Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.2:

"Engineered Safety Feature Actuation System (ESFAS) Instrumentation"

PART 1:

Indian Point 3
Improved Technical Specifications and Bases

3.3 INSTRUMENTATION

3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1.

ACTIONS

----------NOTE----------

Separate Condition entry is allowed for each Function.

RAI -02

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
B. One channel or train inoperable.	B.1 Restore channel or train to OPERABLE status. **OR** B.2.1 Be in MODE 3. **AND** B.2.2 Be in MODE 5.	48 hours 54 hours 84 hours

(continued)

Table 3.3.2-1 (page 1 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	
1. Safety Injection						
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA	
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	RAI-03
c. Containment Pressure-Hi	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 4.80 psig	
d. Pressurizer Pressure-Low	1,2,3[b]	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 1690 psig	NYPA
e. High Differential Pressure Between Steam Lines	1,2,3	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	NA	NYPA RAI-04
f. High Steam Flow in Two Steam Lines	1,2[d],3[d]	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	(c)	RAI-01
Coincident with T_{avg}- Low	1,2[d],3[d]	1 per loop	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 538 °F	NYPA RAI-04

(continued)

(a) Not used RAI-03

(b) Above the Pressurizer Pressure interlock.

(c) Less than or equal to turbine first stage pressure corresponding to 54% full steam flow below 20% load, and increasing linearly from 54% full steam flow at 20% load to 110% full steam flow at 100% load, and corresponding to 110% full steam flow above 100% load. Time delay for SI ≤ 6 seconds. NYPA

(d) Except when all MSIVs are closed.

RAI-04

Table 3.3.2-1 (page 2 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	
1. Safety Injection (continued)						
g. High Steam Flow in Two Steam Lines	1,2[d],3[d]	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	(c)	RAI-04
Coincident with Steam Line Pressure-Low	1,2[d],3[d]	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 500 psig	NYPA RAI-04
2. Containment Spray						
a. Manual Initiation	1,2,3,4	2 per train, 2 trains	B	SR 3.3.2.6	NA	
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	RAI-03
c. Containment Pressure (Hi-Hi)	1,2,3	2 sets of 3	E	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 24 psig	NYPA

(continued)

(c) Less than or equal to turbine first stage pressure corresponding to 54% full steam flow below 20% load, and increasing linearly from 54% full steam flow at 20% load to 110% full steam flow at 100% load, and corresponding to 110% full steam flow above 100% load. Time delay for SI ≤ 6 seconds. RAI-03 NYPA

(d) Except when all MSIVs are closed. RAI-04

Table 3.3.2-1 (page 3 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. Containment Isolation					
a. Phase A Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
b. Phase B Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA
(3) Containment Pressure (Hi- Hi)	1,2,3	2 sets of three	E	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 24 psig

RAI-03

RAI-03

NYPA

(continued)

RAI-03

Table 3.3.2-1 (page 4 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	
4. Steam Line Isolation						
a. Manual Initiation	1,2(d),3(d)	2 per steam line	F	SR 3.3.2.6	NA	
b. Automatic Actuation Logic and Actuation Relays	1,2(d),3(d)	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	
c. Containment Pressure (Hi-Hi)	1,2(d), 3(d)	2 sets of 3	E	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 24 psig	NYPA
d. High Steam Flow in Two Steam Lines	1,2(d), 3(d)	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	(c)	RAI-04
Coincident with T_{avg}-Low	1,2(d), 3(d)	1 per loop	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 538°F	NYPA RAI-04
e. High Steam Flow in Two Steam Lines	1,2(d), 3(d)	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	(c)	RAI-04
Coincident with Steam Line Pressure – Low	1,2(d), 3(d)	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 500 psig	NYPA RAI-04

(continued)

(c) Less than or equal to turbine first stage pressure corresponding to 54% full steam flow below 20% load, and increasing linearly from 54% full steam flow at 20% load to 110% full steam flow at 100% load, and corresponding to 110% full steam flow above 100% load. Time delay for SI ≤ 6 seconds NYPA

