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5	CONTROL ROOM (FL)	OPS(3PT-D001/6(IP3/IPEC)	IP3
11	RES DEPARTMENT MANAGER	RES (UNIT 3/IPEC ONLY)	45-4-A
19	STEWART ANN	LICENSING	GSB-2D
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494	AEOF/A.GROSJEAN(ALL EP'S)	E-PLAN (EOP'S ONLY)	WPO-12D
495	JOINT NEWS CENTER	EMER PLN (ALL EP'S)	EOF
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527	MILIANO PATRICK	NRC/SR. PROJECT MANAGER	OFFSITE
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INDIAN POINT 3
TECHNICAL SPECIFICATION BASES

INSTRUCTIONS FOR UPDATE: **18-09/16/05**

Pages are to be inserted into your controlled copy of the IP3 Technical Specifications Bases following the instructions listed below. The **TAB** notation indicates which section the pages are located.

Remove Page	**Insert Page**
TAB - List Of Effective Sections	
List of Effective Sections, Rev. 17 (5 pages)	List of Effective Sections, Rev. 18 (5 pages)
TAB 3.5 - ECCS	
B 3.5.2, Rev. 1 (13 pages)	B 3.5.2, Rev. 2 (13 pages)
TAB 3.6 – CONTAINMENT SYSTEMS	
B 3.6.10, Rev. 1 (12 Pages)	B 3.6.10, Rev. 2 (12 pages)

TECHNICAL SPECIFICATION BASES
LIST OF EFFECTIVE SECTIONS

BASES SECTION	REV	NUMBER OF PAGES	EFFECTIVE DATE
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B 2.0 SAFETY LIMITS			
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B 3.0 LCO AND SR APPLICABILITY			
B 3.0	2	16	08/10/2005
B 3.1 REACTIVITY CONTROL			
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B 3.6.2	1	9	06/03/2005
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B 3.6.4	0	3	03/19/2001
B 3.6.5	1	5	06/20/2003
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B 3.7 PLANT SYSTEMS			
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B 3.9.1	0	4	03/19/2001
B 3.9.2	0	4	03/19/2001
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B 3.9.4	0	4	03/19/2001
B 3.9.5	0	4	03/19/2001
B 3.9.6	2	3	04/08/2005

REVISION HISTORY FOR BASES

AFFECTED SECTIONS	REV	EFFECTIVE DATE	DESCRIPTION
ALL	0	03/19/01	Initial issue of Bases derived from NUREG-1431, in conjunction with Technical Specification Amendment 205 for conversion of 'Current Technical Specifications' to 'Improved Technical Specifications'.
BASES UPDATE PACKAGE 01-031901			
B 3.4.13 B 3.4.15	1	03/19/01	Changes regarding containment sump flow monitor per NSE 01-3-018 LWD Rev 0. Change issued concurrent with Rev 0.
BASES UPDATE PACKAGE 02-051801			
Table of Contents	1	05/18/01	Title of Section B 3.7.3 revised per Tech Spec Amend 207
B 3.7.3	1	05/18/01	Implementation of Tech Spec Amend 207
BASES UPDATE PACKAGE 03-111901			
B 3.3.2	1	11/19/01	Correction to statement regarding applicability of Function 5, to be consistent with the Technical Specification.
B 3.3.3	1	11/19/01	Changes to reflect reclassification of certain SG narrow range level instruments as QA Category M per NSE 97-3-439, Rev 1.
B 3.4.13 B 3.4.15	2	11/19/01	Changes to reflect installation of a new control room alarm for 'VC Sump Pump Running'. Changes per NSE 01-3-018, Rev 1 and DCP 01-3-023 LWD.
B 3.7.11	1	11/19/01	Clarification of allowable flowrate for CRVS in 'incident mode with outside air makeup.'
BASES UPDATE PACKAGE 04-012202			
B 3.3.2	2	01/22/02	Clarify starting logic of 32 ABFP per EVL-01-3-078 MULTI, Rev 0.
B 3.8.1	1	01/22/02	Provide additional guidance for SR 3.8.1.1 and Condition Statements A.1 and B.1 per EVL-01-3-078 MULTI, Rev 0.
B 3.8.4	1	01/22/02	Revision of battery design description per plant modification and to reflect Tech Spec Amendment 209.
B 3.8.9	1	01/22/02	Provide additional information regarding MCC in Table B 3.8.9-1 per EVL-01-3-078 MULTI, Rev 0.
BASES UPDATE PACKAGE 05-093002			
B 3.0	1	09/30/02	Changes to reflect Tech Spec Amendment 212 regarding delay period for a missed surveillance. Changes adopt TSTF 358, Rev 6.
B 3.3.1	1	09/30/02	Changes regarding description of turbine runback feature per EVAL-99-3-063 NIS.
B 3.3.3	2	09/30/02	Changes to reflect Tech Spec Amendment 211 regarding CETs and other PAM instruments.
B 3.7.9	1	09/30/02	Changes regarding SWN -35-1 and -2 valves per EVAL-00-3-095 SWS, Rev 0.

