyzed in References 1 and 3. Additionally, the Reactor Vessel Water Level—Low Low, Level 2 Function associated with HPCI is directly assumed in the analysis of the recirculation line break (Ref. 2). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level—Low Low, Level 2 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel.

The Reactor Vessel Water Level—Low Low, Level 2 Allowable Value is high enough such that for complete loss of feedwater flow, the Reactor Core Isolation Cooling (RCIC) System flow with HPCI assumed to fail will be sufficient to avoid initiation of low pressure ECCS at Reactor Vessel Water Level—Low Low Low, Level 1.

Four channels of Reactor Vessel Water Level—Low Low, Level 2 Function are required to be OPERABLE only when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI initiation. Refer to LCO 3.5.1 for HPCI Applicability Bases.

3.b. Drywell Pressure—High

High pressure in the drywell could indicate a break in the RCPB. The HPCI System is initiated upon receipt of the Drywell Pressure—High Function in order to minimize the possibility of fuel damage. The Drywell Pressure—High Function, along with the Reactor Water Level—Low Low, Level 2 Function, is directly assumed in the analysis of the

(continued)

Insert Function 3.a(1) (PA1, DB1, DB4)

to be OPERABLE and capable of initiating HPCI (DB1)

Insert Function 3.a(2) (DB1, PA1)

Insert Function 3.b (DB1)

to be OPERABLE and capable of initiating HPCI (DB1)

DB1 INSERT Function 3.a (1)

In addition, the Standby Gas Treatment (SGT) System suction valves receive an open signal so that the gland seal exhaust from the HPCI turbine can be treated. Opening of the SGT System suction valves results in automatic starting of SGT.

DB1 INSERT Function 3.a (2)

The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6)

The HPCI, RCIC and ATWS-RPT initiation functions (as described in Table 3.3.5.1, Functions 3.a; Table 3.3.5.2, Function 1 and LCO 3.3.4.1.a including SR 3.3.4.1.4, respectively) describe the reactor vessel water level initiation function as "Low Low (Level 2)." The Allowable Values associated with the HPCI and RCIC initiation function is different from the Allowable Value associated with the ATWS-RPT initiation function as the ATWS function has a separate analog tip unit. Nevertheless, consistent with the nomenclature typically used in design documents, the "Low Low (Level 2)" is retained in describing each of these three initiation functions.

F

DB1 INSERT Function 3.b

In addition, the SGT System suction valves receive an open signal so that the gland seal exhaust from the HPCI turbine can be treated. Opening of the SGT System suction valves results in automatic starting of SGT.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.b. Drywell Pressure—High (continued)

~~recirculation~~ line break (Ref. 4). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

High drywell pressure signals are initiated from four pressure transmitters that sense drywell pressure. The Allowable Value was selected to be as low as possible to be indicative of a LOCA inside primary containment.

Four channels of the Drywell Pressure—High Function are required to be OPERABLE when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI initiation. Refer to LCO 3.5.1 for the Applicability Bases for the HPCI System.

3.c. Reactor Vessel Water Level—High, Level 8

High RPV water level indicates that sufficient cooling water inventory exists in the reactor vessel such that there is no danger to the fuel. Therefore, the Level 8 signal is used to trip the HPCI turbine to prevent overflow into the main steam lines (MSLs). The Reactor Vessel Water Level—High, Level 8 Function is not assumed in the accident and transient analyses. It was retained since it is a potentially significant contributor to risk.

Reactor Vessel Water Level—High, Level 8 signals for HPCI are initiated from two level transmitters from the narrow range water level measurement instrumentation. Both Level 8 signals are required in order to ~~close~~ the HPCI ~~injection valve~~. This ensures that no single instrument failure can preclude HPCI initiation. The Reactor Vessel Water Level—High, Level 8 Allowable Value is chosen to prevent flow from the HPCI System from overflowing into the MSLs.

Two channels of Reactor Vessel Water Level—High, Level 8 Function are required to be OPERABLE only when HPCI is required to be OPERABLE. Refer to LCO 3.5.1 and LCO 3.5.2 for HPCI Applicability Bases.

Insert Function 3.c

(continued)

DBI

INSERT Function 3.c

The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

DB7 unless otherwise noted

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

3.d. Condensate Storage Tank Level—Low

Low level in the CSTs indicates the unavailability of an adequate supply of makeup water from this normal source. Normally the suction valves between HPCI and the CSTs are open and, upon receiving a HPCI initiation signal, water for HPCI injection would be taken from the CSTs. However, if the water level in the CSTs falls below a preselected level, first the suppression pool suction valves automatically open, and then the CST suction valve automatically closes. This ensures that an adequate supply of makeup water is available to the HPCI pump. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be open before the CST suction valve automatically closes. The Function is implicitly assumed in the accident and transient analyses (which take credit for HPCI) since the analyses assume that the HPCI suction source is the suppression pool.

Condensate Storage Tank Level—Low signals are initiated from two level switches. The logic is arranged such that either level switch can cause the suppression pool suction valves to open and the CST suction valve to close. The Condensate Storage Tank Level—Low Function Allowable Value is high enough to ensure adequate pump suction head while water is being taken from the CSTs.

Two channels of the Condensate Storage Tank Level—Low Function are required to be OPERABLE only when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI swap to suppression pool source. Refer to LCO 3.5.1 for HPCI Applicability Bases.

3.e. Suppression Pool Water Level—High

Excessively high suppression pool water could result in the loads on the suppression pool exceeding design values should there be a blowdown of the reactor vessel pressure through the safety/relief valves. Therefore, signals indicating high suppression pool water level are used to transfer the suction source of HPCI from the CSTs to the suppression pool to eliminate the possibility of HPCI continuing to provide additional water from a source outside containment. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be open before the CST suction valve automatically closes.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.e. Suppression Pool Water Level—High (continued)

This Function is implicitly assumed in the accident and transient analyses (which take credit for HPCI) since the analyses assume that the HPCI suction source is the suppression pool.

Suppression Pool Water Level—High signals are initiated from two level switches. The logic is arranged such that either switch can cause the suppression pool suction valves to open and the CST suction valve to close. The Allowable Value for the Suppression Pool Water Level—High Function is chosen to ensure that HPCI will be aligned for suction from the suppression pool before the water level reaches the point at which suppression pool design loads would be exceeded.

Two channels of Suppression Pool Water Level—High Function are required to be OPERABLE only when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI swap to suppression pool source. Refer to LCO 3.5.1 for HPCI Applicability Bases.

3.f. High Pressure Coolant Injection Pump Discharge Flow—Low (Bypass)

The minimum flow instruments are provided to protect the HPCI pump from overheating when the pump is operating and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump. The High Pressure Coolant Injection Pump Discharge Flow—Low Function is assumed to be OPERABLE and capable of closing the minimum flow valve to ensure that the ECCS flow assumed during the transients and accidents analyzed in References 1, 2, and 3 are met. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

One flow transmitter is used to detect the HPCI System's flow rate. The logic is arranged such that the transmitter causes the minimum flow valve to open. The logic will close the minimum flow valve once the closure setpoint is exceeded.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.f. High Pressure Coolant Injection Pump Discharge Flow—Low (Bypass) (continued)

The High Pressure Coolant Injection Pump Discharge Flow—Low Allowable Value is high enough to ensure that pump flow rate is sufficient to protect the pump, yet low enough to ensure that the closure of the minimum flow valve is initiated to allow full flow into the core. Insert 3.9

One channel of each Function is required to be OPERABLE when the HPCI is required to be OPERABLE. Refer to LCO 3.5.1 for HPCI Applicability Bases.

3.g. Manual Initiation

The Manual Initiation push button channel introduces signals into the HPCI logic to provide manual initiation capability and is redundant to the automatic protective instrumentation. There is one push button for the HPCI System.

The Manual Initiation Function is not assumed in any accident or transient analyses in the FSAR. However, the Function is retained for overall redundancy and diversity of the HPCI function as required by the NRC in the plant licensing basis.

There is no Allowable Value for this Function since the channel is mechanically actuated based solely on the position of the push button. One channel of the Manual Initiation Function is required to be OPERABLE only when the HPCI System is required to be OPERABLE. Refer to LCO 3.5.1 for HPCI Applicability Bases.

Automatic Depressurization System

4.a, 5.a. Reactor Vessel Water Level—Low Low Low, Level 1

Low RPV water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, ADS receives one of the signals necessary for initiation from this Function. The Reactor Vessel Water Level—Low Low Low, Level 1 is one of the Functions assumed to be OPERABLE and capable of initiating the ADS during the accident analyzed

(continued)

DB8

INSERT 3.g

The High Pressure Coolant Injection Pump Discharge Pressure - High (Bypass) Allowable Value is less than the pump discharge pressure when the pump is operating in a full flow mode and high ensough to avoid any condition that results in a discharge pressure permissive when the HPCI pump is aligned for injection and the pump is not running.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4.a, 5.a. Reactor Vessel Water Level—Low Low Low, Level 1 (continued)

in Reference 2. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level—Low Low Low, Level 1 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level—Low Low Low, Level 1 Function are required to be OPERABLE only when ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Two channels input to ADS trip system A, while the other two channels input to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

The Reactor Vessel Water Level—Low Low Low, Level 1 Allowable Value is chosen to allow time for the low pressure core flooding systems to initiate and provide adequate cooling.

Insert Function 4.a, 5.a

4.b, 5.b. Drywell Pressure—High

High pressure in the drywell could indicate a break in the RCPB. Therefore, ADS receives one of the signals necessary for initiation from this Function in order to minimize the possibility of fuel damage. The Drywell Pressure—High is assumed to be OPERABLE and capable of initiating the ADS during the accidents analyzed in Reference 2. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Drywell Pressure—High signals are initiated from four pressure transmitters that sense drywell pressure. The Allowable Value was selected to be as low as possible and be indicative of a LOCA inside primary containment.

Four channels of Drywell Pressure—High Function are only required to be OPERABLE when ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Two channels input to ADS trip system A, while

(continued)

DBI

INSERT Function 4.a, 5.a

The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4.b, 5.b. Drywell Pressure—High (continued)

the other two channels input to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.c, 5.c. Automatic Depressurization System Initiation Timer

The purpose of the Automatic Depressurization System Initiation Timer is to delay depressurization of the reactor vessel to allow the HPCI System time to maintain reactor vessel water level. Since the rapid depressurization caused by ADS operation is one of the most severe transients on the reactor vessel, its occurrence should be limited. By delaying initiation of the ADS Function, the operator is given the chance to monitor the success or failure of the HPCI System to maintain water level, and then to decide whether or not to allow ADS to initiate, to delay initiation further by recycling the timer, or to inhibit initiation permanently. The Automatic Depressurization System Initiation Timer Function is assumed to be OPERABLE for the accident analyses of Reference 2 that require ECCS initiation and assume failure of the HPCI System.

There are two Automatic Depressurization System Initiation Timer relays, one in each of the two ADS trip systems. The Allowable Value for the Automatic Depressurization System Initiation Timer is chosen so that there is still time after depressurization for the low pressure ECCS subsystems to provide adequate core cooling.

Two channels of the Automatic Depressurization System Initiation Timer Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. (One channel inputs to ADS trip system A, while the other channel inputs to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.d, 5.d. Reactor Vessel Water Level—Low, Level 3

The Reactor Vessel Water Level—Low, Level 3 Function is used by the ADS only as a confirmatory low water level signal. ADS receives one of the signals necessary for initiation from Reactor Vessel Water Level—Low Low Low, Level 1 signals. In order to prevent spurious initiation of

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

4.[c] 5.[c] Reactor Vessel Water Level—Low, Level 3

the ADS due to spurious Level 1 signals, a Level 3 signal must also be received before ADS initiation commences.

Reactor Vessel Water Level—Low, Level 3 signals are initiated from two level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. The Allowable Value for Reactor Vessel Water Level—Low, Level 3, is selected [to be the same as] the RPS Level 3 scram Allowable Value for convenience. Refer to LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," for the Bases discussion of this Function.

[Insert Function 4.c, 5.c]

Two channels of Reactor Vessel Water Level—Low, Level 3 Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. One channel inputs to ADS trip system A, while the other channel inputs to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.[e], 4.[f] 5.[e], 5.[f] Core Spray and Low Pressure Coolant Injection Pump Discharge Pressure—High

The Pump Discharge Pressure—High signals from the CS and LPCI pumps are used as permissives for ADS initiation, indicating that there is a source of low pressure cooling water available once the ADS has depressurized the vessel. Pump Discharge Pressure—High is one of the Functions assumed to be OPERABLE and capable of permitting ADS initiation during the events analyzed in Reference 1 and 2 with an assumed HPCI failure. For these events the ADS depressurizes the reactor vessel so that the low pressure ECCS can perform the core cooling function. This core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

[switches]

Pump discharge pressure signals are initiated from twelve pressure transmitters, two on the discharge side of each of the six low pressure ECCS pumps. In order to generate an ADS permissive in one trip system, it is necessary that only

(continued)

DBI

INSERT Function 4.c, 5.c

The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4.e 4.f 5.e 5.f Core Spray and Low Pressure Coolant Injection Pump Discharge Pressure—High (continued)

one pump (both channels for the pump) indicate the high discharge pressure condition. The Pump Discharge Pressure—High Allowable Value is less than the pump discharge pressure when the pump is operating in a full flow mode and high enough to avoid any condition that results in a discharge pressure permissive when the CS and LPCI pumps are aligned for injection and the pumps are not running. The actual operating point of this function is not assumed in any transient or accident analysis.

However, this function is indirectly assumed to operate to provide the ADS permissive to depressurize the RCS to allow the ECCS low pressure systems to operate.

Twelve channels of Core Spray and Low Pressure Coolant Injection Pump Discharge Pressure—High Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Two CS channels associated with CS pump A and four LPCI channels associated with LPCI pumps A and C are required for trip system A. Two CS channels associated with CS pump B and four LPCI channels associated with LPCI pumps B and D are required for trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.g, 5.g. Automatic Depressurization System Low Water Level Actuation Timer

One of the signals required for ADS initiation is Drywell Pressure—High. However, if the event requiring ADS initiation occurs outside the drywell (e.g., main steam line break outside containment), a high drywell pressure signal may never be present. Therefore, the Automatic Depressurization System Low Water Level Actuation Timer is used to bypass the Drywell Pressure—High Function after a certain time period has elapsed. Operation of the Automatic Depressurization System Low Water Level Actuation Timer Function is not assumed in any accident analysis. The instrumentation is retained in the TS because ADS is part of the primary success path for mitigation of a DBA.

There are four Automatic Depressurization System Low Water Level Actuation Timer relays, two in each of the two ADS trip systems. The Allowable Value for the Automatic Depressurization System Low Water Level Actuation Timer is chosen to ensure that there is still time after

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4.g, 5.g. Automatic Depressurization System Low Water Level Actuation Timer (continued)

depressurization for the low pressure ECCS subsystems to provide adequate core cooling.

DBZ

Four channels of the Automatic Depressurization System Low Water Level Actuation Timer Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.h, 5.h. Manual Initiation

DB5

The Manual Initiation push button channels introduce signals into the ADS logic to provide manual initiation capability and are redundant to the automatic protective instrumentation. There are two push buttons for each ADS trip system for a total of four.

The Manual Initiation Function is not assumed in any accident or transient analyses in the FSAR. However, the Function is retained for overall redundancy and diversity of the ADS functions as required by the NRC in the plant licensing basis.

There is no Allowable Value for this Function since the channels are mechanically actuated based solely on the position of the push buttons. Four channels of the Manual Initiation Function (two channels per trip system) are only required to be OPERABLE when the ADS is required to be OPERABLE. Refer to LCO 3.5.1 for ADS Applicability Bases.

ACTIONS

PA4

Reviewer's Note: Certain LCO Completion Times are based on approved topical reports. In order for a licensee to use the times, the licensee must justify the Completion Times as required by the staff Safety Evaluation Report (SER) for the topical report.

A Note has been provided to modify the ACTIONS related to ECCS instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition discovered to be inoperable or

(continued)

BASES

ACTIONS (continued)

not within limits will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable ECCS instrumentation channels provide appropriate compensatory measures for separate inoperable Condition entry for each inoperable ECCS instrumentation channel.

A.1

Required Action A.1 directs entry into the appropriate Condition referenced in Table 3.3.5.1-1. The applicable Condition referenced in the table is Function dependent. Each time a channel is discovered inoperable, Condition A is entered for that channel and provides for transfer to the appropriate subsequent Condition.

B.1, B.2, and B.3

Required Actions B.1 and B.2 are intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in redundant automatic initiation capability being lost for the feature(s). Required Action B.1 features would be those that are initiated by Functions 1.a, 1.b, 2.a, and 2.b (e.g., low pressure ECCS). The Required Action B.2 system would be HPCI. For Required Action B.1, redundant automatic initiation capability is lost if (a) two Function 1.a channels are inoperable and untripped in the same trip system, (b) two Function 2.a channels are inoperable and untripped in the same trip system, (c) two Function 1.b channels are inoperable and untripped in the same system, or (d) two Function 2.b channels are inoperable and untripped in the same trip system. For low pressure ECCS, since each inoperable channel would have Required Action B.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected portion of the associated system of low pressure ECCS and DGs to be declared inoperable. However, since channels in both associated low pressure ECCS subsystems (e.g., both CS subsystems) are inoperable and untripped, and the Completion Times started concurrently for the channels in both subsystems, this results in the affected portions in the associated low

(continued)

BASES

ACTIONS

B.1, B.2, and B.3 (continued)

pressure ECCS and DGs being concurrently declared inoperable.

For Required Action B.2, redundant automatic initiation capability is lost if two Function 3.a or two Function 3.b channels are inoperable and untripped in the same trip system. In this situation (loss of redundant automatic initiation capability), the 24 hour allowance of Required Action B.3 is not appropriate and the feature(s) associated with the inoperable, untripped channels must be declared inoperable within 1 hour. As noted (Note 1 to Required Action B.1), Required Action B.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the low pressure ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of initiation capability for 24 hours (as allowed by Required Action B.3) is allowed during MODES 4 and 5. There is no similar Note provided for Required Action B.2 since HPCI instrumentation is not required in MODES 4 and 5; thus, a Note is not necessary.

Notes are also provided (Note 2 to Required Action B.1 and the Note to Required Action B.2) to delineate which Required Action is applicable for each Function that requires entry into Condition B if an associated channel is inoperable. This ensures that the proper loss of initiation capability check is performed. Required Action B.1 (the Required Action for certain inoperable channels in the low pressure ECCS subsystems) is not applicable to Function 2.e, since this Function provides backup to administrative controls ensuring that operators do not divert LPCI flow from injecting into the core when needed. Thus, a total loss of Function 2.e capability for 24 hours is allowed, since the LPCI subsystems remain capable of performing their intended function.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action B.1, the Completion Time only begins upon discovery that a redundant feature in the same system (e.g., both CS subsystems) cannot be automatically initiated due to inoperable, untripped channels within the same

(continued)

BASES

ACTIONS

B.1, B.2, and B.3 (continued)

Function as described in the paragraph above. For Required Action B.2, the Completion Time only begins upon discovery that the HPCI System cannot be automatically initiated due to two inoperable, untripped channels for the associated Function in the same trip system. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 8) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action B.3. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an initiation), Condition H must be entered and its Required Action taken.