(d) Except when all MSIVs are closed. RAI-04

Table 3.3.2-1 (page 5 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Feedwater Isolation					
a. Safety Injection	1,2[e]	2 trains	H	SR 3.3.2.2 SR 3.3.2.5	NA
b. SG Water Level-High High	1,2[e]	3 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≤ 81% NYPA
6. Auxiliary Feedwater					
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.5	NA
b. SG Water Level-Low Low	1,2,3	3 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 4.0% NR NYPA RAI-04
c. Safety Injection [g]	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
d. Loss of Offsite Power (Non SI Blackout Sequence Signal)	1,2,3	2	F	SR 3.3.2.6 SR 3.3.2.7	≥ 200 V RAI-06
e. Trip of Main Boiler Feedwater Pumps	1[f], 2[f]	1 per MBFP	I	SR 3.3.2.6	NA

(continued)

(e) Except when all MBFPDVs, or MBFRVs and associated bypass valves are closed or isolated by a closed manual valve.

(f) Only required for MBFPs that are in operation.

(g) Not required if AFW pump not required to be OPERABLE.

RAI-04

Table 3.3.2-1 (page 6 of 6)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION S	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
7.	ESFAS Interlocks-Pressurizer Pressure	1,2,3	3	K	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	NA

NYPA

BASES

BACKGROUND (continued)

allocation exists between this actual trip function actuation point and the analytical limit. The Allowable Value is more conservative than the Analytical Limit to account for instrument uncertainties that either are not present or are not measured during periodic testing. Channel uncertainties that either are not present or are not measured during periodic testing may include design basis accident temperature and radiation effects (Ref. 6) or process dependent effects. The channel allowable value for each ESFAS function is controlled by Technical Specifications and is listed in Table 3.3.2-1, Engineered Safety Feature Actuation System Instrumentation. RAI-08 RAI-08

d. Calibration acceptance criteria (i.e., setpoints) are established by plant administrative programs for the components of a channel (i.e., required sensor, alarm, interlock, display, and trip function). The calibration acceptance criteria are established to ensure, within the required level of confidence, that the Allowable Value for the entire channel will not be exceeded during the calibration interval.

A description of the methodology used to calculate the channel allowable values and calibration acceptance criteria is provided in References 6 and 8.

Setpoints in accordance with the Allowable Value ensure that the consequences of Design Basis Accidents (DBAs) will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA and the equipment functions as designed.

Each channel required to be OPERABLE can be tested on line, as necessary, to verify that the signal processing equipment and setpoint accuracy is within the specified allowance requirements of Reference 2. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SR section. RAI-08

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

This LCO requires two trains to be OPERABLE. Actuation logic consists of all circuitry within the actuation subsystems, including the initiating relay contacts responsible for actuating the ESF equipment.

Manual and automatic initiation of SI must be OPERABLE in MODES 1, 2, and 3. In these MODES, there is sufficient energy in the primary and secondary systems to warrant automatic initiation of ESF systems. Manual Initiation is also required in MODE 4 even though automatic actuation is not required. In this MODE, adequate time is available to manually actuate required components in the event of a DBA, but because of the large number of components actuated on a SI, actuation is simplified by the use of the manual actuation push buttons. RAI-03

These Functions are not required to be OPERABLE in MODES 5 and 6 because there is adequate time for the operator to evaluate unit conditions and respond by manually starting individual systems, pumps, and other equipment to mitigate the consequences of an abnormal condition or accident. Unit pressure and temperature are very low and many ESF components are administratively locked out or otherwise prevented from actuating to prevent inadvertent overpressurization of unit systems.

c. Safety Injection-Containment Pressure-High

This signal provides protection against the following accidents:

- SLB inside containment; and
- LOCA.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

Three channels of pressurizer pressure provide input into the ESFAS actuation logic. These channels initiate the ESFAS automatically when two of the three channels exceed the low pressure setpoint. These protection channels also provide control functions; however, the two-out-of-three logic is considered adequate to provide the required protection.
The transmitters are located inside containment, with the taps in the vapor space region of the pressurizer, and thus possibly experiencing adverse environmental conditions (LOCA, SLB inside containment, rod ejection). Therefore, the Allowable Value reflects the inclusion of both steady state and adverse environmental instrument uncertainties. RAI-08

This Function must be OPERABLE in MODES 1, 2, and 3 (above the Pressurizer Pressure Interlock (Function 7) to mitigate the consequences of an HELB inside containment. This signal may be manually blocked by the operator below the Pressurizer Pressure Interlock (Function 7) setpoint. Automatic SI actuation below this pressure setpoint is performed by the Containment Pressure-High signal.