AFFECTED SECTIONS	REV	EFFECTIVE DATE	DESCRIPTION
BASES UPDATE PACKAGE 06-120402			
B 3.3.2 B 3.6.6 B 3.7.1 B 3.7.6	3 1 1 1	12/04/02	Changes to reflect Tech Spec Amendment 213 regarding 1.4% power uprate.
BASES UPDATE PACKAGE 07-031703			
B 3.3.8 B 3.7.13 B 3.9.3	1 1 1	03/17/2003	Changes to reflect Tech Spec Amendment 215 regarding implementation of Alternate Source Term analysis methodology to the Fuel Handling Accident.
BASES UPDATE PACKAGE 08-032803			
B 3.4.9	1	03/28/2003	Changes to reflect Tech Spec Amendment 216 regarding relaxation of pressurizer level limits in MODE 3.
BASES UPDATE PACKAGE 09-062003			
B 3.4.9	2	06/20/2003	Changes to reflect commitment for a dedicated operator per Tech Spec Amendment 216.
B 3.6.5	1	06/20/2003	Implements Corrective Action 11 from CR-IP3-2002-02095; 4 FCUs should be in operation to assure representative measurement of containment air temperature.
B 3.7.11	2	06/20/2003	Correction to Background description regarding system response to Firestat detector actuation per ACT 02-62887.
B 3.7.13	2	06/20/2003	Revision to Background description of FSB air tempering units to reflect design change per DCP 95-3-142.
B 3.8.7 B 3.8.8 B 3.8.9	1 1 2	06/20/2003 06/20/2003 06/20/2003	Changes to reflect replacement of Inverter 34 per DCP-01-022.
BASES UPDATE PACKAGE 10-102704			
B 3.1.3	1	10/27/2004	Clarification of the surveillance requirements for TS 3.1.3 per 50.59 screen.
B 3.3.5	1	10/27/2004	Clarify the requirements for performing a Trip Actuating Device Operational Test (TADOT) on the 480V degraded grid and undervoltage relays per 50.59 screen.
B 3.4.3 B 3.4.12	1 1	10/27/2004	Extension of the RCS pressure/temperature limits and corresponding OPS limits from 16.17 to 20 EFPY (TS Amendment 220).
B 3.5.1	1	10/27/2004	Changes to reflect Tech Spec Amendment 222 regarding extension of completion time for Accumulators.
BASES UPDATE PACKAGE 11-121004			
B 3.7.7	1	12/17/2004	Addition of valves CT-1300 and CT-1302 to Surveillance SR 3.7.7.2 to verify that all city water header supply isolation valves are open. Reflects Tech Spec Amendment 218.
BASES UPDATE PACKAGE 12-012405			
B 3.7.11	3	01/24/2005	Temporary allowance for use of KI/SCBA for unfiltered inleakage above limit.

AFFECTED SECTIONS	REV	EFFECTIVE DATE	DESCRIPTION
			BASES UPDATE PACKAGE 13-022505
B 3.7.5	1	02/25/2005	Clarification on Surveillance Requirement 3.7.5.3 as it relates to plant condition/frequency of performance of Auxiliary Feedwater Pump full flow testing.
			BASES UPDATE PACKAGE 14-030705
B 3.9.6	1	03/07/2005	Changes to reflect that the decay time prior to fuel movement is a minimum of 84 hours per Tech Spec Amendment 215.
			BASES UPDATE PACKAGE 15-040805
B 3.3.2 B 3.3.6 B. 3.3.7 B 3.7.11 B 3.7.14 B 3.9.6	4 1 1 4 1 2	04/07/2005	Changes to reflect AST as per Tech Spec Amendment 224. NOTE: In addition to the AST changes to B. 3.7.11, the temporary allowance for use of KI/SCBA for unfiltered inleakage above limit is being removed. Tracer Gas testing is complete.
			BASES UPDATE PACKAGE 16-060305
B 2.1.1 B 2.1.2 B 3.1.1 B 3.2.2 B 3.3.1 B 3.3.8 B 3.4.1 B 3.4.3 B 3.4.6 B 3.4.9 B 3.4.13 B 3.4.16 B 3.5.2 B 3.6.2 B 3.6.6 B 3.6.7 B 3.6.9 B 3.6.10 B 3.7.1 B 3.7.2 B 3.7.5 B 3.7.6 B 3.7.8 B 3.7.9 B 3.7.10 B 3.7.13 B 3.7.17 B 3.9.3	1 1 1 1 2 2 1 2 1 3 3 1 1 1 2 1 1 1 2 1 2 2 1 2 1 3 1 2	06/03/2005	Changes to reflect SPU as per Tech Spec Amendment 225.

AFFECTED SECTIONS	REV	EFFECTIVE DATE	DESCRIPTION
BASES UPDATE PACKAGE 17-081005			
TOC	2	08/10/2005	B 3.3.3, B 3.6.8 – Removal of Hydrogen Recombiners from the bases as per Technical Specification Amendment 228. B 3.3.3 is also affected by Amendment 226. B 3.7.11 - Add reference that if the primary coolant source of containment is in question, refer to ITS 5.5.2. All other bases changes for this revision are associated with Technical Specification Amendment 226 regarding increase flexibility in Mode Restraints.
B 3.0	2		
B 3.3.3	3		
B 3.3.4	1		
B 3.4.11	1		
B 3.4.12	2		
B 3.4.15	3		
B 3.4.16	2		
B 3.5.3	1		
B 3.6.8	1		
B 3.7.4	1		
B 3.7.5	3		
B 3.7.11	5		
B 3.8.1	2		
BASES UPDATE PACKAGE 18-091605			
B 3.5.2	2	09/16/2005	Reflect implementation of ER-04-2-029 as part of Stretch Power Uprate (SPU) – HHSI Modification. Update LCO and Condition B to clarify required actions consistent with FSAR.
3.6.10	2		

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.2 ECCS—Operating

BASES

BACKGROUND

The function of the ECCS is to provide core cooling and negative reactivity to ensure that the reactor core is protected after any of the following accidents:

a. Loss of coolant accident (LOCA), coolant leakage greater than the capability of the normal charging system;

b. Rod ejection accident;

c. Loss of secondary coolant accident; and

d. Steam generator tube rupture (SGTR).