C.1 and C.2

Required Action C.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within the same Function result in redundant automatic initiation capability being lost for the feature(s). Required Action C.1 features would be those that are initiated by Functions 1.c, 2.c, 2.d, and 2.f (i.e., low pressure ECCS). Redundant automatic initiation capability is lost if either (a) two Function 1.c channels are inoperable in the same trip system, (b) two Function 2.c channels are inoperable in the same trip system, (c) two Function 2.d channels are inoperable in the same trip system, or (d) two or more Function 2.f channels are inoperable. In this situation (loss of redundant automatic initiation capability), the 24 hour allowance of Required Action C.2 is not appropriate and the feature(s) associated with the inoperable channels must be declared inoperable within 1 hour. Since each

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

inoperable channel would have Required Action C.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected portion of the associated system to be declared inoperable. However, since channels for both low pressure ECCS subsystems are inoperable (e.g., both CS subsystems), and the Completion Times started concurrently for the channels in both subsystems, this results in the affected portions in both subsystems being concurrently declared inoperable. For Functions 1.c, 2.d, and 2.f, the affected portions are the associated low pressure ECCS pumps. As noted (Note 1), Required Action C.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of automatic initiation capability for 24 hours (as allowed by Required Action C.2) is allowed during MODES 4 and 5.

Note 2 states that Required Action C.1 is only applicable for Functions 1.c, 2.c, 2.d, and 2.f. Required Action C.1 is not applicable to Functions 1.e, 2.h, and 3.g (which also require entry into this Condition if a channel in these Functions is inoperable), since they are the Manual Initiation Functions and are not assumed in any accident or transient analysis. Thus, a total loss of manual initiation capability for 24 hours (as allowed by Required Action C.2) is allowed. Required Action C.1 is also not applicable to Function 3.c (which also requires entry into this Condition if a channel in this Function is inoperable), since the loss of one channel results in a loss of the Function (two-out-of-two logic). This loss was considered during the development of Reference 5 and considered acceptable for the 24 hours allowed by Required Action C.2.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action C.1, the Completion Time only begins upon discovery that the same feature in both subsystems (e.g., both CS subsystems) cannot be automatically initiated due to inoperable channels within the same Function as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

acceptable because it minimizes risk while allowing time for restoration of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 8) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would either cause the initiation or it would not necessarily result in a safe state for the channel in all events.

D.1, D.2.1, and D.2.2

Required Action D.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in a complete loss of automatic component initiation capability for the HPCI System. Automatic component initiation capability is lost if two Function 3.d channels or two Function 3.e channels are inoperable and untripped. In this situation (loss of automatic suction swap), the 24 hour allowance of Required Actions D.2.1 and D.2.2 is not appropriate and the HPCI System must be declared inoperable within 1 hour after discovery of loss of HPCI initiation capability. As noted, Required Action D.1 is only applicable if the HPCI pump suction is not aligned to the suppression pool, since, if aligned, the Function is already performed.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action D.1, the Completion Time only begins upon discovery that the HPCI System cannot be automatically aligned to the suppression pool due to two inoperable, untripped channels in the same Function. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

(continued)

BASES

ACTIONS

D.1, D.2.1, and D.2.2 (continued)

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 8) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action D.2.1 or the suction source must be aligned to the suppression pool per Required Action D.2.2. Placing the inoperable channel in trip performs the intended function of the channel (shifting the suction source to the suppression pool). Performance of either of these two Required Actions will allow operation to continue. If Required Action D.2.1 or D.2.2 is performed, measures should be taken to ensure that the HPCI System piping remains filled with water. Alternately, if it is not desired to perform Required Actions D.2.1 and D.2.2 (e.g., as in the case where shifting the suction source could drain down the HPCI suction piping), Condition H must be entered and its Required Action taken.

E.1 and E.2

Required Action E.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within the Core Spray and Low Pressure Coolant Injection Pump Discharge Flow—Low Bypass Functions result in redundant automatic initiation capability being lost for the feature(s). For Required Action E.1, the features would be those that are initiated by Functions 1.d and 2.g (e.g., low pressure ECCS). Redundant automatic initiation capability is lost if (a) two Function 1.d channels are inoperable, or (b) one or more Function 2.g channels associated with pumps in LPCI subsystem A and one or more Function 2.g channels associated with pumps in LPCI subsystem B are inoperable. Since each inoperable channel would have Required Action E.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected low pressure ECCS pump to be declared inoperable. However, since channels for more than one low pressure ECCS pump are inoperable, and the Completion Times started concurrently for the channels of the low pressure ECCS pumps, this results in the affected

(continued)

BASES

ACTIONS

E.1 and E.2 (continued)

low pressure ECCS pumps being concurrently declared inoperable.

In this situation (loss of redundant automatic initiation capability), the 7 day allowance of Required Action E.2 is not appropriate and the subsystem associated with each inoperable channel must be declared inoperable within 1 hour. As noted (Note 1 to Required Action E.1), Required Action E.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of initiation capability for 7 days (as allowed by Required Action E.2) is allowed during MODES 4 and 5. A Note is also provided (Note 2 to Required Action E.1) to delineate that Required Action E.1 is only applicable to low pressure ECCS Functions. Required Action E.1 is not applicable to HPCI Function 3.f, since the loss of one channel results in a loss of the Function (one-out-of-one logic). This loss was considered during the development of Reference 5 and considered acceptable for the 7 days allowed by Required Action E.2.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock."

For Required Action E.1, the Completion Time only begins upon discovery that a redundant feature in the same system (e.g., both CS subsystems) cannot be automatically initiated due to inoperable channels within the same Function as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration of channels.

If the instrumentation that controls the pump minimum flow valve is inoperable, such that the valve will not automatically open, extended pump operation with no injection path available could lead to pump overheating and failure. If there were a failure of the instrumentation, such that the valve would not automatically close, a portion of the pump flow could be diverted from the reactor vessel injection path, causing insufficient core cooling. These

(continued)

BASES

ACTIONS

F.1 and F.2 (continued)

consequences can be averted by the operator's manual control of the valve, which would be adequate to maintain ECCS pump protection and required flow. Furthermore, other ECCS pumps would be sufficient to complete the assumed safety function if no additional single failure were to occur. The 7 day Completion Time of Required Action E.2 to restore the inoperable channel to OPERABLE status is reasonable based on the remaining capability of the associated ECCS subsystems, the redundancy available in the ECCS design, and the low probability of a DBA occurring during the allowed out of service time. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would not necessarily result in a safe state for the channel in all events.

F.1 and F.2

Required Action F.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within similar ADS trip system A and B Functions result in redundant automatic initiation capability being lost for the ADS. Redundant automatic initiation capability is lost if either (a) one Function 4.a channel and one Function 5.a channel are inoperable and untripped, (b) one Function 4.b channel and one Function 5.b channel are inoperable and untripped, or (c) one Function 4.[illegible] channel and one Function 5.[illegible] channel are inoperable and untripped.

In this situation (loss of automatic initiation capability), the 96 hour or 8 day allowance, as applicable, of Required Action F.2 is not appropriate and all ADS valves must be declared inoperable within 1 hour after discovery of loss of ADS initiation capability.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action F.1, the Completion Time only begins upon discovery that the ADS cannot be automatically initiated due to inoperable, untripped channels within

(continued)

BASES

ACTIONS

F.1 and F.2 (continued)

similar ADS trip system Functions as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 8 days has been shown to be acceptable (Ref. 5) to permit restoration of any inoperable channel to OPERABLE status if both HPCI and RCIC are OPERABLE. If either HPCI or RCIC is inoperable, the time is shortened to 96 hours. If the status of HPCI or RCIC changes such that the Completion Time changes from 8 days to 96 hours, the 96 hours begins upon discovery of HPCI or RCIC inoperability. However, the total time for an inoperable, untripped channel cannot exceed 8 days. If the status of HPCI or RCIC changes such that the Completion Time changes from 96 hours to 8 days, the "time zero" for beginning the 8 day "clock" begins upon discovery of the inoperable, untripped channel. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action F.2. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an initiation), Condition H must be entered and its Required Action taken.

G.1 and G.2

Required Action G.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within similar ADS trip system Functions result in automatic initiation capability being lost for the ADS. Automatic initiation capability is lost if either (a) one Function 4 channel and one Function 5 channel are inoperable, (b) a combination of Function 4.e, 4.f, 5.e, and 5.f channels are inoperable such that channels associated with five or more low pressure ECCS pumps are inoperable, or (c) one or more 4.d, 4.e, 5.d and 5.e

(continued)

BASES

ACTIONS

G.1 and G.2 (continued)

Function 4.g channels and one or more Function 5.g channels are inoperable.

In this situation (loss of automatic initiation capability), the 96 hour or 8 day allowance, as applicable, of Required Action G.2 is not appropriate, and all ADS valves must be declared inoperable within 1 hour after discovery of loss of ADS initiation capability. The Note to Required Action G.1 states that Required Action G.1 is only applicable for Functions 4.c, 4.e, 4.f, 4.g, 5.c, 5.e, 5.f, and 5.g. Required Action G.1 is not applicable to Functions 4.h and 5.h (which also require entry into this Condition if a channel in these Functions is inoperable), since they are the Manual Initiation Functions and are not assumed in any accident or transient analysis. Thus, a total loss of manual initiation capability for 96 hours or 8 days (as allowed by Required Action G.2) is allowed.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action G.1, the Completion Time only begins upon discovery that the ADS cannot be automatically initiated due to inoperable channels within similar ADS trip system Functions as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 8 days has been shown to be acceptable (Ref. 8) to permit restoration of any inoperable channel to OPERABLE status if both HPCI and RCIC are OPERABLE (Required Action G.2). If either HPCI or RCIC is inoperable, the time shortens to 96 hours. If the status of HPCI or RCIC changes such that the Completion Time changes from 8 days to 96 hours, the 96 hours begins upon discovery of HPCI or RCIC inoperability. However, the total time for an inoperable channel cannot exceed 8 days. If the status of HPCI or RCIC changes such that the Completion Time changes from 96 hours to 8 days, the "time zero" for beginning the 8 day "clock" begins upon discovery of the

(continued)

BASES

ACTIONS

G.1 and G.2 (continued)

inoperable channel. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would not necessarily result in a safe state for the channel in all events.

H.1

With any Required Action and associated Completion Time not met, the associated feature(s) may be incapable of performing the intended function, and the supported feature(s) associated with inoperable untripped channels must be declared inoperable immediately.

SURVEILLANCE REQUIREMENTS

Reviewer's Note: Certain Frequencies are based on approved topical reports. In order for a licensee to use these Frequencies, the licensee must justify the Frequencies as required by the staff SER for the topical report.

As noted in the beginning of the SRs, the SRs for each ECCS instrumentation Function are found in the SRs column of Table 3.3.5.1-1.

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours as follows: (a) for Functions 3.c, 3.f, and 3.g; and (b) for Functions other than 3.c, 3.f, and 3.g provided the associated Function or redundant Function maintains ECCS initiation capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Ref. 8) assumption of the average time required to perform channel surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the ECCS will initiate when necessary.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.1.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or something even more serious. A CHANNEL CHECK guarantees that undetected outright channel failure is limited to 12 hours; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

PA1 Channel

Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the instrument has drifted outside its limit.

The Frequency is based upon operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the channels required by the LCO.

TA1

SR 3.3.5.1.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function.

INSERT SR 3.3.5.1.2

PA2

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based on the reliability analyses of Reference 6.

7

DB4

TSTF 205 R3

(continued)

INSERT SR 3.3.5.1.2

A successful test of the required contacts(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

TSTF-205 R3

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.1.~~3~~ 4

Calibration of trip units provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.5.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analyses. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than the setting accounted for in the appropriate setpoint methodology. 184

The Frequency of 92 days is based on the reliability analysis of Reference ~~5~~.) accuracy and lower failure rates of the associated solid-state electronic Analog Transmitter/Trip System components

SR 3.3.5.1.~~4~~ 3 and SR 3.3.5.1.5

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency of SR 3.3.5.1.~~4~~ 3 is based upon the assumption of a 92 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

The Frequency of SR 3.3.5.1.5 is based upon the assumption of an 18 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.5.1.6

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.5.1, LCO 3.5.2, LCO 3.8.1, and LCO 3.8.2 overlaps this Surveillance to complete testing of the assumed safety function.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.1.6 (continued)

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency.

SR 3.3.5.1.7

This SR ensures that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis. Response time testing acceptance criteria are included in Reference 4.

ECCS RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. The 18 month Frequency is consistent with the typical industry refueling cycle and is based upon plant operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

REFERENCES

1. UFSAR, Section [5.2].
2. UFSAR, Section [6.3].
3. UFSAR, [Chapter 15].
4. NEDC-31336-P, "Edwin I. Hatch Nuclear Power Plant, SAFER/GESTR-LOCA, Loss-of-Coolant Accident Analysis," December 1986.

5. NEDC-30936-P-A, "BWR Owners' Group Technical Specification Improvement Analyses for ECCS Actuation Instrumentation, Part 2," December 1988.

Insert Ref

(X1) (DB1)

INSERT REFERENCES

5. 10 CFR 50.36 (c)(20(ii)

6. Drawing 11825-5.01-15D, Rev. D, Reactor Assembly Nuclear Boiler, (GE Drawing 919D690BD)

JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.1

Emergency Core Cooling System (ECCS) Instrumentation

JUSTIFICATION FOR DIFFERENCES (JFDs) FROM NUREG-1433, REVISION 1, BASES

JUSTIFICATION FOR DIFFERENCES FROM NUREG-1433, REVISION 1
ITS BASES: 3.3.5.1 - ECCS INSTRUMENTATION

RETENTION OF EXISTING REQUIREMENT (CLB)

CLB1 The Bases description associated with the Core Spray and Low Pressure Injection Pump Discharge Pressure High Functions (for ADS) have been modified consistent with the current requirements in CTS Table 3.2-2 as indicated in the "Minimum No. of Operable Instrument Channels Per Trip System" column for Item Number 3 and 4.

CLB2 ECCS Response Time is not required in the CTS. Generic studies have shown that instrumentation response time changes (increasing times), that could impact safety, do not normally vary such that they would not be detected during other required surveillances (e.g., Channel Calibrations). Since the addition of these tests would be a major burden, with little gain in safety, the SRs associated with these tests have not been added for any test associated with instrumentation. The Bases has been revised as required to reflect this difference.

CLB3 The bracketed ISTS SR 3.3.5.1.3 (trip unit calibration) has been retained since the JAFNPP design includes trip units. The bracketed 92 day Frequency has been extended to 184 days consistent with CTS Table 4.2-2 (Note 15) and approved in JAFNPP Technical Specification Amendment No. 89. This Surveillance has been renumbered as SR 3.3.5.1.4 and therefore subsequent SRs have been reordered and renumbered to reflect this change. The appropriate changes have been made to the Bases Surveillance Requirements discussion to reflect this change.

CLB4 The Bases for ITS 3.3.5.1 Function 3.d has been modified to reflect existing details in CTS Table 3.2-2 for Item 16. The water contained in each CST at the Condensate Storage Tank Level - Low Allowable Value will still include 15,600 gallons of water in each tank.

CLB4 The 18 month Frequency of SR 3.3.5.2.6 (LOGIC SYSTEM FUNCTIONAL TEST) has been increased to 24 months. 1A

PLANT-SPECIFIC WORDING PREFERENCE OR MINOR EDITORIAL IMPROVEMENT (PA)

PA1 Changes have been made (additions, deletions, and/or changes to the NUREG) to reflect plant specific nomenclature.

PA2 Editorial change made with no change in intent, or to be consistent with other places in the Bases.

PA3 The wording that the "ECCS subsystem must also respond within its assumed response time" has been deleted since the statement is not appropriate to the ECCS Instrumentation Bases.

JUSTIFICATION FOR DIFFERENCES FROM NUREG-1433, REVISION 1
ITS BASES: 3.3.5.1 - ECCS INSTRUMENTATION

PLANT-SPECIFIC WORDING PREFERENCE OR MINOR EDITORIAL IMPROVEMENT (PA)

PA4 The "Reviewer's Note" has been deleted.

PA5 ITS 3.3.5.1 Required Action G.1 Note has been deleted since it does not provide any useful guidance. The associated words in the Bases have been deleted, as applicable.

PA6 The quotations used in the Bases References have been removed. The Writer's Guide does not require the use of quotations.

PLANT-SPECIFIC DIFFERENCE IN THE DESIGN (DB)

DB1 Changes have been made (additions, deletions, and/or changes to the NUREG) to reflect the plant specific design. References have been included, as applicable.

DB2 JAFNPP ADS logic does not contain Drywell Pressure-High (ISTS 3.3.5.1 Functions 4.b and 5.b) and ADS Low Water Level Actuation Timer inputs (ISTS 3.3.5.1 Functions 4.g and 5.g). Changes have been made to delete these instruments from the Specification. Therefore, the Bases has been revised to delete the descriptions of theses Functions and renumber other functions as required.

DB3 The description of the setpoint calculation methodology has been revised to reflect the plant specific methodology.

DB4 The proper plant specific references have been provided.

DB5 Bracketed Table 3.3.5.1-1 Functions 1.e (CS Manual Initiation), 2.h (LPCI Manual Initiation), 3.g (HPCI Manual Initiation), 4.h (ADS Trip System A Manual Initiation), and 5.h (ADS Trip System B Manual Initiation) do not apply to the JAFNPP design and therefore are not retained in the ITS. The Bases description has been modified as required to reflect this change.

DB6 An additional Function has been added to Table 3.3.5.1-1 to ensure the Core Spray pump will start within the time constraints required by the ECCS analysis and when required to minimize excess loading on the emergency buses and emergency diesel generators. This Function was added as:

1.d Core Spray Pump Start-Time Delay Relay

The Bases has been revised to reflect this change. Subsequent Functions have been renumbered as required to reflect this change.

JUSTIFICATION FOR DIFFERENCES FROM NUREG-1433, REVISION 1
ITS BASES: 3.3.5.1 - ECCS INSTRUMENTATION

PLANT-SPECIFIC DIFFERENCE IN THE DESIGN (DB)

DB7 The JAFNPP design includes two condensate storage tanks (CSTs) which provide a source of water to the High Pressure Coolant Injections System. The Bases has been revised to reflect this difference in design.

DB8 Two additional Functions have been added to Table 3.3.5.1-1 to ensure the Core Spray and High Pressure Coolant Injection (HPCI) System minimum flow control valves operate as required. These Functions are:

1.f Core Spray Pump Discharge Pressure-High (Bypass)
3.g High Pressure Coolant (Bypass) Injection Pump Discharge Pressure-High

Appropriate Actions and Surveillance Requirements have also been added. This instrumentation serves to protect the system pumps from overheating when the pump is operating and the associated injection valve is not open. This will ensure the associated Emergency Core Cooling Systems are Operable and will function properly during a design basis accident.

DB9 The 18 month calibration SR Frequency has been extended from 18 months to 24 months consistent with the setpoint calculation methodology and consistent with CTS Table 4.2-2.