This Function is not required to be OPERABLE in MODE 3 below the Pressurizer Pressure Interlock (Funtion 8) setpoint. Other ESF functions are used to detect accident conditions and actuate the ESF systems in this MODE. In MODES 4, 5, and 6, this Function is not needed for accident detection and mitigation.

e. Safety Injection- High Differential Pressure Between Steam Lines

Steam Line Pressure – High Differential Pressure Between Steam Lines provides protection against the following accidents:

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

- SLB; and
- Inadvertent opening of an ADV or an SG safety valve.

High Differential Pressure Between Steam Lines provides no input to any control functions. Thus, three OPERABLE channels on each steam line are sufficient to satisfy the requirements, with a two-out-of-three logic on each steam line.

With the transmitters located inside the auxiliary feed pump room, it is possible for them to experience adverse environmental conditions during a HELB event. Therefore, the surveillance acceptance criterion reflects both steady state and adverse environmental instrument uncertainties. RAI-08

Steam line high differential pressure must be OPERABLE in MODES 1, 2, and 3 when a secondary side break or stuck open valve could result in the rapid depressurization of the steam line(s). This Function is not required to be OPERABLE in MODE 4, 5, or 6 because there is not sufficient energy in the secondary side of the unit to cause an accident.

The surveillance acceptance criterion used for this function is ≤142 psid. NYPA

f, g. Safety Injection-High Steam Flow in Two Steam Lines Coincident With T_{avg}-Low or Coincident With Steam Line Pressure-Low

These Functions (1.f and 1.g) provide protection against the following accidents:

- SLB; and
- the inadvertent opening of a SG safety valve.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

The Allowable Value for high steam flow is a linear function that varies with power level. The function is a turbine first stage pressure corresponding to approximately 54% of full steam flow between 0% and 20% load to approximately 110% of full steam flow at 100% load. The nominal trip setpoint is similarly calculated. INRA

With the transmitters located inside the containment (RCS temperature and steam line flow) or inside the auxiliary feedwater building (steam pressure), it is possible for them to experience adverse steady state environmental conditions during an SLB event. Therefore, the Allowable Value reflects both steady state and adverse environmental instrument uncertainties.

This Function must be OPERABLE in MODES 1, 2, and 3 when any MSIV is open because a secondary side break or stuck open valve could result in the rapid depressurization of the steam line(s). SLB may be addressed by Containment Pressure High (inside containment) or by High Steam Flow in Two Steam Lines coincident with Steam Line Pressure – Low, for Steam Line Isolation, followed by High Differential Pressure Between Two Steam Lines, for SI. This Function is not required to be OPERABLE in MODE 4, 5, or 6 because there is insufficient energy in the secondary side of the unit to cause an accident.

2. Containment Spray

Containment Spray provides three primary functions:

1. Lowers containment pressure and temperature after an HELB in containment;

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

operators to evaluate unit conditions and respond, to mitigate the consequences of abnormal conditions by manually starting individual components.

c. Containment Spray-Containment Pressure Hi-Hi

This signal provides protection against a LOCA or an SLB inside containment. The transmitters (d/p cells) are located outside of containment with the sensing line (high pressure side of the transmitter) located inside containment. The transmitters and electronics are located outside of containment. Thus, they will not experience any adverse environmental conditions and the Allowable Value reflects only steady state instrument uncertainties. RAI-08

This Function requires the bistable output to energize to perform its required action. It is not desirable to have a loss of power actuate containment spray, because the consequences of an inadvertent actuation of containment spray could be serious. Therefore, the IP3 design consists of 2 sets of 3 channels (i.e., 6 pressure instruments) and 2 channels from each set of 3 are required to energize to actuate Containment Spray. This configuration provides sufficient redundancy to prevent a single failure from causing or preventing Containment Spray initiation even when testing with one inoperable channel already in trip. The Required Actions for an inoperable channel associated with this Function decreases the probability of an inadvertent actuation by allowing no more than one channel per set to be placed in trip.