The addition of negative reactivity is designed primarily for the loss of secondary coolant accident where primary cooldown could add enough positive reactivity to achieve criticality and return to significant power.

There are three phases of ECCS operation: injection, cold leg recirculation, and hot leg recirculation. In the injection phase, water is taken from the refueling water storage tank (RWST) and injected into the Reactor Coolant System (RCS) through the cold legs. When sufficient water is removed from the RWST to ensure that enough boron has been added to maintain the reactor subcritical and the recirculation and containment sumps have enough water to supply the required net positive suction head to the ECCS pumps, suction is switched to the recirculation sump or containment sump for cold leg recirculation. After 6.5 hours, the ECCS flow is shifted to the hot leg recirculation phase to provide a backflush, which would reduce the boiling in the top of the core and any resulting boron precipitation.

(continued)

BASES

BACKGROUND (continued)

The ECCS FUNCTION is provided by three separate ECCS systems: high head safety injection (HHSI), residual heat removal (RHR) injection, and containment recirculation. Each ECCS system is divided into subsystems as follows:

- HHSI System is divided into three 50% capacity subsystems (i.e., HHSI 31, 32 and 33) which share two pump discharge headers (i.e., 31 and 33). Each HHSI subsystem consists of one pump as well as associated piping and valves to transfer water from the suction source to the core. HHSI subsystem 32 is aligned to inject using the flow path associated with both HHSI subsystem 31 and 33. If either HHSI pump 31 or 33 fails to start or achieve required discharge pressure, HHSI pump 32 will inject via the header associated with the failed pump. If all three HHSI pumps start, flow from HHSI pump 32 will be divided between header 31 and 33. Note that the HHSI pumps have a shutoff head of approximately 1500 psig. Therefore, IP3 is classified as a low head safety injection plant.

- RHR injection System is divided into two 100% capacity subsystems. Each ECCS RHR subsystem consists of one RHR pump and one RHR heat exchanger as well as associated piping and valves to transfer water from the suction source to the core. Although either RHR heat exchanger may be credited for either RHR subsystem, one RHR heat exchanger must be OPERABLE for each OPERABLE RHR injection subsystem.

- Containment Recirculation is divided into two 100% capacity subsystems. Each subsystem consists of one Containment Recirculation pump and one RHR heat exchanger as well as associated piping and valves to transfer water from the suction source to the core. Although either RHR heat exchanger may be credited for either Recirculation subsystem, one RHR heat exchanger must be OPERABLE for each OPERABLE Containment Recirculation subsystem.

(continued)

BASES

• • (continued)

The three ECCS systems (3 HHSI, 2 RHR and 2 Recirculation) are grouped into three trains (5A, 2A/3A and 6A) such that any 2 of the 3 trains are capable of meeting all ECCS capability assumed in the accident analysis. Each ECCS train consists of the following:

a. ECCS Train 5A includes subsystems HHSI 31 and containment recirculation 31;

b. ECCS Train 2A/3A includes subsystems HHSI 32 and RHR 31; and,

c. ECCS Train 6A includes subsystems HHSI 33, RHR 32, and containment recirculation 32.

The ECCS trains use the same designation as the Safeguards Power Trains required by LCO 3.8.9, Distribution Systems - Operating, with Safeguards Power Train 5A supported by DG 33, Safeguards Power Train 2A/23 supported by DG 31, Safeguards Power Train 6A supported by DG 32.

The ECCS accumulators and the RWST are also part of the ECCS, but are not considered part of an ECCS flow path as described by this LCO.

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the RWST can be injected into the RCS following the accidents described in this LCO. The major components of each subsystem are the high head safety injection pumps, the RHR pumps, heat exchangers, and the containment recirculation pumps. This interconnecting and redundant subsystem design provides the operators with the ability to utilize components from different trains to achieve the required 100% flow to the core.

During the injection phase of LOCA recovery, a suction header supplies water from the RWST to the HHSI and RHR pumps. The discharge from the HHSI and RHR pumps feed injection lines to each of the RCS cold legs. Control valves are set to balance the HHSI flow to the RCS.

(continued)

BASES

BACKGROUND (continued)

This balance ensures sufficient flow to the core to meet the analysis assumptions following a LOCA in one of the RCS cold legs.

During the recirculation phase of LOCA recovery, the containment recirculation pumps take suction from the containment recirculation sump and direct flow through the RHR heat exchangers to the cold legs. The RHR pumps can be used to provide a backup method of recirculation in which case the RHR pump suction is transferred to the containment sump. The RHR pumps then supply recirculation flow directly or supply the suction of the HHSI pumps. Initially, recirculation is through the same paths as the injection phase. Subsequently, recirculation injection is split between the hot and cold legs.

The ECCS also functions to supply borated water to the reactor core following increased heat removal events, such as a main steam line break (MSLB). The limiting design conditions occur when the negative moderator temperature coefficient is highly negative, such as at the end of each cycle.

During low temperature conditions in the RCS, limitations are placed on the maximum number of HHSI pumps that may be OPERABLE. Refer to the Bases for LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," for the basis of these requirements.

The ECCS subsystems, except for the containment recirculation subsystems, are actuated upon receipt of an SI signal. The actuation of safeguard loads is accomplished in a programmed time sequence. If offsite power is available, the safeguard loads start immediately in the programmed sequence. If offsite power is not available, the Engineered Safety Feature (ESF) buses shed normal operating loads and are connected to the emergency diesel generators (EDGs). Safeguard loads are then actuated in the programmed time sequence. The time delay associated with diesel starting, sequenced loading, and pump starting determines the time required before pumped flow is available to the core following a LOCA.