DB10 A new Function has been added to Table 3.3.5.1-1 to ensure the Low Pressure Coolant Injection subsystems are not diverted unless containment spray is needed. This Function is:

2.h Containment Pressure-High

Appropriate Actions and Surveillance Requirements have also been added. This addition is consistent with the current licensing requirements and is consistent with NEDO-31466 (Technical Specification Screening Criteria Application And Risk Assessment), Supplement 1, February 1990. The Bases has been modified as required to reflect this change.

DIFFERENCE BASED ON AN APPROVED TRAVELER (TA)

TA1 The changes presented in Technical Specification Task Force (TSTF) Technical Specification Change Traveler number 205, Revision 3 have been incorporated into the revised Improved Technical Specifications.

TSTF-205

JUSTIFICATION FOR DIFFERENCES FROM NUREG-1433, REVISION 1
ITS BASES: 3.3.5.1 - ECCS INSTRUMENTATION

DIFFERENCE BASED ON AN APPROVED TRAVELER (TA) (continued)

TA2 The changes presented in Technical Specification Task Force (TSTF) Technical Specification Change Traveler number 275, Revision 0 have been incorporated into the revised Improved Technical Specifications.

TSTF 275 R0

DIFFERENCE BASED ON A SUBMITTED, BUT PENDING TRAVELER (TP)

None

DIFFERENCE FOR ANY REASON OTHER THAN THE ABOVE (X)

X1 NUREG-1433, Revision 1, Bases reference to "the NRC Policy Statement" has been replaced with 10 CFR 50.36(c)(2)(ii), in accordance with 60 FR 36953 effective August 18, 1995. Subsequent References have been renumbered, as applicable.

AM 02-63

JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.1

Emergency Core Cooling System (ECCS) Instrumentation

RETYPED PROPOSED IMPROVED TECHNICAL SPECIFICATIONS (ITS) AND BASES

3.3 INSTRUMENTATION

3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

LCO 3.3.5.1 The ECCS instrumentation for each Function in Table 3.3.5.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5.1-1.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.1-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	B.1 --------NOTES-------- 1. Only applicable in MODES 1, 2, and 3. 2. Only applicable for Functions 1.a, 1.b, 2.a, and 2.b. ---------- Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable. AND	1 hour from discovery of loss of initiation capability for feature(s) in both divisions (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.2	--------NOTE-------- Only applicable for Functions 3.a and 3.b. ---------- Declare High Pressure Coolant Injection (HPCI) System inoperable.	1 hour from discovery of loss of HPCI initiation capability
	AND		
	B.3	Place channel in trip.	24 hours
C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	C.1	--------NOTES-------- 1. Only applicable in MODES 1, 2, and 3. 2. Only applicable for Functions 1.c, 1.d, 2.c, 2.d, and 2.f. ---------- Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for feature(s) in both divisions
	AND		
	C.2	Restore Channel to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	D.1	--------NOTE-------- Only applicable if HPCI pump suction is not aligned to the suppression pool. ---------- Declare HPCI System inoperable.	1 hour from discovery of loss of HPCI initiation capability
	AND		
	D.2.1	Place channel in trip.	24 hours
	OR		
	D.2.2	Align the HPCI pump suction to the suppression pool.	24 hours
E. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	E.1	--------NOTES-------- 1. Only applicable in MODES 1, 2, and 3. 2. Only applicable for Functions 1.e, 1.f, and 2.g. ---------- Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for subsystems in both divisions
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. (continued)	E.2 Restore channel to OPERABLE status.	7 days
F. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	F.1 Declare Automatic Depressurization System (ADS) valves inoperable. AND F.2 Place channel in trip.	1 hour from discovery of loss of ADS initiation capability in both trip systems 96 hours from discovery of inoperable channel concurrent with HPCI or reactor core isolation cooling (RCIC) inoperable AND 8 days
G. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	G.1 Declare ADS valves inoperable. AND	1 hour from discovery of loss of ADS initiation capability in both trip systems (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. (continued)	G.2 Restore channel to OPERABLE status.	96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable AND 8 days
H. Required Action and associated Completion Time of Condition B, C, D, E, F, or G not met.	H.1 Declare associated supported feature(s) inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTES----------

1. Refer to Table 3.3.5.1-1 to determine which SRs apply for each ECCS Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 3.c, 3.f, and 3.g; and (b) for up to 6 hours for Functions other than 3.c, 3.f, and 3.g provided the associated Function or the redundant Function maintains ECCS initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.5.1.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.5.1.3	Perform CHANNEL CALIBRATION.	92 days
SR 3.3.5.1.4	Calibrate the trip units.	184 days
SR 3.3.5.1.5	Perform CHANNEL CALIBRATION.	24 months
SR 3.3.5.1.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.5.1-1 (page 1 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Core Spray System					
a. Reactor Vessel Water Level – Low Low Low (Level 1)	1,2,3, 4(a), 5(a)	4(b)	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 18 inches
b. Drywell Pressure – High	1,2,3	4(b)	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 2.7 psig
c. Reactor Pressure – Low (Injection Permissive)	1,2,3	4	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 410 psig and ≤ 490 psig
	4(a), 5(a)	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 410 psig and ≤ 490 psig
d. Core Spray Pump Start-Time Delay Relay	1,2,3, 4(a), 5(a)	1 per pump	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 12.34 seconds
e. Core Spray Pump Discharge Flow – Low (Bypass)	1,2,3, 4(a), 5(a)	1 per pump	E	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 510 gpm and ≤ 980 gpm
f. Core Spray Pump Discharge Pressure – High (Bypass)	1,2,3, 4(a), 5(a)	1 per pump	E	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 90 psig and ≤ 110 psig
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Vessel Water Level – Low Low Low (Level 1)	1,2,3, 4(a), 5(a)	4(b)	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 18 inches

(continued)

(a) When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2, ECCS – Shutdown.

(b) Also required to initiate the associated emergency diesel generator(s).

DTF-275

Table 3.3.5.1-1 (page 2 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
b. Drywell Pressure – High	1,2,3	4[b]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 2.7 psig
c. Reactor Pressure – Low (Injection Permissive)	1,2,3	4	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 410 psig and ≤ 490 psig
	4[a], 5[a]	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 410 psig and ≤ 490 psig
d. Reactor Pressure – Low (Recirculation Discharge Valve Permissive)	1[c],2[c], 3[c]	4	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 295 psig
e. Reactor Vessel Shroud Level (Level 0)	1,2,3	2	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1.0 inches
f. Low Pressure Coolant Injection Pump Start-Time Delay Relay	1,2,3, 4[a], 5[a]	1 per pump	C	SR 3.3.5.1.5 SR 3.3.5.1.6	
Pumps A, D					≤ 1.51 seconds
Pumps B, C					≤ 6.73 seconds

(continued)

(a) When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2.

(b) Also required to initiate the associated emergency diesel generator(s).

(c) With associated recirculation pump discharge valve open.

Table 3.3.5.1-1 (page 3 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
g. Low Pressure Coolant Injection Pump Discharge Flow – Low (Bypass)	1,2,3, 4(a), 5(a)	1 per subsystem	E	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 1040 gpm and ≤ 1665 gpm
h. Containment Pressure – High	1,2,3	4	B	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 1 psig and ≤ 2.7 psig
3. High Pressure Coolant Injection (HPCI) System					
a. Reactor Vessel Water Level – Low Low (Level 2)	1, 2(d), 3(d)	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 126.5 inches
b. Drywell Pressure – High	1, 2(d), 3(d)	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 2.7 psig
c. Reactor Vessel Water Level – High (Level 8)	1, 2(d), 3(d)	2	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 222.4 inches
d. Condensate Storage Tank Level – Low	1, 2(d), 3(d)	4	D	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 59.5 inches
e. Suppression Pool Water Level – High	1, 2(d), 3(d)	2	D	SR 3.3.5.1.3 SR 3.3.5.1.6	≤ 14.5 feet

(continued)

(a) When the associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2.

(d) With reactor steam dome pressure > 150 psig.

Table 3.3.5.1-1 (page 4 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. HPCI System (continued)					
f. High Pressure Coolant Injection Pump Discharge Flow – Low (Bypass)	1, 2(d), 3(d)	1	E	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 475 gpm and ≤ 800 gpm
g. High Pressure Coolant Injection Pump Discharge Pressure – High (Bypass)	1, 2(d), 3(d)	1	E	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 25 psig and ≤ 80 psig
4. Automatic Depressurization System (ADS) Trip System A					
a. Reactor Vessel Water Level – Low Low Low (Level 1)	1, 2(d), 3(d)	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 18 inches
b. Automatic Depressurization System Initiation Timer	1, 2(d), 3(d)	1	G	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 134 seconds
c. Reactor Vessel Water Level – Low (Level 3)	1, 2(d), 3(d)	1	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 177 inches
d. Core Spray Pump Discharge Pressure – High	1, 2(d), 3(d)	2	G	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 90 psig and ≤ 110 psig

(continued)

(d) With reactor steam dome pressure > 150 psig.

Table 3.3.5.1-1 (page 5 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. ADS Trip System A (continued)					
e. Low Pressure Coolant Injection Pump Discharge Pressure – High	1, 2(d), 3(d)	4	G	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 105 psig and ≤ 145 psig
5. ADS Trip System B					
a. Reactor Vessel Water Level – Low Low Low (Level 1)	1, 2(d), 3(d)	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 18 inches
b. Automatic Depressurization System Initiation Timer	1, 2(d), 3(d)	1	G	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 134 seconds
c. Reactor Vessel Water Level – Low (Level 3)	1, 2(d), 3(d)	1	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 177 inches
d. Core Spray Pump Discharge Pressure – High	1, 2(d), 3(d)	2	G	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 90 psig and ≤ 110 psig
e. Low Pressure Coolant Injection Pump Discharge Pressure – High	1, 2(d), 3(d)	4	G	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 105 psig and ≤ 145 psig

(d) With reactor steam dome pressure > 150 psig.

B 3.3 INSTRUMENTATION

B 3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

BASES

BACKGROUND

The purpose of the ECCS instrumentation is to initiate appropriate responses from the systems to ensure that the fuel is adequately cooled in the event of a design basis accident or transient.

For most abnormal operational transients and Design Basis Accidents (DBAs), a wide range of dependent and independent parameters are monitored.

The ECCS instrumentation actuates core spray (CS), low pressure coolant injection (LPCI), high pressure coolant injection (HPCI), Automatic Depressurization System (ADS), and the emergency diesel generators (EDGs). The equipment involved with each of these systems is described in the Bases for LCO 3.5.1, "ECCS–Operating" and LCO 3.8.1, "AC Sources–Operating."

Core Spray System

The CS System may be initiated by either automatic or manual means, although manual initiation requires manipulation of individual component control switches. Automatic initiation occurs for conditions of Reactor Vessel Water Level–Low Low Low (Level 1) or Drywell Pressure–High; or both. Each of these diverse variables is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the four trip units associated with each diverse variable are connected to relays whose contacts provide input to two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic for each Function. Each trip system initiates one of two CS pumps and provides an open signal to both injection valves associated with the same CS pump. Once an initiation signal is received by the CS control circuitry, the signal is sealed in until manually reset.

Upon receipt of an initiation signal, if preferred power is available, both CS pumps start after approximately an 11 second time delay. If a CS initiation signal is received when preferred power is not available, the CS pumps start

(continued)

BASES

BACKGROUND

Core Spray System (continued)

after approximately 11 seconds after the bus is energized by the EDGs.

The normally closed CS test line isolation valve, which is also a primary containment isolation valve (PCIV), is closed on a CS initiation signal to allow full system flow assumed in the accident analyses and maintain primary containment isolated in the event CS is not operating.

The CS pump discharge flow and pressure are monitored by a differential pressure indicating switch and a pressure switch, respectively. When the pump is running (as indicated by the pressure switch) and discharge flow is low enough so that pump overheating may occur, the minimum flow return line valve is opened. The valve is automatically closed if flow is above the minimum flow setpoint to allow the full system flow assumed in the accident analysis.

The CS System also monitors the pressure in the reactor to ensure that, before the injection valves open, the reactor pressure has fallen to a value below the CS System's maximum design pressure. The variable is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the trip units are connected to relays whose contacts provide input to two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic. Each trip system provides an open permissive signal for two CS injection valves in one of the two CS Systems.

Low Pressure Coolant Injection System

The LPCI is an operating mode of the Residual Heat Removal (RHR) System, with two LPCI subsystems. The LPCI subsystems may be initiated by automatic or manual means, although manual initiation requires manipulation of individual component control switches. Automatic initiation occurs for conditions of Reactor Vessel Water Level – Low Low Low (Level 1); Drywell Pressure – High; or both. Each of these diverse variables is monitored by four redundant transmitters, which, in turn, are connected to four trip units. The outputs of the four trip units associated with

(continued)

BASES

BACKGROUND

Low Pressure Coolant Injection System (continued)

each diverse variable are connected to relays whose contacts provide input to two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic for each Function. Each trip system initiates two of the four LPCI pumps, provides an open signal to each LPCI inboard injection valve, provides an open signal to the associated LPCI outboard injection valve, provides an open signal to the associated LPCI heat exchanger bypass valve, and provides a close signal to both recirculation pump discharge valves. The open signal for the heat exchanger bypass valve is maintained for three minutes to ensure the valve fully opens. Once an initiation signal is received by the LPCI control circuitry, the signal is sealed in until manually reset.

Upon receipt of an initiation signal, if preferred power is available, LPCI pumps A and D start in approximately one second. LPCI pumps B and C are started in approximately 6 seconds to limit the loading of the preferred power sources. With a loss of preferred power, LPCI pumps A and D start in approximately one second after the bus is energized by the EDGs, and LPCI pumps B and C start 6 seconds after the bus is energized by the EDGs to limit the loading of the EDGs. If one EDG should fail to force parallel, an associated LPCI pump will not start (LPCI pump B or C) to ensure the other EDG is not overloaded.

Each LPCI subsystem's discharge flow is monitored by a differential pressure indicating switch. When a pump is running (as indicated by pump breaker position) and discharge flow is low enough so that pump overheating may occur, the respective minimum flow return line valve is opened. If flow is above the minimum flow setpoint, the valve is automatically closed to allow the full system flow assumed in the analyses.

The normally closed RHR suppression pool cooling isolation return valve, suppression pool spray isolation valves, and containment spray isolation valves (which are also PCIVs) are also closed on a LPCI initiation signal to allow the full system flow assumed in the accident analyses and maintain primary containment isolated in the event LPCI is not operating.

(continued)

BASES

BACKGROUND

Low Pressure Coolant Injection System (continued)

The LPCI System monitors the pressure in the reactor to ensure that, before an injection valve opens, the reactor pressure has fallen to a value below the LPCI System's maximum design pressure. The variable is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the trip units are connected to relays whose contacts provide input to two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic. Each trip system provides an open signal to both inboard injection valves and provides an open signal to the associated outboard injection valve. The open signal for the outboard injection valve is maintained for five minutes to ensure the valve fully opens. Additionally, instruments are provided to close the recirculation pump discharge valves to ensure that LPCI flow does not bypass the core when it injects into the recirculation lines. The variable is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the trip units are connected to relays whose contacts provide input to two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic. Each trip system provides a closure signal to both recirculation pump discharge valves.

Low reactor water level in the shroud is detected by two additional instruments. When the level is greater than the low level setpoint, LPCI may no longer be required, therefore, other modes of RHR (e.g., suppression pool cooling) are allowed. The variable is monitored by two transmitters, which are, in turn, connected to two trip units. The outputs of the trip units are connected to relays whose contacts provide input to one of two trip systems. Each trip system provides a permissive signal to open the associated subsystems containment spray and suppression cooling isolation valves. Manual overrides for these isolations below the low level setpoint are provided.

Containment high pressure is detected by four additional instruments to automatically isolate the containment spray mode of RHR when containment depressurization is not required. This Function also precludes inadvertent diversion of LPCI flow unless containment overpressurization is indicated. This variable is monitored by four pressure

(continued)

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BACKGROUND

Low Pressure Coolant Injection System (continued)

switches, whose contacts provide input to two trip systems. The outputs of the contacts are arranged in a one-out-of-two taken twice logic for each trip system. Each trip system provides an input to the associated subsystems containment spray valves.

High Pressure Coolant Injection System

The HPCI System may be initiated by either automatic or manual means, although manual initiation requires manipulation of individual component control switches. Automatic initiation occurs for conditions of Reactor Vessel Water Level – Low Low (Level 2) or Drywell Pressure – High. Each of these variables is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the trip units are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic for each Function.

The HPCI pump discharge flow and pressure are monitored by a flow switch and pressure switch, respectively. When the pump is running (as indicated by the pressure switch) and discharge flow is low enough so that pump overheating may occur, the minimum flow return line valve is opened. The valve is automatically closed if flow is above the minimum flow setpoint to allow the full system flow assumed in the accident analysis.

The HPCI test line isolation valve is closed upon receipt of a HPCI initiation signal to allow the full system flow assumed in the accident analysis.

The HPCI System also monitors the water levels in the condensate storage tanks (CSTs) and the suppression pool because these are the two sources of water for HPCI operation. Reactor grade water in the CSTs is the normal source. The CST suction source consists of two CSTs connected in parallel to the HPCI pump suction. Upon receipt of a HPCI initiation signal, the CST suction valve is automatically signaled to open (it is normally in the open position) unless both suppression pool suction valves are open. If the water level in both CSTs falls below a

(continued)

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BACKGROUND

High Pressure Coolant Injection System (continued)

preselected level, first the suppression pool suction valves automatically open, and then the CST suction valve automatically closes. Two level switches are used to detect low water level in each CST. One switch associated with each CST can cause the suppression pool suction valves to open and the CST suction valve to close. The suppression pool suction valves also automatically open and the CST suction valve closes if high water level is detected in the suppression pool. Two level switches monitor suppression pool water level. Either switch can cause the suppression pool suction valves to open and the CST suction valves to close. To prevent losing suction to the pump, the suction valves are interlocked so that one suction path must be full open before the other automatically closes.

The HPCI provides makeup water to the reactor until the reactor vessel water level reaches the Reactor Vessel Water Level – High (Level 8) setting, at which time the HPCI turbine trips, which causes the turbine's stop valve to close. The logic is two-out-of-two to provide high reliability of the HPCI System. The HPCI System automatically restarts if a Reactor Vessel Water Level – Low Low (Level 2) signal is subsequently received.

Automatic Depressurization System

The ADS may be initiated by either automatic or manual means, although manual initiation requires the manipulation of handswitches associated with each ADS valve. Automatic initiation occurs when signals indicating Reactor Vessel Water Level – Low Low Low (Level 1); confirmed Reactor Vessel Water Level – Low (Level 3); and CS or LPCI Pump Discharge Pressure – High are all present and the ADS Initiation Timer has timed out. There are two transmitters for Reactor Vessel Water Level – Low Low Low (Level 1), and one transmitter for confirmed Reactor Vessel Water Level – Low (Level 3) in each of the two ADS trip systems. Each of these transmitters connects to a trip unit, which then drives a relay whose contacts form the initiation logic.

Each ADS trip system includes a time delay between satisfying the initiation logic and the actuation of the ADS

(continued)

BASES

BACKGROUND

Automatic Depressurization System (continued)

valves. The ADS Initiation Timer time delay setpoint chosen is long enough that the HPCI has sufficient operating time to recover to a level above Level 1, yet not so long that the LPCI and CS Systems are unable to adequately cool the fuel if the HPCI fails to maintain that level. An alarm in the control room is annunciated when either of the timers is timing. Resetting the ADS initiation signals resets the ADS Initiation Timers.