Containment pressure is not used for control; therefore, this arrangement exceeds the minimum redundancy requirements.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

actuation is not required. In this MODE, adequate time is available to manually actuate required components in the event of a DBA, but because of the large number of components actuated on a Phase A Containment Isolation, actuation is simplified by the use of the manual actuation push buttons. Automatic actuation logic and actuation relays must be OPERABLE in MODE 4 to support system level manual initiation. In MODES 5 and 6, there is insufficient energy in the primary or secondary systems to pressurize the containment to require Phase A Containment Isolation. There also is adequate time for the operator to evaluate unit conditions and manually actuate individual isolation valves in response to abnormal or accident conditions.

RAI-03

(3) Phase A Isolation-Safety Injection

Phase A Containment Isolation is also initiated by all Functions that initiate SI. The Phase A Containment Isolation requirements for these Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating Functions and requirements.

b. Containment Isolation-Phase B Isolation

Phase B Containment Isolation is accomplished by Manual Initiation, Automatic Actuation Logic and Actuation Relays, and by Containment Pressure channels (the same channels that actuate Containment Spray, Function 2). The Containment Pressure trip of Phase B Containment Isolation is energized to trip in order to minimize the potential of spurious trips that may damage the RCPs.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

other accident. This could result in the release of significant quantities of energy and cause a cooldown of the primary system. The Steam Line Isolation Function is required in MODES 2 and 3 unless all MSIVs are closed. In MODES 4, 5, and 6, there is insufficient energy in the RCS and SGs to experience an SLB or other accident releasing significant quantities of energy.

c. Steam Line Isolation-Containment Pressure (Hi-Hi)

This Function actuates closure of the MSIVs in the event of a LOCA or an SLB inside containment to limit the mass and energy release to containment. The transmitters (d/p cells) are located outside containment. Containment Pressure-High-High provides no input to any control functions. The transmitters and electronics are located outside of containment. Thus, they will not experience any adverse environmental conditions, and the Allowable Value reflects only steady state instrument uncertainties. RAI-08

The IP3 design consists of 2 sets of 3 channels and 2 channels from each set of 3 are required to energize to actuate steam line isolation on high pressure in the containment. This is the same logic that initiates Containment Spray. Therefore, this logic is designed to provide sufficient redundancy to prevent a single failure from causing or preventing Containment Spray initiation even when testing with one inoperable channel already in trip. The Required Action for an inoperable channel associated with this Function is modified by a Note that permits no more than one channel per set to be placed in trip to decrease the probability of an inadvertent actuation.

Containment Pressure-High-High must be OPERABLE in MODES 1, 2, and 3, when there is sufficient energy in the primary and secondary side to pressurize the

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BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

This Function is actuated by SG Water Level-High High or by an SI signal. The RPS also initiates a turbine trip signal whenever a reactor trip is generated. In the event of SI, the unit is taken off line and the turbine generator must be tripped. The MFW System is also taken out of operation and the AFW System is automatically started. The SI signal was discussed previously. NYPA

a. Feedwater Isolation-Safety Injection

Feedwater Isolation is also initiated by all Functions that initiate SI. Therefore, there are two trains of this Function, one initiated by SI train A and one initiated by SI train B.

b. Feedwater Isolation - Steam Generator Water Level- High High

This signal provides protection against excessive feedwater flow. Signals from two-out-of-three channels from any one SG will isolate feedwater flow by closing two MBFPDVs and MBFRVs. The LCO requires three OPERABLE channels per steam generator.