(continued)

BASES

BACKGROUND (continued)

The active ECCS components, along with the passive accumulators and the RWST covered in LCO 3.5.1, "Accumulators," and LCO 3.5.4, "Refueling Water Storage Tank (RWST)," provide the cooling water necessary to meet GDC 35 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46 (Ref. 2), will be met following a LOCA:

a. Maximum fuel element cladding temperature is $\leq 2200^{0}F$;

b. Maximum cladding oxidation is $\leq$ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is $\leq$ 0.01 times the hypothetical amount generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;

d. Core is maintained in a coolable geometry; and

e. Adequate long term core cooling capability is maintained.

The LCO also limits the potential for a post trip return to power following an MSLB event.

Each ECCS subsystem is taken credit for in a large break LOCA event at full power (Refs. 3 and 4). This event establishes the requirement for runout flow for the ECCS pumps, as well as the maximum response time for their actuation. The HHSI pumps are credited in a small break LOCA event. The OPERABILITY requirements for the ECCS are based on the following LOCA analysis assumptions:

a. A large break LOCA event, with loss of offsite power and a single failure disabling one EDG; and

(continued)

APPLICABLE SAFETY ANALYSES (continued)

b. A small break LOCA event, with a loss of offsite power and a single failure disabling one EDG.

During the blowdown stage of a LOCA, the RCS depressurizes as primary coolant is ejected through the break into the containment. The nuclear reaction is terminated either by moderator voiding during large breaks or control rod insertion for small breaks. Following depressurization, emergency cooling water is injected into the cold legs, flows into the downcomer, fills the lower plenum, and refloods the core.

The effects on containment mass and energy releases are accounted for in appropriate analyses (Refs. 3 and 4). The LCO ensures that an ECCS train will deliver sufficient water to match boiloff rates soon enough to minimize the consequences of the core being uncovered following a large LOCA. It also ensures that the HHSI pumps will deliver sufficient water and boron during a small LOCA to maintain core subcriticality. For a small break LOCA, the steam generators continue to serve as the heat sink, providing part of the required core cooling.

The ECCS trains satisfy Criterion 3 of 10 CFR 50.36.

LCO

In MODES 1, 2, and 3, three ECCS trains are required to ensure that sufficient ECCS flow is available, assuming a single failure affecting any one train. Additionally, individual components within the ECCS trains may be called upon to mitigate the consequences of other transients and accidents.

In MODES 1, 2, and 3, the ECCS consists of the following:

a. ECCS Train 5A includes HHSI subsystem 31 and containment recirculation subsystem 31;

b. ECCS Train 2A/3A includes HHSI subsystem 32 and RHR subsystem 31; and,

(continued)

BASES

LCO (continued)

c. ECCS Train 6A includes HHSI subsystem 33, RHR subsystem 32, and containment recirculation subsystem 32.

Each HHSI subsystem consists of one pump as well as associated instrumentation, piping and valves to transfer water from the suction source to the core. HHSI subsystem 32 is OPERABLE when capable of injecting using the flow paths associated with HHSI subsystem 31 and 33. Each ECCS RHR subsystem consists of one RHR pump and one RHR heat exchanger as well as associated instrumentation, piping and valves to transfer water from the suction source to the core. Although either RHR heat exchanger may be credited for either RHR subsystem, one RHR heat exchanger must be OPERABLE for each OPERABLE RHR injection subsystem.

Each containment recirculation subsystem consists of one Containment Recirculation pump and one RHR heat exchanger as well as associated instrumentation piping and valves to transfer water from the suction source to the core. Although either RHR heat exchanger may be credited for either Recirculation subsystem, one RHR heat exchanger must be OPERABLE for each OPERABLE Containment Recirculation subsystem. Note that Recirculation pump OPERABILITY requires the functional availability of the associated auxiliary component cooling water pump.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the HHSI and RHR pumps and their supply header to each of the four cold leg injection nozzles (6 cold leg injection nozzles for the HHSI pumps). Note: One of the four originally installed cold leg lines in each header has been isolated by a locked closed valve as part of a Stretch Power Uprate (SPU) modification to provide higher hot leg recirc flow and to support higher branch-line valve positions to minimize sump particle blockage and reduce potential for throttle valve cavitation). In the long term, this flow path may be switched to take its supply from the containment recirculation sump using the containment recirculation pumps or, alternately, the containment sump using the RHR pumps to supply its flow to the RCS hot and cold legs, either directly into the RCS or via the HHSI pumps.

The flow path for each train must maintain its designed independence to ensure that no single failure can disable more than one ECCS train (except as described in Reference 5).

(continued)

BASES

LCO (continued)

As indicated in Note 1, the SI flow paths may be isolated for 2 hours in MODE 3, under controlled conditions, to perform pressure isolation valve testing per SR 3.4.14.1. This is acceptable because the flow paths are readily restorable from the control room or the valves are opened under administrative controls that ensure prompt closure when required. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room.

As indicated in Note 2, operation in MODE 3 with ECCS trains made incapable of injecting pursuant to LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is necessary for plants with an LTOP arming temperature at or near the MODE 3 boundary temperature of 350°F. LCO 3.4.12 requires that certain pumps be made incapable of injecting at and below the LTOP arming temperature. When this temperature is at or near the MODE 3 boundary temperature, time is needed to restore the inoperable pumps to OPERABLE status.