The ADS also monitors the discharge pressures of the four LPCI pumps and the two CS pumps. Each ADS trip system includes two discharge pressure permissive switches from one CS and from two LPCI pumps in the associated Division (i.e., Division 1 CS subsystem A and LPCI pumps A and C input to ADS trip System A, and Division 2 CS subsystem B and LPCI pumps B and D input to ADS trip System B). The signals are used as a permissive for ADS actuation, indicating that there is a source of core coolant available once the ADS has depressurized the vessel. Any one of the six low pressure pumps is sufficient to permit automatic depressurization. The switches associated with one ADS trip system also provide signals to the other ADS trip system, but these signals are not required for the other ADS trip system to be considered OPERABLE.

The ADS logic in each trip system is arranged in two strings. Each string has a contact from the Reactor Vessel Water Level – Low Low Low (Level 1). One of the two strings in each trip system must also have a confirmed Reactor Vessel Water Level – Low (Level 3). All contacts in both logic strings must close, the ADS initiation timer must time out, and a CS or LPCI pump discharge pressure signal must be present to initiate an ADS trip system. Either the A or B trip system will cause all the ADS relief valves to open. Once the ADS initiation signal is present, it is individually sealed in until manually reset.

Manual inhibit switches are provided in the control room for the ADS; however, their function is not required for ADS OPERABILITY (provided ADS is not inhibited when required to be OPERABLE).

(continued)

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BACKGROUND (continued)

Emergency Diesel Generators

The EDGs may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level – Low Low Low (Level 1) or Drywell Pressure – High. Each of these diverse variables is monitored by four redundant transmitters, which are, in turn, connected to four trip units. The outputs of the four trip units associated with each diverse variable are connected to relays whose contacts provide input to two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic for each Function. One trip system will start EDG-A and EDG-C. The other trip system will start EDG-B and EDG-D. The EDGs receive their initiation signals from the LPCI and CS System initiation logic. The EDGs are also initiated upon loss of voltage signals. (Refer to the Bases for LCO 3.3.8.1, "Loss of Power (LOP) Instrumentation," for a discussion of these signals.) The EDGs can also be started manually from the control room and locally from the associated EDG room. The EDG initiation signal is a sealed in signal and must be manually reset. The EDG initiation logic is reset by resetting the associated ECCS initiation logic. Upon receipt of an ECCS initiation signal, each EDG is automatically started, is ready to load in approximately 10 seconds, and will run in standby conditions (rated voltage and speed, with the EDG output breaker open). The EDGs will only energize their respective emergency buses if a loss of preferred power occurs. (Refer to Bases for LCO 3.3.8.1.)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The actions of the ECCS are explicitly assumed in the safety analyses of References 1, 2, 3, and 4. The ECCS is initiated to preserve the integrity of the fuel cladding by limiting the post LOCA peak cladding temperature to less than the 10 CFR 50.46 limits.

ECCS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 5). Certain instrumentation Functions are retained for other reasons and are described below in the individual Functions discussion.

The OPERABILITY of the ECCS instrumentation is dependent upon the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.5.1-1. Each

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Function must have a required number of OPERABLE channels, with their setpoints within the specified Allowable Values, where appropriate. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Table 3.3.5.1-1 is modified by two footnotes. Footnote (a) is added to clarify that the associated functions are required to be OPERABLE in MODES 4 and 5 only when their supported ECCS are required to be OPERABLE per LCO 3.5.2, ECCS – Shutdown. Footnote (b) is added to show that certain ECCS instrumentation Functions also perform EDG initiation.

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Allowable Values are specified for each ECCS Function specified in the table. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (e.g., reactor vessel water level), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., trip unit) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis or other appropriate documents. The trip setpoints are derived from the analytical limits and account for all worst case instrumentation uncertainties (e.g., drift, process effects, calibration uncertainties, and severe environmental errors (for channels that must function in harsh environments as defined by 10 CFR 50.49)). The trip setpoints derived in this manner provide adequate protection because all expected uncertainties are accounted for. The Allowable Values are then derived from the trip setpoints by accounting for normal effects that would be seen during periodic surveillance or calibration. These effects are instrumentation uncertainties observed during normal operation (e.g., drift and calibration uncertainties).

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BASES

APPLICABLE SAFETY ANALYSIS, LCO, and APPLICABILITY (continued)

In general, the individual Functions are required to be OPERABLE in the MODES or other specified conditions that may require ECCS (or EDG) initiation to mitigate the consequences of a design basis transient or accident. To ensure reliable ECCS and EDG function, a combination of Functions is required to provide primary and secondary initiation signals. The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

Core Spray and Low Pressure Coolant Injection Systems

1.a, 2.a. Reactor Vessel Water Level – Low Low Low (Level 1)

Low reactor pressure vessel (RPV) water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. The low pressure ECCS and associated EDGs are initiated at Level 1 to ensure that core spray and flooding functions are available to prevent or minimize fuel damage. The EDGs are initiated from Function 1.a and 2.a. The Reactor Vessel Water Level – Low Low Low (Level 1) is one of the Functions assumed to be OPERABLE and capable of initiating the ECCS during the transients analyzed in Reference 3. In addition, the Reactor Vessel Water Level – Low Low Low (Level 1) Function is directly assumed in the analysis of the recirculation line break (Refs. 1, 2, and 4). The core cooling function of the ECCS, along with the scram action of the Reactor Protection System (RPS), ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level – Low Low Low (Level 1) signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel.

The Reactor Vessel Water Level – Low Low Low (Level 1) Allowable Value is chosen to allow time for the low pressure core flooding systems to activate and provide adequate cooling. The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

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BASES

APPLICABLE SAFETY ANALYSIS LCO, and APPLICABILITY

1.a, 2.a Reactor Vessel Water Level - Low Low Low (Level 1) (continued)

Thus, four channels of the CS and LPCI Reactor Vessel Water Level - Low Low Low (Level 1) Function are only required to be OPERABLE when the ECCS are required to be OPERABLE to ensure that no single instrument failure can preclude ECCS initiation. Per Footnote (a) to Table 3.3.5.1-1, this ECCS Function is only required to be OPERABLE in MODES 4 and 5 whenever the associated ECCS is required to be OPERABLE per LCO 3.5.2. Refer to LCO 3.5.1. "ECCS-Operating," and LCO 3.5.2, "ECCS - Shutdown," for Applicability Bases for the low pressure ECCS subsystems; LCO 3.8.1, "AC Sources - Operating"; and LCO 3.8.2, "AC Sources - Shutdown," for Applicability Bases for the EDGs.

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1.b, 2.b. Drywell Pressure - High

High pressure in the drywell could indicate a break in the reactor coolant pressure boundary (RCPB). The low pressure ECCS and associated EDGs are initiated upon receipt of the Drywell Pressure - High Function in order to minimize the possibility of fuel damage. The EDGs are initiated from Function 1.b and 2.b. The Drywell Pressure - High Function, along with the Reactor Water Level - Low Low Low (Level 1) Function, is directly assumed in the analysis of the recirculation line break (Refs. 1, 2, and 4). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

High drywell pressure signals are initiated from four pressure transmitters that sense drywell pressure. The Allowable Value was selected to be as low as possible and be indicative of a LOCA inside primary containment.

The Drywell Pressure - High Function is required to be OPERABLE when the ECCS or EDG(s) are required to be OPERABLE in conjunction with times when the primary containment is required to be OPERABLE. Thus, four channels of the CS and LPCI Drywell Pressure - High Function are required to be OPERABLE in MODES 1, 2, and 3 to ensure that no single instrument failure can preclude ECCS and EDG initiation. In MODES 4 and 5, the Drywell Pressure - High Function is not required, since there is insufficient energy in the reactor to pressurize the primary containment to Drywell Pressure - High setpoint. Refer to LCO 3.5.1 for Applicability Bases for the low pressure ECCS subsystems and to LCO 3.8.1 for Applicability Bases for the EDGs.

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BASES

APPLICABLE SAFETY ANALYSES LCO, and APPLICABILITY (continued)

1.c, 2.c. Reactor Pressure - Low (Injection Permissive)

Low reactor pressure signals are used as permissives for the low pressure ECCS subsystems. This ensures that, prior to opening the injection valves of the low pressure ECCS subsystems, the reactor pressure has fallen to a value below these subsystems' maximum design pressure. The Reactor Pressure - Low is one of the Functions assumed to be OPERABLE and capable of permitting initiation of the ECCS during the transients analyzed in Reference 3. In addition, the Reactor Pressure - Low Function is directly assumed in the analysis of the recirculation line break (Refs. 1, 2, and 4). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

The Reactor Pressure - Low signals are initiated from four pressure transmitters that sense the reactor dome pressure.

The Allowable Value is low enough to prevent overpressuring the equipment in the low pressure ECCS, but high enough to ensure that the ECCS injection prevents the fuel peak cladding temperature from exceeding the limits of 10 CFR 50.46.

Four channels of Reactor Pressure - Low Function are only required to be OPERABLE when the ECCS is required to be OPERABLE to ensure that no single instrument failure can preclude ECCS initiation. Per Footnote (a) to Table 3.3.5.1-1, this ECCS Function is only required to be OPERABLE in MODES 4 and 5 whenever the associated ECCS is required to be OPERABLE per LCO 3.5.2. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the low pressure ECCS subsystems.

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1.d, 2.f. Core Spray and Low Pressure Coolant Injection Pump Start-Time Delay Relay

The purpose of these time delay relays is to stagger the start of the CS and LPCI pumps to enable sequential loading of the appropriate AC source. The CS and LPCI Pump Start-Time Delay Relays are assumed to be OPERABLE in the accident analyses requiring ECCS initiation. That is, the analyses assumes that the pumps will initiate when required and no excess loading of the power sources will occur.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.d, 2.f. Core Spray and Low Pressure Coolant Injection Pump Start-Time Delay Relay (continued)

There are two CS and four LPCI Pump Start-Time Delay Relays, one in each of the CS and LPCI pump start circuits. While each time delay relay is dedicated to a single pump start circuit, a single failure of a CS or LPCI Pump Start-Time Delay Relay could result in the failure of a CS pump and both the LPCI pumps powered from the same emergency bus to perform their intended function within the assumed ECCS response time (e.g., as in the case where one inoperable time delay relay results in more than one pump starting at nearly the same time). In the worst case this would still leave the other three low pressure ECCS pumps OPERABLE; thus, the single failure of one instrument does not preclude ECCS initiation. The Allowable Values for the CS and LPCI Pump Start-Time Delay Relays are chosen to be short enough so that ECCS operation is within the time period assumed in the accident analyses.

Each CS and LPCI Pump Start-Time Delay Relay Function is required to be OPERABLE only when the associated CS and LPCI subsystem is required to be OPERABLE. Per Footnote (a) to Table 3.3.5.1-1, this ECCS Function is only required to be OPERABLE in MODES 4 and 5 whenever the associated ECCS is required to be OPERABLE per LCO 3.5.2. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the CS and LPCI subsystems.

1.e, 2.g, 1.f. Core Spray and Low Pressure Coolant Injection Pump Discharge Flow-Low (Bypass), Core Spray Pump Discharge Pressure-High (Bypass)

The minimum flow instruments are provided to protect the associated low pressure ECCS pump from overheating when the pump is operating at reduced flows. The minimum flow line valve is opened when low flow is sensed (if the associated pump is detected to be operating), and the valve is automatically closed when the flow rate is adequate to protect the pump. The CS pump is detected to be operating by sensing high pump discharge pressure, while the LPCI pumps are detected to be operating by the use of pump motor breaker auxiliary contacts. The LPCI and CS Pump Discharge

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.e, 2.g, 1.f. Core Spray and Low Pressure Coolant Injection Pump Discharge Flow-Low (Bypass), Core Spray Pump Discharge Pressure-High (Bypass) (continued)

Flow-Low and the CS Pump Discharge Pressure-High (Bypass) Functions are assumed to be OPERABLE and capable of closing the minimum flow valves to ensure that the low pressure ECCS flows assumed during the transients and accidents analyzed in References 1, 2, 3, and 4 are met. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. One differential pressure indicating switch per CS pump and one differential pressure indicating switch per LPCI subsystem are used to detect the associated subsystems' flow rates. In addition, one pressure switch per CS pump is used to detect the associated pumps discharge pressure. The logic is arranged such that each differential pressure indicating switch causes its associated minimum flow valve to open. For CS, both the differential pressure indicating switch and the pressure switch must actuate to cause the valve to open. The logic will close the minimum flow valve once the closure setpoint of the associated differential pressure indicating switch is exceeded. The LPCI minimum flow valves are time delayed such that the valves will not open for 10 seconds after the switches detect low flow. The time delay is provided to limit reactor vessel inventory loss during the startup of the RHR shutdown cooling mode. The Pump Discharge Flow-Low Allowable Values are high enough to ensure that the pump flow rate is sufficient to protect the pump, yet low enough to ensure that the closure of the minimum flow valve is initiated to allow full flow into the core. The Core Spray Pump Discharge Pressure-High (Bypass) Allowable Value is less than the pump discharge pressure when the pump is operating in a full flow mode and high enough to avoid any condition that results in a discharge pressure permissive when the CS pump is aligned for injection and the pump is not running.

Each channel of Pump Discharge Flow-Low Function (two CS channels and four LPCI channels) and each channel of Core Spray Pump Discharge Pressure-High (Bypass) are only required to be OPERABLE when the associated ECCS is required to be OPERABLE to ensure that no single instrument failure can preclude the ECCS function. Per Footnote (a) to Table 3.3.5.1-1, this ECCS Function is only required to be OPERABLE in MODES 4 and 5 whenever the associated ECCS is required to be OPERABLE per LCO 3.5.2. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the low pressure ECCS subsystems.

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2.d. Reactor Pressure – Low (Recirculation Discharge Valve Permissive)

Low reactor pressure signals are used as permissives for recirculation discharge valve closure. This ensures that the LPCI subsystems inject into the proper RPV location assumed in the safety analysis. The Reactor Pressure – Low is one of the Functions assumed to be OPERABLE and capable of closing the valve during the transients analyzed in Reference 3. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. The Reactor Pressure – Low Function is directly assumed in the analysis of the recirculation line break (Refs. 1, 2 and 4).

The Reactor Pressure – Low signals are initiated from four pressure transmitters that sense the reactor dome pressure.

The Allowable Value is chosen to ensure that the valves close prior to commencement of LPCI injection flow into the core, as assumed in the safety analysis.

Four channels of the Reactor Pressure – Low Function are only required to be OPERABLE in MODES 1, 2, and 3 with the associated recirculation pump discharge valve open. With the valve(s) closed, the function of the instrumentation has been performed; thus, the Function is not required. In MODES 4 and 5, the loop injection location is not critical since LPCI injection through the recirculation loop in either direction will still ensure that LPCI flow reaches the core (i.e., there is no significant reactor steam dome back pressure).

2.e. Reactor Vessel Shroud Level (Level 0)

The Reactor Vessel Shroud Level (Level 0) Function is provided as a permissive to allow the RHR System to be manually aligned from the LPCI mode to the suppression pool cooling/spray or drywell spray modes. The reactor vessel shroud level permissive ensures that water in the vessel is approximately two thirds core height before the manual transfer is allowed. This ensures that LPCI is available to prevent or minimize fuel damage. This function may be overridden during accident conditions as allowed by plant procedures. Reactor Vessel Shroud Level (Level 0) Function

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.e. Reactor Vessel Shroud Level (Level 0) (continued)

is implicitly assumed in the analysis of the recirculation line break (Refs. 1, 2 and 4) since the analysis assumes that no LPCI flow diversion occurs when reactor water level is below Level 0.

Reactor Vessel Shroud Level (Level 0) signals are initiated from two level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. The Reactor Vessel Shroud Level (Level 0) Allowable Value is chosen to allow the low pressure core flooding systems to activate and provide adequate cooling before allowing a manual transfer. The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

Two channels of the Reactor Vessel Shroud Level (Level 0) Function are only required to be OPERABLE in MODES 1, 2, and 3. In MODES 4 and 5, the specified initiation time of the LPCI subsystems is not assumed, and other administrative controls are adequate to control the valves associated with this Function (since the systems that the valves are opened for are not required to be OPERABLE in MODES 4 and 5 and are normally not used).

2.h. Containment Pressure-High

The Containment Pressure-High Function is provided as an isolation of the containment spray mode of RHR on decreasing containment pressure following manual actuation of the system. This isolation ensures excessive depressurization of the containment does not occur due to containment spray. This Function also serves as an interlock permissive to allow the RHR System to be manually aligned from the LPCI mode to the containment spray mode after containment pressure has exceeded the trip setting. The permissive ensures that containment pressure is elevated before the manual transfer is allowed. This ensures that LPCI is available to prevent or minimize fuel damage until such time that the operator determines that containment pressure control is needed. The Containment Pressure-High Function is implicitly assumed in the analysis of LOCAs inside

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.h. Containment Pressure–High (continued)

containment (Ref. 1, 2, and 4) since the analysis assumes that containment spray occurs when containment pressure is high.

Containment Pressure–High signals are initiated from four pressure switches that sense drywell pressure. The Containment Pressure–High Allowable Value lower value is chosen to ensure isolation of containment spray prior to establishing a negative containment pressure; thereby maintaining margin to the negative design pressure, and minimizing operation of the reactor building-to-suppression chamber vacuum breakers, which in turn prevents de-inerting the atmosphere. The upper Allowable Value is chosen to ensure containment spray is not isolated when there may be a need for containment spray.

Four channels of the Containment Pressure–High Function are only required to be OPERABLE in MODES 1, 2, and 3. In MODES 4 and 5, containment spray is not assumed to be initiated, and other administrative controls are adequate to control the valves that this Function isolates (since the systems that the valves are opened for are not required to be OPERABLE in MODES 4 and 5, and are normally not used).

High Pressure Coolant Injection System

3.a. Reactor Vessel Water Level–Low Low (Level 2)

Low RPV water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, the HPCI System is initiated at Level 2 to maintain level above the top of the active fuel. In addition, the Standby Gas Treatment (SGT) System suction valves receive an open signal so that the gland seal exhaust from the HPCI turbine can be treated. Opening of the SGT System suction valves results in automatic starting of SGT. The Reactor Vessel Water Level–Low Low (Level 2) is one of the Functions assumed to be OPERABLE and capable of initiating HPCI during the transients analyzed in Reference 3. Additionally, the Reactor Vessel Water Level–Low Low (Level 2) Function associated with HPCI is assumed to be OPERABLE and capable of initiating HPCI in the analysis of line breaks (Refs. 1

(continued)

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.a. Reactor Vessel Water Level – Low Low (Level 2) (continued)

and 4). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level – Low Low (Level 2) signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel.