The transmitters (d/p cells) are located inside containment. However, the events that this Function protects against cannot cause a severe environment in containment. Therefore, the Allowable Value reflects only steady state instrument uncertainties. NYPA

Feedwater Isolation Functions must be OPERABLE in MODES 1 and 2 and 3 except when all MBFPDVs or MBFRVs and associated low flow bypass valves are closed or isolated by a closed manual valve when the MFW System is in operation. In MODES 4, 5, and 6, the MFW System is not in service and this Function is not required to be OPERABLE.

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BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

With the transmitters (d/p cells) located inside containment and thus possibly experiencing adverse environmental conditions, the Allowable Value reflects the inclusion of both steady state and adverse environmental instrument uncertainties. RAI-08

c. Auxiliary Feedwater-Safety Injection

An SI actuation starts the motor driven AFW pumps. The AFW initiation functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating functions and requirements.

d. Auxiliary Feedwater-Loss of Offsite Power

A turbine trip in conjunction with a loss of offsite power to the safeguards buses will be accompanied by a loss of reactor coolant pumping power and the subsequent need for some method of decay heat removal. The loss of offsite power (Non SI blackout signal) is detected by a voltage drop on 480 V bus 3A and/or 6A. Loss of power to either safeguards bus will start the turbine driven AFW pump 32 to ensure that at least one SG contains enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip following a loss of offsite power.

The LCO requires two OPERABLE channels, one OPERABLE channel for bus 3A and one OPERABLE channel for bus 6A. Either channel will start the turbine driven AFW pump. Therefore, a single failure of one channel of non-Safety Injection blackout sequence will not result in a loss of Function. RAI-06

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

Functions 6.a through 6.d must be OPERABLE in MODES 1, 2, and 3 to ensure that the SGs remain the heat sink for the reactor. SG Water Level – Low Low in any operating SG will cause the motor driven AFW pump to start. The system is aligned so that upon a start of the pump, water immediately begins to flow to the SGs. SG Water Level – Low Low in any two operating SGs will cause the turbine driven pump to start. These Functions do not have to be OPERABLE in MODES 5 and 6 because there is not enough heat being generated in the reactor to require the SGs as a heat sink. In MODE 4, AFW actuation does not need to be OPERABLE because either AFW or residual heat removal (RHR) will already be in operation to remove decay heat or sufficient time is available to manually place either system in operation.

The Allowable Value for this Function is based on anticipated 480 V bus voltage transient conditions to prevent spurious trips and needless disconnection of safety buses from preferred power (Offsite Power). The analytical limit for event analysis purposes is 0 Volts AC (i.e. complete loss of offsite power). The Allowable Value is therefore is conservative relative to the actual operability limit.

NYPA

e. Auxiliary Feedwater-Trip of Main Feedwater Pumps

A Trip of either MBFW pump is an indication of a potential loss of MFW and the potential need for some method of decay heat and sensible heat removal to bring the reactor back to no load temperature and pressure. Each turbine driven MBFW pump is equipped with a pressure switch on the control oil line for the speed control system. A low pressure signal from this pressure switch indicates a trip of that pump. The single channel associated with each operating MBFP will start both motor driven AFW pumps. However, there is no single failure tolerance for this Function unless both MBFPs are operating.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

This is acceptable because this is a backup method for starting AFW and other Functions, in particular SG Water Level – Low Low, provide the primary protection against a loss of heat sink. The LCO requires one Operable channel for each operating MBFP. A trip of either MBFW pump starts both motor driven AFW pumps to ensure that at least one SG is available with water to act as the heat sink for the reactor.

Function 6.e must be OPERABLE in MODES 1 and 2. This ensures that at least one SG is provided with water to serve as the heat sink to remove reactor decay heat and sensible heat in the event of loss of normal feedwater. In MODES 3, 4, and 5, the MBFW pumps are shut down, and thus MBFW pump trip does not require automatic AFW initiation.

7. ESFAS Interlock-Pressurizer Pressure

The Pressurizer Pressure interlock permits a normal unit cooldown and depressurization without actuation of SI. With two-out-of-three pressurizer pressure channels (discussed previously) less than the setpoint, the operator can manually block the Pressurizer Pressure-Low SI signal. With two-out-of-three pressurizer pressure channels above the setpoint, the Pressurizer Pressure-Low SI signal is automatically enabled. The operator can also enable these trips by use of the respective manual blocking switches.