APPLICABILITY

In MODES 1, 2, and 3, the ECCS OPERABILITY requirements for the limiting Design Basis Accident, a large break LOCA, are based on full power operation. Although reduced power would not require the same level of performance, the accident analysis does not provide for reduced cooling requirements when at lower power. The HHSI pump performance requirements are based on a small break LOCA. MODE 2 and MODE 3 requirements are bounded by the MODE 1 analysis.

This LCO is only applicable in MODE 3 and above. Below MODE 3, system functional requirements are relaxed as described in LCO 3.5.3, "ECCS—Shutdown."

In MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops—MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops—MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Residual Heat Removal (RHR) and Coolant Circulation—High Water Level," and LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation—Low Water Level."

(continued

BASES

ACTIONS

A.1

With one or more trains inoperable and any two HHSI pumps, any one RHR pump, and any one Containment Recirculation pump OPERABLE (i.e., 100% of the ECCS capability assumed in the accident analysis is available), the inoperable components must be returned to OPERABLE status within 72 hours. The 72 hour Completion Time is based on an NRC reliability evaluation (Ref. 4) and is a reasonable time for repair of many ECCS components. If 100% of the ECCS capability assumed in the accident analysis is not OPERABLE, entry into LCO 3.0.3 is required.

An ECCS train is inoperable if it is not capable of delivering design flow to the RCS. Individual components are inoperable if they are not capable of performing their design function or supporting systems are not available.

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one pump in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different pumps, each in a different train, necessarily result in a loss of function for the ECCS. The intent of this Condition is to maintain a combination of equipment such that 100% of the ECCS flow equivalent to two OPERABLE ECCS trains remains available. This allows increased flexibility in plant operations under circumstances when pumps in redundant trains are inoperable.

An event accompanied by a loss of offsite power and the failure of an EDG can disable one ECCS train until power is restored. A reliability analysis (Ref. 4) has shown that the impact of having one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

Reference 5 describes situations in which one component, such as the valves governed by SR 3.5.2.1, can disable more than one ECCS train. With one or more component(s) inoperable such that 100% of the flow equivalent for HHSI, RHR and Containment Recirculation is not available, the facility is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be immediately entered.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

If the inoperable trains cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Misalignment of these valves could render more than one ECCS train inoperable. Securing these valves in position by removal of power or by key locking the control in the correct position ensures that they cannot change position as a result of an active failure or be inadvertently misaligned. These valves are of the type, described in Reference 5, that can disable the function of more than one ECCS train and invalidate the accident analyses. A 12 hour Frequency is considered reasonable in view of other administrative controls that will ensure a mispositioned valve is unlikely.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve will automatically reposition within the proper stroke time. This Surveillance does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned are in the correct position. The 31 day Frequency is appropriate because the valves are operated under administrative control, and an improper valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience.

SR 3.5.2.3

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by Section XI of the ASME Code. This type of testing may be accomplished by measuring the pump developed head at only one point of the pump characteristic curve. This verifies both that the measured performance is within an acceptable tolerance of the original pump baseline performance and that the performance at the test flow is greater than or equal to the performance assumed in the plant safety analysis. SRs are specified in the Inservice Testing Program, which encompasses Section XI of the ASME Code. Section XI of the ASME Code provides the activities and Frequencies necessary to satisfy the requirements.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.4 and SR 3.5.2.5

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI signal and that each ECCS pump starts on receipt of an actual or simulated SI signal. Note that the Containment Recirculation system is a manually initiated system and is not included as part of this SR. Additionally, this Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 24 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned plant transients if the Surveillances were performed with the reactor at power. The 24 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment. The actuation logic is tested as part of ESF Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program.

SR 3.5.2.6

Realignment of valves in the flow path on an SI signal is necessary for proper ECCS performance. These valves have stops to allow proper positioning for restricted flow to a ruptured cold leg, ensuring that the other cold legs receive at least the required minimum flow. Therefore, an improperly positioned valve could result in the inoperability of more than one injection flow path. The stops are set based on the results of the most recent ECCS operational flow test. The 24 month Frequency is based on the reasons stated in SR 3.5.2.4 and SR 3.5.2.5.

SR 3.5.2.7

Periodic inspections of each containment and recirculation sump suction inlet ensure that each is unrestricted and stays in

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.2.7 (continued)

proper operating condition. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage, on the need to have access to the location, and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. This Frequency is sufficient to detect abnormal degradation and is confirmed by industry operating experience.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 35.
2. 10 CFR 50.46.
3. FSAR, Section 14.
4. NRC Memorandum to V. Stello, Jr., from R.L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.
5. IE Information Notice No. 87-01.

B 3.6 CONTAINMENT SYSTEMS

B.3.6.10 Weld Channel and Penetration Pressurization System

BASES

BACKGROUND

The Weld Channel and Penetration Pressurization System (WC&PPS) is designed to continuously pressurize the double penetration barriers used at locations where plant systems penetrate the containment boundary, the space between selected isolation valves, and most of the weld seam channels installed on the inside of the liner of the Containment. Continuous pressurization by the WC&PPS provides a continuous, sensitive, and accurate means of monitoring their status with respect to leakage. Additionally, the WC&PPS is maintained at a pressure above the containment peak accident pressure so that any postulated leakage past the monitored barriers will be into the containment rather than out of the containment. The design basis leakage rate from the WC&PPS is 0.2% of containment free volume per day which assumes leakage of 0.1% of containment free volume per day into the containment and an identical amount leaking to the environment. Following a design basis accident, the system will maintain pressure greater than the post accident containment pressure for 24 hours (Ref. 1).