The Reactor Vessel Water Level – Low Low (Level 2) Allowable Value is high enough such that for complete loss of feedwater flow, the Reactor Core Isolation Cooling (RCIC) System flow with HPCI assumed to fail will be sufficient to avoid initiation of low pressure ECCS at Reactor Vessel Water Level – Low Low Low (Level 1). The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

The HPCI, RCIC and ATWS-RPT initiation functions (as described in Table 3.3.5.1, Functions 3.a; Table 3.3.5.2, Function 1 and LCO 3.3.4.1.a including SR 3.3.4.1.4, respectively) describe the reactor vessel water level initiation function as "Low Low (Level 2)." The Allowable Values associated with the HPCI and RCIC initiation function is different from the Allowable Value associated with the ATWS-RPT initiation function as the ATWS function has a separate analog trip unit. Nevertheless, consistent with the nomenclature typically used in design documents, the "Low Low (Level2)" is retained in describing each of these three initiation functions.

(F)

Four channels of Reactor Vessel Water Level – Low Low (Level 2) Function are required to be OPERABLE only when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI initiation. Refer to LCO 3.5.1 for HPCI Applicability Bases.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

3.b. Drywell Pressure – High

High pressure in the drywell could indicate a break in the RCPB. The HPCI System is initiated upon receipt of the Drywell Pressure – High Function in order to minimize the possibility of fuel damage. In addition, SGT System suction valves receive an open signal so that the gland seal exhaust from the HPCI turbine can be treated. Opening of the SGT System suction valves results in automatic starting of SGT. The Drywell Pressure – High Function, along with the Reactor Water Level – Low Low (Level 2) Function, is assumed to be OPERABLE and capable of initiating HPCI in the analysis of line breaks (Refs. 1 and 4). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

High drywell pressure signals are initiated from four pressure transmitters that sense drywell pressure. The Allowable Value was selected to be as low as possible to be indicative of a LOCA inside primary containment.

Four channels of the Drywell Pressure – High Function are required to be OPERABLE when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI initiation. Refer to LCO 3.5.1 for the Applicability Bases for the HPCI System.

3.c. Reactor Vessel Water Level – High (Level 8)

High RPV water level indicates that sufficient cooling water inventory exists in the reactor vessel such that there is no danger to the fuel. Therefore, the Level 8 signal is used to trip the HPCI turbine to prevent overflow into the main steam lines (MSLs). The Reactor Vessel Water Level – High (Level 8) Function is not assumed in the accident and transient analyses. It was retained since it is a potentially significant contributor to risk.

Reactor Vessel Water Level – High (Level 8) signals for HPCI are initiated from two level transmitters from the narrow range water level measurement instrumentation. Both Level 8 signals are required in order to trip the HPCI turbine. This ensures that no single instrument failure can preclude HPCI initiation. The Reactor Vessel Water Level – High (Level 8) Allowable Value is chosen to prevent flow from the HPCI System from overflowing into the MSLs. The Allowable

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.c. Reactor Vessel Water Level – High (Level 8) (continued)

Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

Two channels of Reactor Vessel Water Level – High (Level 8) Function are required to be OPERABLE only when HPCI is required to be OPERABLE. Refer to LCO 3.5.1 and LCO 3.5.2 for HPCI Applicability Bases.

3.d. Condensate Storage Tank Level – Low

Low level in the CSTs indicates the unavailability of an adequate supply of makeup water from this normal source.

Normally the suction valve between HPCI and the CSTs is open and, upon receiving a HPCI initiation signal, water for HPCI injection would be taken from the CSTs. However, if the water level in both CSTs falls below a preselected level, the suppression pool suction valves automatically open. Opening the suppression pool suction valves causes the CST suction valve to automatically close. This ensures that an adequate supply of makeup water is available to the HPCI pump. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be full open before the CST suction valve automatically closes. The Function is implicitly assumed in the accident and transient analyses (which take credit for HPCI) since the analyses assume that the HPCI suction source is the suppression pool.

Condensate Storage Tank Level – Low signals are initiated from four level switches (2 per CST). The logic is arranged such that one switch associated with each CST must actuate to cause the suppression pool suction valves to open and the CST suction valve to close. The Condensate Storage Tank Level – Low Function Allowable Value is high enough to ensure (15,600 gallons of water is available in each CST) adequate pump suction head while water is being taken from the CSTs.

Four channels of the Condensate Storage Tank Level – Low Function are required to be OPERABLE only when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI swap to suppression pool source. Refer to LCO 3.5.1 for HPCI Applicability Bases.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

3.e. Suppression Pool Water Level – High

Excessively high suppression pool water could result in the loads on the suppression pool exceeding design values should there be a blowdown of the reactor vessel pressure through the safety/relief valves. Therefore, signals indicating high suppression pool water level are used to transfer the suction source of HPCI from the CSTs to the suppression pool to eliminate the possibility of HPCI continuing to provide additional water from a source outside containment. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be full open before the CST suction valve automatically closes.

This Function is implicitly assumed in the accident and transient analyses (which take credit for HPCI) since the analyses assume that the HPCI suction source is the suppression pool.

Suppression Pool Water Level – High signals are initiated from two level switches. The logic is arranged such that either switch can cause the suppression pool suction valves to open and the CST suction valve to close. The Allowable Value for the Suppression Pool Water Level – High Function is chosen to ensure that HPCI will be aligned for suction from the suppression pool before the water level reaches the point at which suppression pool design loads would be exceeded.

Two channels of Suppression Pool Water Level – High Function are required to be OPERABLE only when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI swap to suppression pool source. Refer to LCO 3.5.1 for HPCI Applicability Bases.

3.f, 3.g. High Pressure Coolant Injection Pump Discharge Flow – Low (Bypass), High Pressure Coolant Injection Pump Discharge Pressure – High (Bypass)

The minimum flow instruments are provided to protect the HPCI pump from overheating when the pump is operating at reduced flow. The minimum flow line valve is opened when low flow is sensed (if the HPCI pump is operating), and the valve is automatically closed when the discharge flow rate is adequate to protect the pump. Pump operation is

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.f, 3.g. High Pressure Coolant Injection Pump Discharge Flow-Low (Bypass), High Pressure Coolant Injection Pump Discharge Pressure-High (Bypass) (continued)

determined by sensing high pump discharge pressure. The High Pressure Coolant Injection Pump Discharge Flow-Low and Pump Discharge Pressure-High Functions are assumed to be OPERABLE and capable of opening the minimum flow valve to protect the pump and closing the minimum flow valve to ensure that the ECCS flow assumed during the transients and accidents analyzed in References 1, 2 and 4 are met. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

One flow switch is used to detect the HPCI System's flow rate and one pressure switch is used to detect the HPCI pump discharge pressure. The logic is arranged such that the flow switch and pressure switch must actuate to cause the minimum flow valve to open. The logic will close the minimum flow valve once the flow closure setpoint is exceeded.

The High Pressure Coolant Injection Pump Discharge Flow-Low Allowable Value is high enough to ensure that pump flow rate is sufficient to protect the pump, yet low enough to ensure that the closure of the minimum flow valve is initiated to allow full flow into the core. The High Pressure Coolant Injection Pump Discharge Pressure-High (Bypass) Allowable Value is less than the pump discharge pressure when the pump is operating in a full flow mode and high enough to avoid any condition that results in a discharge pressure permissive when the HPCI pump is aligned for injection and the pump is not running.

One channel of each Function is required to be OPERABLE when the HPCI is required to be OPERABLE. Refer to LCO 3.5.1 for HPCI Applicability Bases.

(continued)

BASES

APPLICABLE SAFETY ANALYSES LCO, and APPLICABILITY (continued)

Automatic Depressurization System

4.a. 5.a. Reactor Vessel Water Level-Low Low Low (Level 1)

Low RPV water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, ADS receives one of the signals necessary for initiation from this Function. The Reactor Vessel Water Level – Low Low Low (Level 1) is one of the Functions assumed to be OPERABLE and capable of initiating the ADS during the accident analyzed in References 1, 2, and 4. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level – Low Low Low (Level 1) signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level – Low Low Low (Level 1) Function are required to be OPERABLE only when ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Two channels input to ADS trip system A, while the other two channels input to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

The Reactor Vessel Water Level – Low Low Low (Level 1) Allowable Value is chosen to allow time for the low pressure core flooding systems to initiate and provide adequate cooling. The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

4.b, 5.b. Automatic Depressurization System Initiation Timer

The purpose of the Automatic Depressurization System Initiation Timer is to delay depressurization of the reactor vessel to allow the HPCI System time to maintain reactor vessel water level. Since the rapid depressurization caused by ADS operation is one of the most severe transients on the reactor vessel, its occurrence should be limited. By delaying initiation of the ADS Function, the operator is

(continued)

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APPLICABLE SAFETY ANAYLYSES LCO, and APPLICABILITY

4.b, 5.b. Automatic Depressurization System Initiation Timer (continued)

given the chance to monitor the success or failure of the HPCI System to maintain water level, and then to decide whether or not to allow ADS to initiate, to delay initiation further by recycling the timer, or to inhibit initiation permanently. The Automatic Depressurization System Initiation Timer Function is assumed to be OPERABLE for the accident analyses of Reference 1, 2, and 4 that require ECCS initiation and assume failure of the HPCI System.

There are two Automatic Depressurization System Initiation Timer relays, one in each of the two ADS trip systems. The Allowable Value for the Automatic Depressurization System Initiation Timer is chosen so that there is still time after depressurization for the low pressure ECCS subsystems to provide adequate core cooling.

Two channels of the Automatic Depressurization System Initiation Timer Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. (One channel inputs to ADS trip system A, while the other channel inputs to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.c, 5.c. Reactor Vessel Water Level – Low (Level 3)

The Reactor Vessel Water Level – Low (Level 3) Function is used by the ADS only as a confirmatory low water level signal. ADS receives one of the signals necessary for initiation from Reactor Vessel Water Level – Low Low Low (Level 1) signals. In order to prevent spurious initiation of the ADS due to spurious Level 1 signals, a Level 3 signal must also be received before ADS initiation commences.

Reactor Vessel Water Level – Low (Level 3) signals are initiated from two level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. The Allowable Value for Reactor Vessel Water Level – Low (Level 3) is selected to be the same as the RPS Level 3 scram Allowable Value for convenience. Refer to LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," for the Bases

(continued)

BASES

APPLICABLE SAFETY ANALYSES LCO, and APPLICABILITY

4.c, 5.c. Reactor Vessel Water Level – Low (Level 3) (continued)

discussion of this Function. The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 6).

Two channels of Reactor Vessel Water Level – Low (Level 3) Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. One channel inputs to ADS trip system A, while the other channel inputs to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

The Pump Discharge Pressure – High signals from the CS and LPCI pumps are used as permissives for ADS initiation, indicating that there is a source of low pressure cooling water available once the ADS has depressurized the vessel. Pump Discharge Pressure – High is one of the Functions assumed to be OPERABLE and capable of permitting ADS initiation during the events analyzed in References 1, 2, and 4 with an assumed HPCI failure. For these events the ADS depressurizes the reactor vessel so that the low pressure ECCS can perform the core cooling function. This core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Pump discharge pressure signals are initiated from twelve pressure switches, two on the discharge side of each of the six low pressure ECCS pumps. In order to generate an ADS permissive in one trip system, it is necessary that only one pump (both channels for the pump) indicate the high discharge pressure condition. The Pump Discharge Pressure – High Allowable Value is less than the pump discharge pressure when the pump is operating in a full flow mode and high enough to avoid any condition that results in a discharge pressure permissive when the CS and LPCI pumps are aligned for injection and the pumps are not running. The actual operating point of this function is not assumed in any transient or accident analysis. However, this function is indirectly assumed to operate to provide the ADS permissive to depressurize the RCS to allow the ECCS low pressure systems to operate.

(continued)

BASES

APPLICABLE SAFETY ANALYSES LCO, and APPLICABILITY

4.c, 5.c. Reactor Vessel Water Level – Low (Level 3) (continued)

Twelve channels of Core Spray and Low Pressure Coolant Injection Pump Discharge Pressure – High Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Two CS channels associated with CS pump A and four LPCI channels associated with LPCI pumps A and D are required for trip system A. Two CS channels associated with CS pump B and four LPCI channels associated with LPCI pumps B and C are required for trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

ACTIONS

A Note has been provided to modify the ACTIONS related to ECCS instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition discovered to be inoperable or not within limits will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable ECCS instrumentation channels provide appropriate compensatory measures for separate inoperable Condition entry for each inoperable ECCS instrumentation channel.

A.1

Required Action A.1 directs entry into the appropriate Condition referenced in Table 3.3.5.1-1. The applicable Condition referenced in the table is Function dependent. Each time a channel is discovered inoperable, Condition A is entered for that channel and provides for transfer to the appropriate subsequent Condition.

B.1, B.2, and B.3

Required Actions B.1 and B.2 are intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in

(continued)

BASES (continued)

ACTIONS

B.1, B.2, and B.3 (continued)

redundant automatic initiation capability being lost for the feature(s). Required Action B.1 features would be those that are initiated by Functions 1.a, 1.b, 2.a, and 2.b (e.g., low pressure ECCS). The Required Action B.2 system would be HPCI. For Required Action B.1, redundant automatic initiation capability is lost if (a) two or more Function 1.a channels are inoperable and untripped such that both trip systems lose initiation capability, (b) two or more Function 2.a channels are inoperable and untripped such that both trip systems lose initiation capability, (c) two or more Function 1.b channels are inoperable and untripped such that both trip systems lose initiation capability, or (d) two or more Function 2.b channels are inoperable and untripped such that both trip systems lose initiation capability. For low pressure ECCS, since each inoperable channel would have Required Action B.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected portion of the associated system of low pressure ECCS and EDGs to be declared inoperable. However, since channels in both associated low pressure ECCS subsystems (e.g., both CS subsystems) are inoperable and untripped, and the Completion Times started concurrently for the channels in both subsystems, this results in the affected portions in the associated low pressure ECCS and EDGs being concurrently declared inoperable.

For Required Action B.2, redundant automatic HPCI initiation capability is lost if two or more Function 3.a or two or more Function 3.b channels are inoperable and untripped such that trip capability is lost. In this situation (loss of redundant automatic initiation capability), the 24 hour allowance of Required Action B.3 is not appropriate and the HPCI System must be declared inoperable within 1 hour. As noted (Note 1 to Required Action B.1), Required Action B.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the low pressure ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of initiation capability for 24 hours (as allowed by Required Action B.3) is allowed during MODES 4 and 5. There is no similar Note provided for Required Action B.2 since HPCI instrumentation is not required in MODES 4 and 5; thus, a Note is not necessary.

(continued)

BASES (continued)

ACTIONS

B.1, B.2, and B.3 (continued)

Notes are also provided (Note 2 to Required Action B.1 and the Note to Required Action B.2) to delineate which Required Action is applicable for each Function that requires entry into Condition B if an associated channel is inoperable. This ensures that the proper loss of initiation capability check is performed. Required Action B.1 (the Required Action for certain inoperable channels in the low pressure ECCS subsystems) is not applicable to Function 2.e or 2.h, since these Functions provide backup to administrative controls ensuring that operators do not divert LPCI flow from injecting into the core when needed, and do not spray the containment unless needed. Thus, a total loss of Function 2.e or 2.h capability for 24 hours is allowed, since the LPCI subsystems remain capable of performing their intended function.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action B.1, the Completion Time only begins upon discovery that a redundant feature in the same system (e.g., both CS subsystems) cannot be automatically initiated due to inoperable, untripped channels within the same Function as described in the paragraph above. For Required Action B.2, the Completion Time only begins upon discovery that the HPCI System cannot be automatically initiated due to two inoperable, untripped channels for the associated Function in the same trip system. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 7) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action B.3. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue.

(continued)

BASES (continued)

ACTIONS

B.1, B.2, and B.3 (continued)

Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an initiation), Condition H must be entered and its Required Action taken.

C.1 and C.2

Required Action C.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within the same Function result in redundant automatic initiation capability being lost for the feature(s). Required Action C.1 features would be those that are initiated by Functions 1.c, 1.d, 2.c, 2.d, and 2.f (i.e., low pressure ECCS). Redundant automatic initiation capability is lost if either (a) two or more Function 1.c channels are inoperable such that both trip systems lose initiation capability, (b) two Function 1.d channels are inoperable, (c) two or more Function 2.c channels are inoperable such that both trip systems lose initiation capability, (d) two or more Function 2.d channels are inoperable such that both trip systems lose initiation capability, or (e) three Function 2.f channels are inoperable. In this situation (loss of redundant automatic initiation capability), the 24 hour allowance of Required Action C.2 is not appropriate and the feature(s) associated with the inoperable channels must be declared inoperable within 1 hour. Since each inoperable channel would have Required Action C.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected portion of the associated system to be declared inoperable. However, since channels for both low pressure ECCS subsystems are inoperable (e.g., both CS subsystems), and the Completion Times started concurrently for the channels in both subsystems, this results in the affected portions in both subsystems being concurrently declared inoperable. For Functions 1.c, 1.d, 2.c, 2.d, and 2.f, the affected portions are the associated low pressure ECCS pumps. As noted (Note 1), Required Action C.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of automatic initiation capability for 24 hours (as allowed by Required Action C.2) is allowed during MODES 4 and 5.

(continued)

BASES (continued)

ACTIONS

C.1 and C.2 (continued)

Note 2 states that Required Action C.1 is only applicable for Functions 1.c, 1.d, 2.c, 2.d, and 2.f. Required Action C.1 is not applicable to Function 3.c (which also requires entry into this Condition if a channel in this Function is inoperable), since the loss of one channel results in a loss of the Function (two-out-of-two logic). This loss was considered during the development of Reference 7 and considered acceptable for the 24 hours allowed by Required Action C.2.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action C.1, the Completion Time only begins upon discovery that the same feature in both subsystems (e.g., both CS subsystems) cannot be automatically initiated due to inoperable channels within the same Function as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 7) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would either cause the initiation or it would not necessarily result in a safe state for the channel in all events.

D.1, D.2.1 and D.2.2

Required Action D.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in a complete loss of automatic component initiation capability for the HPCI System. Automatic component initiation capability is lost if two Function 3.d channels associated with one CST or two Function 3.e channels are inoperable and untripped. In this

(continued)

BASES (continued)

ACTIONS

D.1, D.2.1, and D.2.2 (continued)

situation (loss of automatic suction swap), the 24 hour allowance of Required Actions D.2.1 and D.2.2 is not appropriate and the HPCI System must be declared inoperable within 1 hour after discovery of loss of HPCI initiation capability. As noted, Required Action D.1 is only applicable if the HPCI pump suction is not aligned to the suppression pool, since, if aligned, the Function is already performed.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action D.1, the Completion Time only begins upon discovery that the HPCI System cannot be automatically aligned to the suppression pool due to two inoperable, untripped channels in the same Function. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 7) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action D.2.1 or the suction source must be aligned to the suppression pool per Required Action D.2.2. Placing the inoperable channel in trip performs the intended function of the channel (shifting the suction source to the suppression pool). Performance of either of these two Required Actions will allow operation to continue. If Required Action D.2.1 or D.2.2 is performed, measures should be taken to ensure that the HPCI System piping remains filled with water. Alternately, if it is not desired to perform Required Actions D.2.1 and D.2.2 (e.g., as in the case where shifting the suction source could drain down the HPCI suction piping), Condition H must be entered and its Required Action taken.