The WC&PPS is divided into four independent zones to simplify the process of locating leaks during operation. If one zone has a leak during operation, the specific penetration, weld channel, or containment isolation valve (CIV) containing the leak can be identified by isolating the individual air supply line to each component in the zone. Additionally, a capped tube connection installed in each line allows injecting leak test gas (Ref. 1).

The instrument air system provides a regulated supply of clean and dry compressed air for the WC&PPS. Two instrument air compressors are used, although only one is required to maintain pressurization at the maximum allowable leakage rate of the WC&PPS. A backup source of air

(continued)

BACKGROUND (continued)

for the WC&PPS is the station air system which includes at least one station air compressor. Each WC&PPS zone is served by its own air receiver which will continue to supply air to the zone if the instrument air system and station air system are lost. Each of the air receivers is sized to supply air to its zone for a period of at least one hour based on a total leakage rate of 0.2% of the containment free volume per day. If the receivers are exhausted before normal and backup air supplies are restored, additional backup is provided by a bank of nitrogen cylinders. The nitrogen backup system will automatically deliver nitrogen at a pressure slightly lower than the normal regulated air supply. Thus, in the event of failure of the normal and backup air supply systems during periods when the system is in operation, WC&PPS pressure requirements will be automatically maintained by the nitrogen supply. This assures reliable pressurization under both normal and accident conditions. The combination of the air receivers and nitrogen supply is sufficient to ensure WC&PPS pressure is above the peak containment pressure at the start of a LOCA and to maintain WC&PPS above the post-LOCA containment pressure profile for the 24 hour period following a LOCA at the design leakage rate of 0.2% of the containment free volume per day.

Pressure control valves, isolation valves and check valves are generally located outside of the containment for ease of inspection and maintenance. The line to each of the four pressurized zones is equipped with a critical pressure drop orifice to assure that air consumption will be within the capacity of the system and that high air consumption in one zone does not affect the operation of the other zones. Additionally, restricting orifices are installed on pressurization lines, where required, to assure that air consumption, even on failure of an individual line, will not result in loss of pressure to the other components connected to the same pressurization header.

All pressurized components have provisions for either local pressure indication, mounted outside the Containment, or remote low pressure alarms in the Control Room. The actuating pressure for each pressure alarm is set above incident pressure and below the nitrogen supply regulator setting.

(continued)

BASES

BACKGROUND (continued)

WC&PPS air consumption is continuously monitored by a flow sensing device located in each of the headers supplying makeup air to the four WC&PPS zones. Output from these sensors is applied to a summing amplifier which drives a total flow recorder. The flow measurement range is 0-15 scfm with an accuracy of ± 1% of full scale. High flow alarms in the Control Room are derived from the recording channel. With the WC&PPS at 43 psig and the containment at approximately atmospheric pressure, an indicated WC&PPS flow rate of 14.2 scfm is equivalent to the WC&PPS design leakage limit. A WC&PPS flow rate of 14.2 scfm, if sustained for 24 hours, is equivalent to 0.2% of the containment free volume at a pressure of 43 psig.

APPLICABLE SAFETY ANALYSES

For Indian Point 3, offsite dose calculations demonstrate compliance with 10 CFR 50.67 guidelines and the results are well within those guidelines. In these calculations, it is assumed that the Containment leaks at a rate of 0.1% per day of Containment free volume for the first 24 hours and 0.05% per day of Containment free volume thereafter. No credit is taken for the WC&PPS when determining the amount of radioactivity released for offsite dose evaluations because the integrated leakage rate tests required by Specification 5.15, Containment Leakage Rate Testing Program, are performed with the double penetration and weld channel zones open to the containment atmosphere. However, WC&PPS does provide an additional means for ensuring that containment leakage is minimized (Ref. 3).

A design function of WC&PPS is to provide a continuous, sensitive, and accurate means of monitoring leakage of selected containment isolation valves (CIVs), the air lock door seals, and containment welds that are pressurized by this system. WC&PPS leakage, even if below the WC&PPS design leakage rate, may indicate that one of these supported components is exceeding its leakage rate acceptance criteria. In this situation, the supported component may be inoperable and the APPLICABLE SAFETY ANALYSES for the supported component is applicable.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Specification 5.15, Containment Leakage Rate Testing Program, allows an exemption to Regulatory Guide 1.163, "Performance-Based Containment Leak Test Program, and ANS 56.8-1994, Section 3.3.1, in that WC&PPS supply isolation valves are not required to be Type C tested. Note that the WC&PPS supply isolation valves are normally open valves. As specified in Reference 2, operating with these valves normally open and the exemption from type C testing is acceptable because: (1) the WC&PPS is monitored for changes to the system leakage rate; (2) the WC&PPS leakage rate is quantified every 36 months; and, (3) WC&PPS pressure is maintained higher than the containment peak accident pressure (Ref. 2). Therefore, if the required pressure is not maintained or excessive WC&PPS leakage is identified, then compensatory actions are required to ensure the containment boundary is maintained.

<u>For containment isolation valves (CIVs) supported by WC&PPS</u>, WC&PPS pressurization is applied to the space between those CIVs that are normally closed. CIVs supported by WC&PPS are Type C tested in accordance with Specification 5.5.15 because WC&PPS is not credited as a seal system. <u>For loss of WC&PPS pressurization</u>, isolation of the WC&PPS supply to the affected CIVs provides appropriate compensatory action because the supported CIVs are a tested boundary and isolating the depressurized WC&PPS supply eliminates WC&PPS as a potential leakage path. <u>For high WC&PPS air consumption</u>, a consideration is that the leakage may indicate that a supported CIV is exceeding its leakage rate acceptance criteria. If the leakage path is isolated from the supported CIVs when the WC&PPS supply to the CIV is isolated, isolation of the WC&PPS supply to the CIV restores the required safety function. If the leakage path is not isolated from the supported CIV when the WC&PPS supply to the CIV is isolated (i.e., the CIV is depressurized), the supported CIV may be inoperable and the requirements of LCO 3.6.3, "Containment Isolation Valves," are applicable.

<u>For the containment air lock door seals supported by WC&PPS</u>, WC&PPS pressurization is normally applied to the space between the double gaskets on each of the airlock seals.

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BASES

APPLICABLE SAFETY ANALYSES (continued)

Air lock operability does not require pressurization of the air lock door seals except as needed to verify the seals have reseated after each air lock door is operated (see LCO 3.6.2, "Containment Air Locks"). For loss of WC&PPS pressurization, isolation of the WC&PPS supply to the affected air lock door seals provides appropriate compensatory action because pressurization is not required for air lock operability (except as needed to verify the seals have reseated after each air lock door is operated) and isolating the depressurized WC&PPS supply eliminates WC&PPS as a potential leakage path. For high WC&PPS air consumption, a consideration is that the leakage may indicate that a supported air lock seal is exceeding its leakage rate acceptance criteria. If the leakage path is isolated from the supported air lock when the WC&PPS supply to the air lock is isolated, isolation of the WC&PPS supply to the air lock restores the required safety function. If the leakage path is not isolated from the supported air lock seal when the WC&PPS supply to the air lock seal is isolated, the supported air lock may be inoperable and the requirements of LCO 3.6.2, "Containment Air Locks," are applicable.

For weld channels and piping penetrations supported by WC&PPS, WC&PPS pressurizes what is equivalent to a closed system inside containment. Because it is reasonable to assume that WC&PPS leakage is not the result of a containment weld or piping penetration defect, WC&PPS leakage and/or lack of pressurization is a concern only because it presents a potential leakage path from containment to the atmosphere via the depressurized WC&PPS. Therefore, isolation of the WC&PPS supply to the affected section of weld channel or piping penetration provides appropriate compensatory action for both loss of pressurization and air consumption caused by flow from the WC&PPS into containment. This assumes that containment leakage rate testing required by Specification 5.15 provides a high degree of assurance that WC&PPS air consumption is not indicative of deterioration of the containment boundary.

WC&PPS satisfies Criterion 3 of 10 CFR 50.36 where it is used to pressurize the space between selected CIVs and pressurize air

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

lock door seals. The WC&PPS system, if not maintained at the required pressure, represents a potential leakage path to the environment if there is a single failure of a supported CIV or air lock seal.

WC&PPS satisfies Criterion 4 of 10 CFR 50.36 it provides an additional means for ensuring that containment leakage is minimized although no credit is taken for the WC&PPS in calculating offsite dose for meeting 10 CFR 100 and GDC 19.

LCO

This LCO requires that the WC&PPS be OPERABLE. OPERABILITY requires the following: all required portions of each WC&PPS zone are pressurized to a value that exceeds peak containment pressure during a design basis accident; and, total leakage (i.e., air consumption) from the required portions of the WC&PPS are within specified limits. Limits for air consumption are based on the integrated containment leak rate test acceptance criterion and the ability of the reserve air supplies in the air receivers and nitrogen cylinders to maintain WC&PPS pressure above calculated containment pressure for a minimum of 24 hours following an event. Station Air is not credited for air supply to the WC&PPS during an event.

For a portion of the WC&PPS to be considered not required, it must meet all of the following criteria: 1) it must be inoperable (i.e., can not maintain a pressure above required limits and/or cause system air consumption to exceed required limits); 2) it must be isolated or disconnected from the system; and, 3) it must have been determined by written evaluation as not practicably accessible for repair.

Inoperable sections of WC&PPS piping which can be considered as not practicably accessible for repair will satisfy one of the following criteria: 1) the piping is covered by concrete and repairs of the piping would involve the removal of some portion of the containment structure; or, 2) the piping is located behind plant equipment in the containment building and repairs of the piping would involve the relocation of the equipment.

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BASES

LCO (continued)

The integrity of the welds associated with any disconnected or isolated portions of the WC&PPS is considered verified by integrated leak rate testing performed in accordance with Specification 5.15. The provision that allows for the disconnection of portions of the WC&PPS piping does not apply to any other WC&PPS piping.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. WC&PPS is required to support OPERABILITY of the containment, containment air locks, and selected containment isolation valves. In MODES 5 and 6, OPERABILITY of the containment, containment air locks, and containment isolation valves is not required. Therefore, the WC&PPS is not required to be OPERABLE in MODES 5 and 6.

ACTIONS

The ACTIONS are modified by two Notes. Note 1 is added to clarify that Separate Condition entry is allowed for each component supplied by WC&PPS. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for each component supported by WC&PPS. Complying with the Required Actions may allow for continued operation, and subsequent inoperable WC&PPS components are governed by subsequent Condition entry and application of associated Required Actions.

Note 2 is added to direct entry into the applicable Conditions and Required Actions of LCO 3.6.1, "Containment," if it is determined that WC&PPS inoperability is indicative of exceeding the overall containment leakage rate. Note that entry into the Conditions and Required Actions of LCO 3.6.1 may be required even if WC&PPS air consumption limits are not exceeded.