(continued)

BASES (continued)

ACTIONS (continued)

E.1 and E.2

Required Action E.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within the Core Spray and Low Pressure Coolant Injection Pump Discharge Flow–Low Bypass and the Core Spray Pump Discharge Pressure–High Functions result in redundant automatic initiation capability being lost for the feature(s). For Required Action E.1, the features would be those that are initiated by Functions 1.e, 1.f, and 2.g (e.g., low pressure ECCS). Redundant automatic initiation capability is lost if (a) two Function 1.e channels are inoperable, (b) two Function 1.f channels are inoperable, (c) two Function 2.g channels are inoperable, or (d) one Function 1.e channel and one Function 1.f channel associated with different CS pumps are inoperable. Since each inoperable channel would have Required Action E.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected low pressure ECCS pump to be declared inoperable. However, since channels for more than one low pressure ECCS pump are inoperable, and the Completion Times started concurrently for the channels of the low pressure ECCS pumps, this results in the affected low pressure ECCS pumps being concurrently declared inoperable.

In this situation (loss of redundant automatic initiation capability), the 7 day allowance of Required Action E.2 is not appropriate and the subsystem associated with each inoperable channel must be declared inoperable within 1 hour. As noted (Note 1 to Required Action E.1), Required Action E.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of initiation capability for 7 days (as allowed by Required Action E.2) is allowed during MODES 4 and 5. A Note is also provided (Note 2 to Required Action E.1) to delineate that Required Action E.1 is only applicable to low pressure ECCS Functions. Required Action E.1 is not applicable to HPCI Functions 3.f and 3.g since the loss of one channel results in a loss of the Function (one-out-of-one logic). This loss was considered during the development of Reference 7 and considered acceptable for the 7 days allowed by Required Action E.2.

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BASES (continued)

ACTIONS

E.1 and E.2 (continued)

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock."

For Required Action E.1, the Completion Time only begins upon discovery that a redundant feature in the same system (e.g., both CS subsystems) cannot be automatically initiated due to inoperable channels within the same Function as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration of channels.

If the instrumentation that controls the pump minimum flow valve is inoperable, such that the valve will not automatically open, extended pump operation with no injection path available could lead to pump overheating and failure. If there were a failure of the instrumentation, such that the valve would not automatically close, a portion of the pump flow could be diverted from the reactor vessel injection path, causing insufficient core cooling. These consequences can be averted by the operator's manual control of the valve, which would be adequate to maintain ECCS pump protection and required flow. Furthermore, other ECCS pumps would be sufficient to complete the assumed safety function if no additional single failure were to occur. The 7 day Completion Time of Required Action E.2 to restore the inoperable channel to OPERABLE status is reasonable based on the remaining capability of the associated ECCS subsystems, the redundancy available in the ECCS design, and the low probability of a DBA occurring during the allowed out of service time. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would not necessarily result in a safe state for the channel in all events.

F.1 and F.2

Required Action F.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within similar ADS trip system A and B Functions

(continued)

BASES (continued)

ACTIONS

F.1 and F.2 (continued)

result in redundant automatic initiation capability being lost for the ADS. Redundant automatic initiation capability is lost if either (a) one Function 4.a channel and one Function 5.a channel are inoperable and untripped, or (b) one Function 4.c channel and one Function 5.c channel are inoperable and untripped.

In this situation (loss of automatic initiation capability), the 96 hour or 8 day allowance, as applicable, of Required Action F.2 is not appropriate and all ADS valves must be declared inoperable within 1 hour after discovery of loss of ADS initiation capability.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock."

For Required Action F.1, the Completion Time only begins upon discovery that the ADS cannot be automatically initiated due to inoperable, untripped channels within similar ADS trip system Functions as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 8 days has been shown to be acceptable (Ref. 7) to permit restoration of any inoperable channel to OPERABLE status if both HPCI and RCIC are OPERABLE. If either HPCI or RCIC is inoperable, the time is shortened to 96 hours. If the status of HPCI or RCIC changes such that the Completion Time changes from 8 days to 96 hours, the 96 hours begins upon discovery of HPCI or RCIC inoperability. However, the total time for an inoperable, untripped channel cannot exceed 8 days. If the status of HPCI or RCIC changes such that the Completion Time changes from 96 hours to 8 days, the "time zero" for beginning the 8 day "clock" begins upon discovery of the inoperable, untripped channel. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped

(continued)

BASES (continued)

ACTIONS

G.1 and G.2 (continued)

condition per Required Action F.2. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an initiation), Condition H must be entered and its Required Action taken.

Required Action G.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within similar ADS trip system Functions result in automatic initiation capability being lost for the ADS. Automatic initiation capability is lost if either (a) one Function 4.b channel and one Function 5.b channel are inoperable, or (b) a combination of Function 4.d, 4.e, 5.d, and 5.e channels are inoperable such that channels associated with five or more low pressure ECCS pumps are inoperable.

In this situation (loss of automatic initiation capability), the 96 hour or 8 day allowance, as applicable, of Required Action G.2 is not appropriate, and all ADS valves must be declared inoperable within 1 hour after discovery of loss of ADS initiation capability.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action G.1, the Completion Time only begins upon discovery that the ADS cannot be automatically initiated due to inoperable channels within similar ADS trip system Functions as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 8 days has been shown to be acceptable (Ref. 7) to permit restoration of any inoperable channel to OPERABLE status if both HPCI and RCIC are OPERABLE (Required Action G.2). If either HPCI or RCIC is inoperable, the time shortens to 96 hours. If the status of

(continued)

BASES (continued)

ACTIONS

G.1 and G.2 (continued)

HPCI or RCIC changes such that the Completion Time changes from 8 days to 96 hours, the 96 hours begins upon discovery of HPCI or RCIC inoperability. However, the total time for an inoperable channel cannot exceed 8 days. If the status of HPCI or RCIC changes such that the Completion Time changes from 96 hours to 8 days, the "time zero" for beginning the 8 day "clock" begins upon discovery of the inoperable channel. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would not necessarily result in a safe state for the channel in all events.

H.1

With any Required Action and associated Completion Time not met, the associated feature(s) may be incapable of performing the intended function, and the supported feature(s) associated with inoperable untripped channels must be declared inoperable immediately.

SURVEILLANCE REQUIREMENTS

As noted in the beginning of the SRs, the SRs for each ECCS instrumentation Function are found in the SRs column of Table 3.3.5.1-1.

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours as follows: (a) for Functions 3.c, 3.f, and 3.g; (b) for Functions other than 3.c, 3.f, and 3.g provided the associated Function or redundant Function maintains ECCS initiation capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Ref. 7) assumption of the average time required to perform channel surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the ECCS will initiate when necessary.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.1.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument

channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or something even more serious. A CHANNEL CHECK guarantees that undetected outright channel failure is limited to 12 hours; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Channel agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the instrument has drifted outside its limit.

The Frequency is based upon operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the channels required by the LCO.

SR 3.3.5.1.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. A successful test of the required contacts(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

TSTF-205-A3

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.5.1.2 (continued)

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based on the reliability analyses of Reference 7.

SR 3.3.5.1.3 and SR 3.3.5.1.5

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency of SR 3.3.5.1.3 is based upon the assumption of a 92 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

The Frequency of SR 3.3.5.1.5 is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.5.1.4

Calibration of trip units provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.5.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analyses. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than the setting accounted for in the appropriate setpoint methodology.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.5.1.4 (continued)

The Frequency of 184 days is based on the reliability, accuracy, and lower failure rates of the associated solid-state electronic Analog Transmitter/Trip System components.

SR 3.3.5.1.6

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.5.1, LCO 3.5.2, LCO 3.8.1, and LCO 3.8.2 overlaps this Surveillance to complete testing of the assumed safety function.

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

REFERENCES

1. UFSAR, Section 6.5.
2. UFSAR, Section 14.6.
3. UFSAR, Section 14.5.
4. NEDC-31317P, Revision 3, James A. FitzPatrick Nuclear Power Plant, SAFER/GESTR-LOCA, Loss of Coolant Accident Analysis, March 1997.
5. 10 CFR 50.36(c)(2)(ii).
6. Drawing 11825-5.01-15D, Rev. D, Reactor Assembly Nuclear Boiler, (GE Drawing 919D690BD).
7. NEDC-30936P-A, BWR Owners' Group Technical Specification Improvement Methodology (With Demonstration for BWR ECCS Actuation Instrumentation), Part 2, December 1988.

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IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.2

Reactor Core Isolation Cooling (RCIC) System Instrumentation

MARKUP OF CURRENT TECHNICAL SPECIFICATIONS (CTS)

DISCUSSION OF CHANGES (DOCs) TO THE CTS

NO SIGNIFICANT HAZARDS CONSIDERATION (NSHC) FOR LESS RESTRICTIVE CHANGES

MARKUP OF NUREG-1433, REVISION 1, SPECIFICATION

JUSTIFICATION FOR DIFFERENCES (JFDs) FROM NUREG-1433, REVISION 1

MARKUP OF NUREG-1433, REVISION 1, BASES

JUSTIFICATION FOR DIFFERENCES (JFDs) FROM NUREG-1433, REVISION 1, BASES

RETYPED PROPOSED IMPROVED TECHNICAL SPECIFICATIONS (ITS) AND BASES

JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.2

Reactor Core Isolation Cooling (RCIC) System Instrumentation

MARKUP OF CURRENT TECHNICAL SPECIFICATIONS (CTS)

Specification 3.3.5.2

A1

RCIC System Instrumentation

3.2 (cont'd)	4.2 (cont'd)
[3.3.5.2] B. Core and Containment Cooling Systems - Initiation and Control [3.3.5.2]	B. Core and Containment Cooling Systems - Initiation and Control
The limiting conditions for operation for the instrumentation that initiates or controls the RCIC 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. [LCO 3.3.5.2 Applicability] 3.3.5.2-1	[SR Table Note 1] 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. MODE 1, MODE 2 and 3 with reactor steam dome pressure > 150 psig. A2
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.	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. See ITS: 3.3.2.1
D. Radiation Monitoring Systems - Isolation and Initiation Functions Refer to the Radiological Effluent Technical Specifications (Appendix B).	D. Radiation Monitoring Systems - Isolation and Initiation Functions Refer to the Radiological Effluent Technical Specifications (Appendix B). A8

Table 3.3.5.2-1 Reactor Core Isolation Cooling System Instrumentation

Specification 3.3.5.2 (A1)

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 (LA1)	Trip Function	Allowable Value (A9) / Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems (Required Channels per Function)	Remarks
1 [ACTION B, E]	2 (Notes 1, 11) [SR Table Note 2]	Reactor Low-Low Water Level (Level 2)	≥ 126.5 in. above TAF (LA4)	4 (HPCI & RCIC) See ITS: 3.3.5.1	Initiates HPCI, RCIC, and SGTS. (LA2)
2	2 (Notes 2, 3, 11)	Reactor Low-Low-Low Water Level	≥ 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 (Notes 4, 12)	Reactor High Water Level	≤ 222.5 in. above TAF	2 (Note 16)	Trips HPCI turbine.
2 [ACTION C, E]	2 (LA1) (Notes 4, 12) [SR Table Note 2]	Reactor High Water Level [Level 8]	≤ 228.5 in. above TAF (LA4) 222.4 (M4)	2 (Note 16) (LA1)	Closes RCIC steam supply valve. (LA2) (E)
5	1 (Notes 5, 11)	Reactor Low Level (inside shroud)	≥ 0 in. above TAF	2	Prevents inadvertent operation of containment spray during accident condition.
6	2 (Notes 5, 11)	Containment High Pressure	1 < p < 2.7 psig	4	Prevents inadvertent operation of containment spray during accident condition.

See ITS: 3.3.5.1

add Function 4 (M2)

Table 3.3.5.2-1 Reactor Core Isolation Cooling System Instrumentation

Specification 3.3.5.2

A1

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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	Trip Function	Trip Level Setting	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Remarks
13	1 (Notes 8, 11)	Auto Blowdown Timer	≤ 134 sec.	2	Initiates ADS (if not inhibited by ADS override switches).
14	4 (Notes 8, 11)	RHR (LPCI) Pump Discharge Pressure Interlock	125 psig ± 20 psig	8	Permits ADS actuation.
15	2 (Notes 8, 11)	Core Spray Pump Discharge Pressure Interlock	100 psig ± 10 psig	4	Permits ADS actuation.
16	2 (Notes 9, 11)	Condensate Storage Tank Low Level	≥ 59.5 in. above tank bottom (= 15,600 gal. avail)	4 (Note 16)	Transfers RCIC pump suction to suppression chamber.
17	2 (Notes 9, 11)	Condensate Storage Tank Low Level	≥ 59.5 in. above tank bottom (= 15,600 gal. avail)	2 (Note 16)	Transfers HPCI pump suction to suppression chamber.
18	2 (Notes 9, 11)	Suppression Chamber High Level	≤ 6 in. above normal level	2 (Note 16)	Transfers HPCI pump suction to suppression chamber.

See ITS 3.3.5.1

Amendment No. ~~19, 48, 84, 134, 227, 250~~, 263

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Revision F

Specification 3.3.5.2

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TABLE 3.2-2

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

A1

A3 add ACTION Table Note

A4 add ACTION A

See ITS: 3.3.5.1

[Function 1] NOTES FOR TABLE 3.2-2

[ACTION B] 1. With one or more channels inoperable for HPCI and/or RCIC:

RCIC

[RA B.1] A. Within one hour from discovery of loss of system initiation capability, declare the affected system inoperable, and

[RA B.2] B. Within 24 hours, place channel in trip.

[ACTION E] C. If required actions and associated completion times of actions A or B are not met, immediately declare the affected RCIC system inoperable.

2. With one or more channels inoperable for Core Spray and/or RHR:

A. Within one hour from discovery of loss of initiation capability for feature(s) in both divisions, declare the supported features inoperable, and

B. Within 24 hours, place channel in trip.

C. If required actions and associated completion times of actions A or B are not met, immediately declare associated supported feature(s) inoperable.

See ITS: 3.3.5.1 3.3.6.1

3. With one or more channels inoperable for ADS:

A. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS inoperable, and

B. Within 96 hours from discovery of an inoperable channel concurrent with HPCI or RCIC inoperable, place channel in trip, and

C. Within 8 days, place channel in trip.

D. If required actions and associated completion times of actions A, B, or C are not met, immediately declare ADS inoperable.

See ITS 3.3.5.1

Specification 3.3.5.2

A1

TABLE 3.2-2

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

See ITS 3.3.5.1

[Function 2]

[ACTION C] → [4.]	With one or more channels inoperable for HPCI and/or RCIC:	
[RA C.1] → [A.]	Within 24 hours, restore channel to operable status.	
[ACTION E] [B.]	If required action and associated completion time of action A is not met, immediately declare RCIC system inoperable.	
5.	With one or more channels inoperable for containment spray:	
A.	Within 24 hours, place channel in trip.	
B.	If required action and associated completion time of action A is not met, immediately declare associated supported feature(s) inoperable.	
6.	With one or more channels inoperable for injection permissive and/or recirculation discharge valve permissive:	
A.	Within one hour from discovery of loss of initiation capability for feature(s) in both divisions, declare the supported features inoperable, and	
B.	Within 24 hours, restore channel to operable status.	
C.	If required actions and associated completion times of actions A or B are not met, immediately declare associated supported feature(s) inoperable.	

See ITS: 3.3.5.1

Specification 3.3.5.2

A1

TABLE 3.3.5.2

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

7. A. With inoperable start timers in two or more ECCS subsystems, immediately declare the associated ECCS subsystems inoperable.

   B. With both start timers in the same LPCI subsystem inoperable, immediately rack out the circuit breakers for the affected RHR pumps and declare that LPCI subsystem inoperable.

   C. With one start timer inoperable, restore the timer to an operable status within 24 hours, or immediately rack out the circuit breaker for the affected pump and declare the affected pump inoperable.

8. With one or more channels inoperable for ADS:

   A. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS inoperable, and

   B. Within 96 hours from discovery of an inoperable channel concurrent with HPCI or RCIC inoperable, restore channel to operable status, and

   C. Within 8 days, restore channel to operable status.

   D. If required actions and associated completion times of actions A, B, or C are not met, immediately declare ADS inoperable.

See ITS 3.3.5.1

[Function 3] [ACTION D]

9. With one or more channels inoperable for HPCI and/or RCIC:

[RAD.1] A. Within one hour from discovery of loss of system initiation capability while suction for the affected system is aligned to the CST, declare the affected system inoperable, and

[RAD 2.1.a, 2.2.2] B. Within 24 hours, place channel in trip or align suction for the affected system to the suppression pool.

[ACTION E] C. If required actions and associated completion times of actions A or B are not met, immediately declare the affected system inoperable.

R.A. D.1 Note

Specification 3.3.5.2

(A) 1

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TABLE 3.2-2

CORE AND CONTAINMENT COOLING SYSTEM INITIATION AND CONTROL INSTRUMENTATION OPERABILITY REQUIREMENTS

10. With one or more channels inoperable for 4kV Emergency Bus Undervoltage Trip Functions: (See ITS: 3.3.8.1)

    A. Within one hour, place channel in trip.

    B. If required action and associated completion time of action A is not met, immediately declare the affected Emergency Diesel Generator System inoperable.

[SR Table Note 2] 11. 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 or the redundant Trip Function maintains ECCS (RCIC) initiation capability.

[SR Table Note 2] 12. 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.

13. 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.

14. A secondary voltage of 110.6 volts corresponds to approximately 93% of 4160 volts on the bus. (See ITS: 3.3.8.1)

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

16. ~~Only one trip system.~~ (LA 1)

Specification 3.3.5.2

Table 3.3.5.2-1
RCIC System
Instrumentation

JAFNPP

A1

TABLE 4.2-2

CORE AND CONTAINMENT COOLING SYSTEM INSTRUMENTATION
TEST AND CALIBRATION REQUIREMENTS

A5

Function

Instrument Channel		Instrument Functional Test	Calibration Frequency	Instrument Check (Note 4)
[1][2] 1)	Reactor Water Level	[SR3.3.5.2.2] A6 Q (Note 5) 92 days	[SR3.3.5.2.4] SA 184 days / [SR3.3.5.2.5] R (Note 15) 24 months	[SR3.3.5.2.1] D 12 hours M1
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
See ITS 3.3.5.1 [3] 6)	HPCI & RCIC Suction Source Levels	Q A7	[SR3.3.5.2.3] R 92 days	NA
7)	4kV Emergency Bus Under-Voltage (Loss-of-Voltage, Degraded Voltage LOCA and non-LOCA) Relays and Timers.	R	R	NA

See ITS 3.3.8.1

NOTE: See notes following Table 4.2-5.

A1

add Function 4 M2

Amd 263

Specification 3.3.5.2

A1

~~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.

See ITS: 3.4.5

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.

See ITS: 3.3.2.1

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

A5

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.

A6

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

See ITS: 3.3.2.1

7. Simulated automatic actuation shall be performed once per 24 months.

See ITS: 3.5.1, 3.6.1.3, 3.6.4.2, 3.6.4.3

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.

See ITS: 3.3.6.1

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

See ITS: 3.3.5.1, 3.3.6.1, 3.3.6.2

10. (Deleted)

11. Perform a calibration once per 24 months using a radiation source. Perform an instrument channel alignment once every 3 months using a current source.

See ITS 3.3.6.1, 3.3.7.2

~~12. (Deleted)~~

~~13. (Deleted)~~

~~14. (Deleted)~~

[SR 3.3.5.2.5]

15. Sensor calibration once per 24 months. Master/slave trip unit calibration once per 6 months (184 days) [SR 3.3.5.2.4]

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

See ITS: 3.3.6.1

Specification 3.5.2 (A1)

3.5 (cont'd)

4.5 (cont'd)

Item	Frequency
d. Flow Rate Test - The RCIC pump shall deliver at least 400 gpm against a system head corresponding to a reactor vessel pressure of 1195 psig to 150 psig.	Once per 92 Days
e. Testable Check Valves	Tested for operability any time the reactor is in the cold condition exceeding 48 hours, if operability tests have not been performed during the preceding 92 days.
f. Logic System Functional Test	Once per 24 Months

See ITS: 3.5.3

SR 3.3.5.2.6

See ITS: 3.5.3

2. When it is determined that the RCIC System is inoperable at a time when it is required to be operable, the HPCI System shall be verified to be operable immediately and daily thereafter.

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IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.2

Reactor Core Isolation Cooling (RCIC) System Instrumentation

DISCUSSION OF CHANGES (DOCs) TO THE CTS

DISCUSSION OF CHANGES
ITS: 3.3.5.2 - RCIC SYSTEM INSTRUMENTATION

ADMINISTRATIVE CHANGES

A1 In the conversion of the James A. FitzPatrick Nuclear Power Plant (JAFNPP) Current Technical Specification (CTS) to the proposed plant specific Improved Technical Specifications (ITS) certain wording preferences or conventions are adopted which do not result in technical changes. Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the conventions in NUREG-1433, "Standard Technical Specifications, General Electric Plants, BWR/4", Revision 1 (i.e., Improved Standard Technical Specifications (ISTS)).

A2 CTS 3.2.B requires the Applicability of the RCIC Instrumentation to be Operable whenever the RCIC system is required to be Operable as specified in CTS 3.5. CTS 3.5.E.1 requires the RCIC system to be Operable whenever there is irradiated fuel in the reactor vessel, the reactor pressure is greater than 150 psig and the reactor coolant temperature is greater than 212°F. The ITS 3.3.5.2 Applicability is in MODE 1, and in MODES 2 and 3 with reactor steam dome pressure > 150 psig. Since the proposed requirements are consistent with the current requirements in CTS 3.5.E.1, this change is considered administrative. This change is consistent with NUREG-1433, Revision 1.

A3 This change proposes to add a Note to CTS Table 3.2-2 which allows separate Condition entry for each channel. The Note is reflected in ITS 3.3.5.2 ACTIONS Table ("Separate Condition entry is allowed for each channel."). This change provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3 "Completion Times," this Note provides direction consistent with the intent of the current Required Actions for inoperable RCIC channels or trip systems. It is intended that each Required Action be applied regardless of it having been applied previously for other inoperable channels, trip systems or functions.

A4 ITS 3.3.5.2 ACTION A is proposed to be added to CTS 3.2-2. The proposed format for this Specification includes this ACTION to direct entry into the appropriate Conditions referenced in Table 3.3.5.2-1 when one or more channels are inoperable. The ACTION has been added since not all Functions have the same ACTIONS. This change represents a presentation preference only and is, therefore, considered administrative. As such, the Condition merely directs the operator where to look for any required Actions for the inoperable channels(s). Therefore, the new ACTION does not add any new or different requirements from the CTS. Therefore the proposed change is considered administrative, and is consistent with NUREG-1433, Revision 1.

ADMINISTRATIVE CHANGES

A5 CTS Table 4.2-2, Note 4 states that "instrument checks are not required when these instruments are not required to be operable or are tripped." This explicit requirement is not retained in ITS 3.3.5.2. This Note is not needed in ITS 3.3.5.2 since these allowances are included in ITS SR 3.0.1. ITS SR 3.0.1 states that "SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR." The SR also states that "surveillances do not have to be performed on inoperable equipment or variables outside specified limits." When equipment is declared inoperable, the Actions of this LCO may require the equipment to be placed in the trip condition within a certain time period. In this condition, the equipment is still inoperable but has accomplished the required safety function. Therefore the allowances in SR 3.0.1 and the associated actions provide adequate guidance with respect to when the associated surveillances are required to be performed and this explicit requirement is not retained. Therefore, the change is considered administrative, and is consistent with NUREG-1433, Revision 1.

A6 CTS Table 4.2-2, Note 5 states that "This instrumentation is exempt from the functional test definition. The functional test will consist of injecting a simulated electrical signal into the measurement channel." This explicit allowance is not retained in ITS 3.3.5.2 since it is duplicative of the current and proposed CHANNEL FUNCTIONAL TEST definition in ITS Chapter 1.0. Since this change does not change any technical requirements, it is considered administrative, and is consistent with NUREG-1433, Revision 1.

A7 CTS Table 4.2-2 (Item No. 6) requires the RCIC Suction Source Level Channels to be calibrated and functional tested on a quarterly bases. The explicit requirement to perform a channel functional test is not retained in the ITS. ITS 3.3.5.2 will only require a CHANNEL CALIBRATION to be performed on a 92 day Frequency. Since the current and proposed definition of channel calibration includes the requirements of a channel functional test this explicit requirement is not necessary. Therefore since there are not changes to the actual testing requirements, this change is considered administrative and is consistent with the format of NUREG-1433, Revision 1.

A8 CTS 3.2.D and 4.2.D provide a cross reference to the Radiological Effluent Technical Specification (Appendix B) for those Radiation Monitoring Systems which provide an Isolation and Initiation Function. Since CTS 3.2.D and 4.2.D do not prescribe any specific requirements and since the changes to the current requirements in Appendix B are

ADMINISTRATIVE CHANGES

A8 (continued)

discussed in the Discussion of Changes within this submittal, this cross reference has been deleted. This change is considered administrative since it simply eliminates a cross-reference. This change is consistent with NUREG-1433, Revision 1.

A9 CTS Table 3.2-2 includes a "Trip Level Setting" column. The setting for each reactor core isolation cooling function is listed in this column (along with other core and containment system functions). In the ITS, the RCIC System Instrumentation Functions are included in Table 3.3.5.2-1 along with its associated "Allowable Value". The CTS "trip level settings" are considered the "Allowable Values" as described in the ITS since the instrumentation is considered inoperable if the value is exceeded when either the CTS or the ITS is applicable. A detailed explanation of trip setpoints, allowable values and analytical limits as they relate to instrumentation uncertainties is provided below.

Trip setpoints are those predetermined values of output at which an action is expected to take place. The setpoints are compared to the actual process parameter and when the measured output value of the process parameter exceeds the setpoint in either the increasing or decreasing direction, the associated device (e.g., trip unit) changes state.

The trip setpoints are specified in the setpoint calculations, are derived from the analytical limits and account for all worst case applicable instrumentation uncertainties (e.g., drift, process effects, calibration uncertainties, and severe environmental effects as appropriate). The trip setpoints derived in this manner provide adequate protection because all expected uncertainties are accounted for in the setpoint calculations.

The setpoints specified in the setpoint calculations are selected to ensure that the actual field trip setpoints do not exceed the ITS Allowable Values (i.e., the CTS "trip level settings") between successive CHANNEL CALIBRATIONS. The CTS "trip settings" and the "ITS Allowable Values" are both the TS limit values that are placed on the actual field setpoints. The Allowable Values are derived from the trip setpoints by accounting for normal effects that would be seen during periodic surveillance or calibration. These effects are instrumentation uncertainties observed during normal operation (e.g., drift and calibration uncertainties). Accordingly, the ITS Allowable Values include all applicable instrument channel and measurement uncertainties.

LAR 3.3.5.2-1

ADMINISTRATIVE CHANGES

A9 (continued)

A channel is inoperable if its actual field trip setpoint is not within its required ITS Allowable Value.

The analytical limits are derived from the limiting values of the process parameters obtained from the safety analysis or other appropriate documents.

These "Trip Level Settings" or "Allowable Values" have been established consistent with the NYPA Engineering Standards Manual, IES-3A, "Instrument Loop Accuracy and Setpoint Calculation Methodology." The methodology used to determine the "Allowable Values" are consistent with the methodology discussed in ISA-S67.04-1994, Part II, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation." This change revises the terminology used in the CTS from "Trip Level Setting" to "Allowable Values". Since the instrumentation will be declared inoperable at the same numerical value, this change is considered administrative. This change is consistent with NUREG-1433, Revision 1.

RAI 3.3.5.1-1

A10 CTS Table 3.2-2 Item 16 specifies that the Condensate Storage Tank Low Level setting must be $\geq$ 59.5 inches above the tank bottom. ITS Table 3.3.5.2-1 Function 3 does not specify the reference point since it is implied by the associated name of the Function (Condensate Storage Tank Level), however, the current setting is maintained as the Allowable Value (see A9). This change is considered administrative since there is no technical change in the current requirement. This change is consistent with the format of NUREG-1433, Revision 1.

TECHNICAL CHANGES - MORE RESTRICTIVE

M1 CTS Table 4.2-2 presently contain daily requirements for performing instrument checks on reactor water level instrumentation. Proposed SR 3.3.5.2.1 requires that these Channel Checks be performed every 12 hours. Performing these checks on a more frequent basis adds to the ability to verify that the channels are operable, and therefore, does not represent a change that could affect safety. Since the change is

TECHNICAL CHANGES - MORE RESTRICTIVE

M1 (continued)

requiring a surveillance to be performed on a more frequent basis, the change is considered more restrictive. The proposed change is consistent with NUREG-1433, Revision 1.

M2 A new Function has been added to the CTS Table 3.2-2 and 4.2-2 that requires one channel of RCIC Manual Initiation to be Operable consistent with the Applicability of all other RCIC Instrumentation requirements in the current Specification. In addition, ITS SR 3.3.5.2.6 (LOGIC SYSTEM FUNCTIONAL TEST) and ACTION C are applicable to this Function. This Function is not assumed in any accident or transient analyses in the UFSAR, however the Function is included for overall redundancy and diversity of the RCIC function.

M3 CTS Table 3.2-2 Item No. 16 (Condensate Storage Tank Level) requires two channels to be Operable. For the same Function in the ITS (ITS 3.3.5.2-1 Function 3) the required number of channels has been increased to 4 channels. The JAFNPP design includes two condensate storage tanks. Both tanks provide suction to the RCIC pump and each tank is instrumented with two channels of Condensate Storage Tank Level – Low. At least one channel in each tank must indicate low water level for the automatic transfer logic to function to initiate the transfer of the suction source from the CSTs to the suppression pool. Therefore, to ensure that no single instrument failure can preclude RCIC swap to the suppression pool source four channels of Condensate Storage Tank Level – Low are proposed to be included in the ITS. The addition of new requirements constitutes a more restrictive change.

M4 This change replaces the setpoint or Allowable Value (A9) in CTS Table 3.2-2, Item 4, Reactor High Water Level $\leq$ 222.5 inches with $\leq$ 222.4 inches (ITS Table 3.3.5.2-1, Function 2, Reactor Vessel Water Level - High, Level 8). The Allowable Values (to be included in the Technical Specifications) and the Trip Setpoints (to be included in plant procedures) have been established consistent with the NYPA Engineering Standards Manual, IES-3A, "Instrument Loop Accuracy and Setpoint Calculation Methodology." The methodology used to determine the "Allowable Values" are consistent with the methodology discussed in ISA-S67.04-1994, Part II, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation." The proposed value will ensure the most limiting requirement is met. All design limits, applied in the methodologies, were confirmed as ensuring that applicable design requirements of the associated system is maintained.

(F)

TECHNICAL CHANGES - LESS RESTRICTIVE (GENERIC)

LA1 The details of the "Minimum No. of Operable Instrument Channels Per Trip System" column of Table CTS 3.2-2 and Note 16 (only one trip system) is proposed to be relocated to the Bases. The requirements in LCO 3.3.5.2, that the RCIC instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE and the definition of OPERABILITY suffice. ITS Table 3.3.5.2-1 will specify the "Required Channels per Function" which is identical to the current requirements. The details of the logic configuration and the number of trip systems is included in the Bases. As such, these details are not required to be in the ITS to provide adequate protection of public health and safety. Changes to the Bases will be controlled by the provisions of the Bases Control Program described in Chapter 5 of the ITS.

LA2 The details (i.e., closes, RCIC steam supply valve, etc) in the "Remarks" column of CTS Table 3.2-2 are proposed to be relocated to the Bases. These details are not required to be included in the Specification to ensure Operability. The requirements in LCO 3.3.5.2 that the RCIC System instrumentation for each Function shall be OPERABLE and the ITS definition of OPERABILITY suffice. As such, these details are not required to be in the ITS to provide adequate protection of public health and safety. Changes to the Bases will be controlled by the provisions of the Bases Control Program described in Chapter 5 of the ITS.

LA3 The details in the CTS Table 3.2-2 "Trip Level Setting" column for Function 16 (Condensate Storage Tank Low Level) that the setting is equivalent to 15,600 gallons available is proposed to be relocated to the Bases. The requirement in ITS LCO 3.3.5.2 that the RCIC System instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE, the Allowable Value for Function 3 (Condensate Storage Tank Level - Low) of > 59.5 inches above the tank bottom, and the specified Surveillances will ensure that the associated instrumentation remains OPERABLE. Therefore the detail is not necessary and has been relocated to the Bases. As such, these details are not required to be in the ITS to provide adequate protection of public health and safety. Changes to the Bases will be controlled by the provisions of the Bases Control Program described in Chapter 5 of the ITS.

LA4 The detail in CTS Table 3.2-2 that the Trip Level Setting of the Reactor Water Level Trip Functions (Items 1 and 4) is referenced from the Top of Active Fuel (TAF) is proposed to be relocated to the Bases. CTS 1.0.Z definition specifies that the Top of Active Fuel, corresponding to the top of the enriched fuel column of each fuel bundle, is located 352.5 inches above vessel zero, which is the lowest point in the inside bottom

TECHNICAL CHANGES - LESS RESTRICTIVE (GENERIC)

LA4 (continued)

of the reactor pressure vessel. (See General Electric drawing No. 919D690BD). These details are also proposed to be relocated to the Bases. The requirement in ITS LCO 3.3.5.2 that the ECCS instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE, the requirements in the Table including the Allowable Value for Functions 1 and 2, the definition of Operability, the proposed Actions, and Surveillance Requirements are adequate to ensure the instrumentation is properly maintained. In addition, the Bases includes a statement that the Allowable Value corresponds to a level of water 352.56 inches above the lowest point in the inside bottom of the reactor pressure vessel and also corresponds to the top of a 144 inch fuel column. As such, these details are not required to be in the ITS to provide adequate protection of public health and safety. Changes to the Bases will be controlled by the provisions of the Bases Control Program described in Chapter 5 of the ITS.

TECHNICAL CHANGES - LESS RESTRICTIVE (SPECIFIC)

None

TECHNICAL CHANGES - RELOCATIONS

None

JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.2

Reactor Core Isolation Cooling (RCIC) System Instrumentation

NO SIGNIFICANT HAZARDS CONSIDERATION (NSHC) FOR LESS RESTRICTIVE CHANGES

NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS: 3.3.5.2 - RCIC SYSTEM INSTRUMENTATION

TECHNICAL CHANGES - LESS RESTRICTIVE (SPECIFIC)

There are no plant specific less restrictive changes identified for this Specification.

JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.2

Reactor Core Isolation Cooling (RCIC) System Instrumentation

MARKUP OF NUREG-1433, REVISION 1
SPECIFICATION

3.3 INSTRUMENTATION

[3.2.6] 3.3.5.2 Reactor Core Isolation Cooling (RCIC) System Instrumentation

[3.2.5] LCO 3.3.5.2 The RCIC System instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE.

[3.2.6] APPLICABILITY: MODE 1,
MODES 2 and 3 with reactor steam dome pressure > [150] psig. (DB1)

ACTIONS

[A3] NOTE
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
[A4] A. One or more channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.2-1 for the channel.	Immediately
[Table 3.2-2 Note 1] B. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	B.1 Declare RCIC System inoperable. AND B.2 Place channel in trip.	1 hour from discovery of loss of RCIC initiation capability (automatic, DA3.) 24 hours
[Table 3.2-2 Note 4] C. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	C.1 Restore channel to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. As required by Required Action A.1 and referenced in Table 3.3.5.2-1. [Table 3.2-2 Note 9]	D.1	--------NOTE-------- Only applicable if RCIC pump suction is not aligned to the suppression pool. ---------- Declare RCIC System inoperable.	1 hour from discovery of loss of RCIC initiation capability
	AND		
	D.2.1	Place channel in trip.	24 hours
	OR		
	D.2.2	Align RCIC pump suction to the suppression pool.	24 hours
[Table 3.2-2 Note 1 Note 4 Note 9] E. Required Action and associated Completion Time of Condition B, C, or D not met.	E.1	Declare RCIC System inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTES----------

[4.2.B.] 1. Refer to Table 3.3.5.2-1 to determine which SRs apply for each RCIC Function.

[Table 3.2-2 Note 11,12] 2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 2 (4) and 5; and (b) for up to 6 hours for Functions 1, 3, and 4 provided the associated Function maintains RCIC initiation capability. DB2

SURVEILLANCE		FREQUENCY
[Table 4.2-2] SR 3.3.5.2.1	Perform CHANNEL CHECK.	12 hours
[Table 4.2-2] SR 3.3.5.2.2	Perform CHANNEL FUNCTIONAL TEST.	~~92~~ 184 days CLB1
[Table 4.2-2] SR 3.3.5.2.3 (4)	Calibrate the trip units.	~~92~~ 184 days CLB2
[Table 4.2-2] SR 3.3.5.2.4 (3)	Perform CHANNEL CALIBRATION.	92 days
[Table 4.2-2] SR 3.3.5.2.5	Perform CHANNEL CALIBRATION.	~~18~~ 24 months DB3
[Table 4.2-2] SR 3.3.5.2.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months CLB3

Table 3.3.5.2-1 (page 1 of 1)
Reactor Core Isolation Cooling System Instrumentation

FUNCTION	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level – Low Low, Level 2	[2]	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3 SR 3.3.5.2.5 SR 3.3.5.2.6	≥ [-47] inches
2. Reactor Vessel Water Level – High, Level 8	[2]	C	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3 SR 3.3.5.2.5 SR 3.3.5.2.6	≤ [156.5] inches
3. Condensate Storage Tank Level – Low	[1]	D	[SR 3.3.5.2.1] [SR 3.3.5.2.3] SR 3.3.5.2.6	≥ [10.5] inches
4. Suppression Pool Water Level – High	[2]	D	[SR 3.3.5.2.1] SR 3.3.5.2.2 [SR 3.3.5.2.3] SR 3.3.5.2.5 SR 3.3.5.2.6	≤ [151] inches
5. Manual Initiation	[1]	C	SR 3.3.5.2.6	NA

JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.2

Reactor Core Isolation Cooling (RCIC) System Instrumentation

JUSTIFICATION FOR DIFFERENCES (JFDs)
FROM NUREG-1433, REVISION 1

JUSTIFICATION FOR DIFFERENCES FROM NUREG-1433, REVISION 1
ITS: 3.3.5.2 - RCIC SYSTEM INSTRUMENTATION

RETENTION OF EXISTING REQUIREMENT (CLB)

CLB1 The brackets have been removed for the Frequency of ITS SR 3.3.5.2.2 and the 92 day Frequency retained consistent with CTS Table 4.2-2 and with the reliability analysis of GENE-770-06-02-A.