<u>A.1 and A.2</u>

In the event one or more components supplied by WC&PPS is not within the pressure limit of SR 3.6.10.1, Required Action A.1 requires that the WC&PPS supply to the affected weld channels, penetrations, or containment isolation valves must be isolated within 4 hours. Required Action A.1 is needed because isolation of the WC&PPS

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

supply to the affected component results in using an isolation valve as a substitute for pressurization. This prevents the WC&PPS from becoming a potential leakage path from the containment to the atmosphere. This action satisfies the required safety function because the leakage rate testing performed in accordance with Specification 5.15 has already verified that the containment leakage rate is within required limits without crediting the WC&PPS.

The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, a blind flange (including Swagelok fittings), and a check valve with flow through the valve secured (Ref. 3). For a WC&PPS supply isolated in accordance with Required Action A.1, the device used to isolate the weld channel, penetration or containment isolation valves should be the closest available to component. Required Action A.1 must be completed within 4 hours. The 4 hour Completion Time is reasonable, considering the time required to isolate the penetration and the relative importance of supporting containment OPERABILITY during MODES 1, 2, 3, and 4.

If a WC&PPS supply cannot be restored to OPERABLE status within the 4 hour Completion Time and is isolated in accordance with Required Action A.1, the affected penetration flow paths must be verified to be isolated on a periodic basis. This is necessary to ensure that containment penetrations required to be isolated following an accident and not pressurized by WC&PPS will be in the isolation position should an event occur. Required Action A.2 does not require any testing or device manipulation. This action involves verification, through a system walkdown, that isolation devices outside containment and capable of being mispositioned are in the correct position. The Completion Time of "once per 31 days for isolation devices outside containment" and exempting valves that are locked, sealed or otherwise secured in the required position is appropriate considering the fact that the devices are operated under administrative controls and the

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

probability of their misalignment is low. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

Required Action A.2 is modified by a Note that applies to isolation devices located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of these devices, once they have been verified to be in the proper position, is small.

B.1, B.2 and B.3

Condition B applies if WC&PPS has air consumption that places the WC&PPS outside the limits of SR 3.6.10.2. This also applies if the air receivers or nitrogen cylinders necessary to maintain WC&PPS pressure above calculated containment pressure for a minimum of 24 hours following a design basis event are unavailable. In this condition, Required Action B.3 requires that portions of the WC&PPS are isolated, as necessary, to restore WC&PPS leakage to within the limits of SR 3.6.10.2. However, safety function is not restored until any portions of the WC&PPS that are depressurized by this Action are isolated. Therefore, Required Action B.3, is modified by a Note that requires entry into Condition A for components not within the pressure limit of SR 3.6.10.1 as a result of isolating the leakage path. The Completion Time of 7 days to isolate the leakage path is acceptable because all un-isolated portions of the WC&PPS are pressurized, otherwise, Condition A is applicable immediately. Safety function is restored when leaking portions of the WC&PPS are isolated and at least one isolation device separates the containment barrier from the WC&PPS leakage path. If leakage exceeds 0.2%, then replenishment would be required before 24 hours, during an accident.

(continued)

BASES

ACTIONS

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

As discussed in the Applicable Safety Analyses above, safety function is not restored by Required Action B.3 if the air consumption leakage path is depressurized but not isolated from the supported containment isolation valves or containment air lock seal. In this situation, the WC&PPS air consumption leakage path could create a leakage path from containment to the atmosphere. Therefore, Required Action B.1 requires entry into the applicable Conditions and Required Actions of LCO 3.6.3, "Containment Isolation Valves" within 1 hour of discovery that the WC&PPS air consumption leakage path is depressurized and not isolated from the supported containment isolation valves. Likewise, Required Action B.2 requires entry into the applicable Conditions and Required Actions of LCO 3.6.2, "Containment Air Locks" within 1 hour of discovery that the WC&PPS air consumption leakage path is depressurized and not isolated from the supported air locks. The Required Actions of LCO 3.6.2 and LCO 3.6.3 will restore safety function for WC&PPS air consumption leakage path that is depressurized.

C.1 and C.2

If the Required Actions and associated Completion Times are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.10.1

This SR requires periodic verification during plant operation that the required portions of each WC& PPS zone are maintained at a pressure greater than the containment peak accident pressure.

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.10.1 (continued)

This SR is satisfied by verification of zone pressure on each of the four WC&PPS zones is above the specified limit. The 31 day Frequency is acceptable because there are low pressure alarms in the Control Room to ensure that operators are aware that all WC&PPS zones are pressurized.

SR 3.6.10.2

This SR requires periodic verification during plant operation that the WC&PPS air consumption is ≤ 0.2% of the containment free volume per day. This SR is performed by taking the sum of the reading on the flow sensing devices located in each of the zone headers. A WC&PPS flow rate of 14.2 scfm, if sustained for 24 hours, is equivalent to 0.2% of the containment free volume at a pressure of 43 psig. The 31 day Frequency recognizes that WC&PPS air consumption indication and high flow alarms are provided in the control room.

SR 3.6.10.3

This SR, sometimes called the sensitive leak rate test, ensures that the leakage rate for the WC&PPS is ≤ 0.2% of the containment free volume per day when pressurized to ≥ 43 psig above containment pressure. The sensitive leak rate test includes only the volume of the weld channels, double penetrations, and containment isolation valves supported by WC&PPS. This test is considered more sensitive than the integrated leakage rate test, as the instrumentation used permits a direct measurement of leakage from the pressurized zones. The 36 month Frequency is acceptable because experience has shown that the WC&PPS usually passes this Surveillance when performed at the 36 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint. The Frequency is modified by a Note indicating that SR 3.0.2 is not applicable.

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BASES

REFERENCES

1. FSAR, Section 6.6.
2. Safety Evaluation Report for IP3 Amendment 174.
3. FSAR, Section 14.3.
4. Standard Review Plan Section 6.2.4.