CLB2 ISTS SR 3.3.5.2.3 has been renumbered as SR 3.3.5.2.4. The SR Frequency has been modified to be consistent with the frequency in CTS Table 4.2-2 Note 15 and approved in JAFNPP Technical Specification Amendment No. 89.

CLB3 The brackets have been removed from the Frequency of ITS SR 3.3.5.2.6 (LSFT) and the Frequency has been extended from 18 months to 24 months consistent with CTS Table 4.2-2. This Frequency is consistent with the JAFNPP fuel cycle.

PLANT-SPECIFIC WORDING PREFERENCE OR MINOR EDITORIAL IMPROVEMENT (PA)

PA1 The SRs associated with each Function in Table 3.3.5.2-1 have been renumbered as required, consistent with changes to the ITS 3.3.5.2 SR Table.

PA2 Changes have been made (additions, deletions and/or changes to the NUREG) to reflect plant specific nomenclature.

PA3 Changes made to be consistent with Bases.

PLANT-SPECIFIC DIFFERENCE IN THE DESIGN (DB)

DB1 The brackets have been removed from the ITS 3.3.5.2 Applicability consistent with the CTS 3.5.E.1. The RCIC System is designed to function during isolation of the reactor from the main condenser and a total loss of offsite power when reactor pressure is above 150 psig (UFSAR 4.7.1)

DB2 ISTS 3.3.5.2 Function 4 (Suppression Pool Water Level - High) does not apply to the JAFNPP specific design. This Function has been deleted and the subsequent Function has been renumbered. In addition, ITS 3.3.5.2 SR Note 2 has been adjusted, as required.

DB3 The brackets have been removed from ISTS SR 3.3.5.2.4 (SR 3.3.5.2.3) and from the Surveillance Frequency of SR 3.3.5.2.5 consistent with the requirements in CTS Table 4.2-2 and the calibration methodology for the associated channels of each Function. The Surveillance Frequency of SR 3.3.5.2.5 has been extended to 24 months.

JUSTIFICATION FOR DIFFERENCES FROM NUREG-1433, REVISION 1
ITS: 3.3.5.2 - RCIC SYSTEM INSTRUMENTATION

PLANT-SPECIFIC DIFFERENCE IN THE DESIGN (DB)

DB4 The brackets have been removed and the proper number of channels included for each Function in Table 3.3.5.2-1. The values are consistent with the JAFNPP design. In all cases, all existing channels are included.

DB5 The brackets have been removed from the Allowable Values and the proper plant specific value has been included in accordance with the setpoint calculation methodology.

DIFFERENCE BASED ON AN APPROVED TRAVELER (TA)

None

DIFFERENCE BASED ON A SUBMITTED, BUT PENDING TRAVELER (TP)

None

DIFFERENCE FOR ANY REASON OTHER THAN THE ABOVE (X)

X1 The brackets have been removed from ISTS Table 3.3.5.2-1 Function 5 (Manual Initiation) and retained as Function 4 in accordance with M2.

JAFNPP

IMPROVED STANDARD TECHNICAL SPECIFICATIONS (ISTS) CONVERSION

ITS: 3.3.5.2

Reactor Core Isolation Cooling (RCIC) System Instrumentation

MARKUP OF NUREG-1433, REVISION 1, BASES

DBI unless otherwise noted

B 3.3 INSTRUMENTATION

B 3.3.5.2 Reactor Core Isolation Cooling (RCIC) System Instrumentation

BASES

BACKGROUND

The purpose of the RCIC System instrumentation is to initiate actions to ensure adequate core cooling when the reactor vessel is isolated from its primary heat sink (the main condenser) and normal coolant makeup flow from the Reactor Feedwater System is unavailable, such that initiation of the low pressure Emergency Core Cooling Systems (ECCS) pumps does not occur. A more complete discussion of RCIC System operation is provided in the Bases of LCO 3.5.3, "RCIC System."

The RCIC System may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of reactor vessel Low Low water level. The variable is monitored by four transmitters that are connected to four trip units. The outputs of the trip units are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic arrangement. Once initiated, the RCIC logic seals in and can be reset by the operator only when the reactor vessel water level signals have cleared.

The RCIC test line isolation valve (which is also a primary containment isolation valve) is closed on a RCIC initiation signal to allow full system flow and maintain primary containment isolated in the event RCIC is not operating.

The RCIC System also monitors the water level in the condensate storage tank (CST) and the suppression pool since these are the two sources of water for RCIC operation. Reactor grade water in the CSTs is the normal source. Upon receipt of a RCIC initiation signal, the CSTs suction valve is automatically signaled to open (it is normally in the open position) unless the pump suction from the suppression pool valves is open. If the water level in the CST falls below a preselected level, first the suppression pool suction valves automatically open, and then the CST suction valve automatically closes. Two level switches are used to detect low water level in the CST. Either switch can cause the suppression pool suction valves to open and the CSTs suction valve to close. The suppression pool suction valves also automatically open and the CST suction valve closes if high water level is detected in the suppression pool

(continued)

BASES

BACKGROUND (continued)

~~one-out-of-two logic similar to the CST water level logic~~) to prevent losing suction to the pump, the suction valves are interlocked so that ~~one~~ suction path must be open before the ~~other~~ automatically closes.

CST suction path

the suppression pool

when automatically transferring suction from the CSTs to the suppression pool on low CST level

The RCIC System provides makeup water to the reactor until the reactor vessel water level reaches the high water level (Level 8) trip (two-out-of-two logic), at which time the RCIC steam supply, steam supply bypass, and cooling water supply valves close (the injection valve also closes due to the closure of the steam supply valves). The RCIC System restarts if vessel level again drops to the low level initiation point (Level 2).

inlet

DB1

DB1

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

15

by providing makeup coolant to the reactor

PA1

The function of the RCIC System to ~~provide makeup coolant to the reactor is used to~~ respond to transient events. The RCIC System is not an Engineered Safety ~~Feature~~ System and no credit is taken in the safety analyses for RCIC System operation. Based on its contribution to the reduction of overall plant risk, however, the system, and therefore its instrumentation, are included in the Technical Specifications as required by the NRC Policy Statement. Certain instrumentation Functions are retained for other reasons and are described below in the individual Functions discussion.

guard

PA3

TSTF-367

TA2

The RCIC System instrumentation satisfies Criterion 4 of 10 CFR 50.36 (c)(2)(ii) (Ref. 1)

X1

The OPERABILITY of the RCIC System instrumentation is dependent upon the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.5.2-1. Each Function must have a required number of OPERABLE channels with their setpoints within the specified Allowable Values, where appropriate. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions.

PA2

Allowable Values are specified for each RCIC System instrumentation Function specified in the Table. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between CHANNEL

(continued)

Revision F

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. Each Allowable Value specified accounts for instrument uncertainties appropriate to the Function. These uncertainties are described in the setpoint methodology.

Insert ASA

DB2 PA2

The individual Functions are required to be OPERABLE in MODE 1, and in MODES 2 and 3 with reactor steam dome pressure > 150 psig since this is when RCIC is required to be OPERABLE. (Refer to LCO 3.5.3 for Applicability Bases for the RCIC System.)

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

1. Reactor Vessel Water Level—Low Low, Level 2

Low reactor pressure vessel (RPV) water level indicates that normal feedwater flow is insufficient to maintain reactor vessel water level and that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, the RCIC System is initiated at Level 2 to assist in maintaining water level above the top of the active fuel.

Reactor Vessel Water Level—Low Low, Level 2 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel.

The Reactor Vessel Water Level—Low Low, Level 2 Allowable Value is set high enough such that for complete loss of feedwater flow, the RCIC System flow with high pressure coolant injection assumed to fail will be sufficient to avoid initiation of low pressure ECCS at Level 1.

Insert Function 1

DB1

Four channels of Reactor Vessel Water Level—Low Low, Level 2 Function are available and are required to be OPERABLE when RCIC is required to be OPERABLE to ensure that no single instrument failure can preclude RCIC initiation. Refer to LCO 3.5.3 for RCIC Applicability Bases.

PA3

(continued)

DB2

INSERT ASA

A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (e.g., reactor vessel water level), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., trip unit) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis or other appropriate documents. The trip setpoints are derived from the analytical limits and account for all worst case instrumentation uncertainties as appropriate (e.g., drift, process effects, calibration uncertainties, and severe environmental errors (for channels that must function in harsh environments as defined by 10 CFR 50.49)). The trip setpoints derived in this manner provide adequate protection because all expected uncertainties are accounted for. The Allowable Values are then derived from the trip setpoints by accounting for normal effects that would be seen during periodic surveillance or calibration. These effects are instrumentation uncertainties observed during normal operation (e.g., drift and calibration uncertainties).

PA2

RAI 3.3.5.1-1

DB1

INSERT Function 1

The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 2).

The HPCI, RCIC and ATWS-RPT initiation functions (as described in Table 3.3.5.1, Functions 3.a; Table 3.3.5.2, Function 1 and LCO 3.3.4.1.a including SR 3.3.4.1.4, respectively) describe the reactor vessel water level initiation function as "Low Low (Level 2)." The Allowable Values associated with the HPCI and RCIC initiation function is different from the Allowable Value associated with the ATWS-RPT initiation function as the ATWS function has a separate analog trip unit. Nevertheless, consistent with the nomenclature typically used in design documents, the "Low Low (Level 2)" is retained in describing each of these three initiation functions.

F

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2. Reactor Vessel Water Level—High, Level 8

High RPV water level indicates that sufficient cooling water inventory exists in the reactor vessel such that there is no danger to the fuel. Therefore, the Level 8 signal is used to close the RCIC steam supply, steam supply bypass, and cooling water supply valves to prevent overflow into the main steam lines (MSLs). (The injection valve also closes due to the closure of the steam supply valve.)

Reactor Vessel Water Level—High, Level 8 signals for RCIC are initiated from two level transmitters from the narrow range water level measurement instrumentation, which sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel.

The Reactor Vessel Water Level—High, Level 8 Allowable Value is high enough to preclude isolating the injection valve of the RCIC during normal operation, yet low enough to trip the RCIC System prior to water overflowing into the MSLs.

Two channels of Reactor Vessel Water Level—High, Level 8 Function are available and are required to be OPERABLE when RCIC is required to be OPERABLE to ensure that no single instrument failure can preclude RCIC initiation. Refer to LCO 3.5.3 for RCIC Applicability Bases.

3. Condensate Storage Tank Level—Low

Low level in the CST indicates the unavailability of an adequate supply of makeup water from this normal source. Normally, the suction valve between the RCIC pump and the CST is open and, upon receiving a RCIC initiation signal, water for RCIC injection would be taken from the CST. However, if the water level in the CST falls below a preselected level, first the suppression pool suction valves automatically open, and then the CST suction valve (consistency) automatically closes. This ensures that an adequate supply of makeup water is available to the RCIC pump. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be open before the CST suction valve automatically closes.

(continued)

DBI

INSERT Function 2

The Allowable Value is the water level above a zero reference level which is 352.56 inches above the lowest point inside the RPV and is also at the top of a 144 inch fuel column (Ref. 2).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3. Condensate Storage Tank Level—Low (continued)

Two level switches are used to detect low water level in the CST. The Condensate Storage Tank Level—Low Function Allowable Value is set high enough to ensure adequate pump suction head while water is being taken from the CST.

Two channels of Condensate Storage Tank Level—Low Function are available and are required to be OPERABLE when RCIC is required to be OPERABLE to ensure that no single instrument failure can preclude RCIC swap to suppression pool source. Refer to LCO 3.5.3 for RCIC Applicability Bases.

4. Suppression Pool Water Level—High

Excessively high suppression pool water level could result in the loads on the suppression pool exceeding design values should there be a blowdown of the reactor vessel pressure through the safety/relief valves. Therefore, signals indicating high suppression pool water level are used to transfer the suction source of RCIC from the CST to the suppression pool to eliminate the possibility of RCIC continuing to provide additional water from a source outside primary containment. This Function satisfies Criterion 3 of the NRC Policy Statement. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be open before the CST suction valve automatically closes.

Suppression pool water level signals are initiated from two level switches. The Allowable Value for the Suppression Pool Water Level—High Function is set low enough to ensure that RCIC will be aligned to take suction from the suppression pool before the water level reaches the point at which suppression design loads would be exceeded.

Two channels of Suppression Pool Water Level—High Function are available and are required to be OPERABLE when RCIC is required to be OPERABLE to ensure that no single instrument failure can preclude RCIC swap to suppression pool source. Refer to LCO 3.5.3 for RCIC Applicability Bases.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

g. Manual Initiation

The Manual Initiation push button switch introduces a signal into the RCIC System initiation logic that is redundant to the automatic protective instrumentation and provides manual initiation capability. There is one push button for the RCIC System.

The Manual Initiation Function is not assumed in any accident or transient analyses in the FSAR. However, the Function is retained for overall redundancy and diversity of the RCIC function as required by the NRC in the plant licensing basis.

There is no Allowable Value for this Function since the channel is mechanically actuated based solely on the position of the push button. One channel of Manual Initiation is required to be OPERABLE when RCIC is required to be OPERABLE.

ACTIONS

Reviewer's Note: Certain LCO Completion Times are based on approved topical reports. In order for a licensee to use the times, the licensee must justify the Completion Times as required by the staff Safety Evaluation Report (SER) for the topical report.

A Note has been provided to modify the ACTIONS related to RCIC System instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition discovered to be inoperable or not within limits will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable RCIC System instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable RCIC System instrumentation channel.

(continued)

BASES

ACTIONS (continued)

A.1

Required Action A.1 directs entry into the appropriate Condition referenced in Table 3.3.5.2-1. The applicable Condition referenced in the Table is Function dependent. Each time a channel is discovered to be inoperable, Condition A is entered for that channel and provides for transfer to the appropriate subsequent Condition.

B.1 and B.2

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in a complete loss of automatic initiation capability for the RCIC System. In this case, automatic initiation capability is lost if two Function 1 channels in the same trip system are inoperable and untripped. In this situation (loss of automatic initiation capability), the 24 hour allowance of Required Action B.2 is not appropriate, and the RCIC System must be declared inoperable within 1 hour after discovery of loss of RCIC initiation capability.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action B.1, the Completion Time only begins upon discovery that the RCIC System cannot be automatically initiated due to two inoperable, untripped Reactor Vessel Water Level—Low Low, Level 2, channels in the same trip system. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the redundancy of sensors available to provide initiation signals and the fact that the RCIC System is not assumed in any accident or transient analysis, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 7) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action B.2. Placing the

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an initiation), Condition E must be entered and its Required Action taken.

C.1

A risk based analysis was performed and determined that an allowable out of service time of 24 hours (Ref. 9) is acceptable to permit restoration of any inoperable channel to OPERABLE status (Required Action C.1). A Required Action (similar to Required Action B.1) limiting the allowable out of service time, if a loss of automatic RCIC initiation capability exists, is not required. This Condition applies to the Reactor Vessel Water Level—High, Level 8 Function whose logic is arranged such that any inoperable channel will result in a loss of automatic RCIC initiation capability. As stated above, this loss of automatic RCIC initiation capability was analyzed and determined to be acceptable. This Condition also applies to the Manual Initiation Function. Since this Function is not assumed in any accident or transient analysis, a total loss of manual initiation capability (Required Action C.1) for 24 hours is allowed. The Required Action does not allow placing a channel in trip since this action would not necessarily result in a safe state for the channel in all events.

D.1, D.2.1, and D.2.2

Required Action D.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in automatic component initiation capability being lost for the feature(s). For Required Action D.1, the RCIC System is the only associated feature. In this case, automatic initiation capability is lost if two Function 3 channels or two Function 4 channels are inoperable and untripped. In this situation (loss of automatic suction swap), the 24 hour allowance of Required Actions D.2.1 and D.2.2 is not

(continued)

BASES

ACTIONS

D.1, D.2.1, and D.2.2 (continued)

appropriate, and the RCIC System must be declared inoperable within 1 hour from discovery of loss of RCIC initiation capability. As noted, Required Action D.1 is only applicable if the RCIC pump suction is not aligned to the suppression pool since, if aligned, the Function is already performed.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action D.1, the Completion Time only begins upon discovery that the RCIC System cannot be automatically aligned to the suppression pool due to two inoperable, untripped channels in the same Function. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the redundancy of sensors available to provide initiation signals and the fact that the RCIC System is not assumed in any accident or transient analysis, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 10) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action D.2.1, which performs the intended function of the channel (shifting the suction source to the suppression pool). Alternatively, Required Action D.2.2 allows the manual alignment of the RCIC suction to the suppression pool, which also performs the intended function. If Required Action D.2.1 or D.2.2 is performed, measures should be taken to ensure that the RCIC System piping remains filled with water. If it is not desired to perform Required Actions D.2.1 and D.2.2 (e.g., as in the case where shifting the suction source could drain down the RCIC suction piping), Condition E must be entered and its Required Action taken.

(continued)

BASES

ACTIONS (continued)

E.1

With any Required Action and associated Completion Time not met, the RCIC System may be incapable of performing the intended function, and the RCIC System must be declared inoperable immediately.

SURVEILLANCE REQUIREMENTS

Reviewer's Note: Certain Frequencies are based on approved topical reports. In order for a licensee to use these Frequencies, the licensee must justify the Frequencies as required by the staff SER for the topical report.

As noted in the beginning of the SRs, the SRs for each RCIC System instrumentation Function are found in the SRs column of Table 3.3.5.2-1.

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 2 and 3; and (b) for up to 6 hours for Functions 1, 3 and 4, provided the associated Function maintains trip capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Ref. 1) assumption of the average time required to perform channel surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the RCIC will initiate when necessary.

SR 3.3.5.2.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a parameter on other similar channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.2.1 (continued)

something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Channel PA1

Agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the instrument has drifted outside its limit.

The Frequency is based upon operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the channels required by the LCO.

SR 3.3.5.2.2

TA1 Insert SR 3.3.5.2.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the ~~entire~~ channel will perform the intended function. PA1 TSTF-205

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 3. X1 DB1 CLB1

SR 3.3.5.2.3 (4)

The calibration of trip units provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.5.2-1. If the trip setting is discovered to be less conservative than the setting accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analysis. Under these conditions, the setpoint

move to page B 3.3-150 as indicated

(continued)

TA1

INSERT SR 3.3.5.2.2

A successful test of the required contacts(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

TSTF-205

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.2.4 (continued)

must be readjusted to be equal to or more conservative than accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 1.

SR 3.3.5.2.4 and SR 3.3.5.2.5

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency of SR 3.3.5.2.4 is based upon the assumption of a 92 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

The Frequency of SR 3.3.5.2.5 is based upon the assumption of a 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.5.2.6

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.5.3 overlaps this Surveillance to provide complete testing of the safety function.

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency.

(continued)

BASES (continued)

REFERENCES

3. 4. NEDB-770-06-2, "Addendum to Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," February 1991. December 1992

1. 10 CFR 50, 36 (c) (2) (ii).
2. Drawing 11825-5.01-15D, Rev. D, Reactor Assembly Nuclear Boilers, GE Drawing 919D690BD