This Function must be OPERABLE in MODES 1, 2, and 3 to allow an orderly cooldown and depressurization of the unit without the actuation of SI. The interlock Functions back up manual actions to ensure bypassable functions are in operation under the conditions assumed in the safety analyses. This Function does not have to be OPERABLE in MODE 4, 5, or 6 because system pressure must already be below the setpoint for the requirements of the heatup and cooldown curves to be met.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES, LCO and APPLICABILITY (continued)

The surveillance acceptance criterion for this function is ≤1980 psig. NYPA

The ESFAS instrumentation satisfies Criterion 3 of 10 CFR 50.36.

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.2-1. RAI-02

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument Loop, signal processing electronics, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the protection Function(s) affected. When the Required Channels in Table 3.3.2-1 are specified (e.g., on a per steam line, per loop, per SG, etc., basis), then the Condition may be entered separately for each steam line, loop, SG, etc., as appropriate. RAI-08

When the number of inoperable channels in a trip function exceed those specified in one or other related Conditions associated with a trip function, then the unit is outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered if applicable in the current MODE of operation.

A.1

Condition A applies to all ESFAS protection functions.

Condition A addresses the situation where one or more channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.2-1 and to take the Required Actions for the protection functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

(continued)

BASES

ACTIONS

H.1 and H.2 (continued)

systems. These Functions are no longer required in MODE 3. Placing the unit in MODE 3 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 8 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 8 hours is the average time required to perform channel surveillance.

I.1, I.2 and J.1

Condition I applies to the AFW pump start on trip of either Main Boiler Feedwater pump.

The OPERABILITY of the AFW System must be assured by allowing automatic start of the AFW System pumps. The single channel associated with each operating MBFP will start both motor driven AFW pumps. However, there is no single failure tolerance for this Function unless both MBFPs are operating. Therefore, when a channel is inoperable, Required Action I.1, verifies that one channel associated with an operating MBFP is OPERABLE to ensure that there is no loss of function. Otherwise, entry into LCO 3.0.3 is required. If both MBFPs are operating, Required Action I.2 allows 48 hours to restore redundancy by requiring one channel associated with each operating MBFP to be OPERABLE. Continued operation without redundant channels for 48 hours is acceptable because this is a backup method for starting AFW and other Functions, in particular SG Water Level – Low Low, provide the primary protection against a loss of heat sink. RAI-05

If the function cannot be returned to an OPERABLE status, 6 hours are allowed by Required Action J.1 to place the unit in MODE 3.

(continued)

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.2:

"ESFAS INSTRUMENTATION"

PART 2:

CURRENT TECHNICAL SPECIFICATION PAGES

Annotated to show differences between CTS and ITS

CTS PAGE	AMENDMENT FOR REV O SUBMITTAL	AMENDMENT FOR REV 1 SUBMITTAL	COMMENT
3.5-1	26	26	
3.5-2	65	65	
3.5-3	26	26	
3.5-4	106	106	
3.5-5	26; 5-17-90	26;5-17-90	
3.5-6	154	154	
3.5-7	154	154	
3.5-8	154	154	
3.5-9	154	154	
T3.5-1(1)	154	154	
T3.5-3(1)	113	113	
T3.5-3(2)	151	151	
T3.5-3(3)	151	151	
T3.5-4(1)	151	151	
T3.5-4(2)	151	151	
4.1-1	97	97	
4.1-3	148	148	
4.1-4	107	107	
4.1-5	107;97-156	182	Surveillance Frequency for Turbine Stop and Control Valves Changed
T4.1-1(1)	170;98-043	185	Instrument Channel Surveillance Interval increased from 18 to 24 months
T4.1-1(2)	169	200	Deleted Boric Acid Tank Level Surveillance
T4.1-1(3)	168;98-043	192	Turbine Trip Low Auto Stop Oil Pressure Changed (Power > P-8)
T4.1-1(4)	169;98-043	200	Deleted Surveillance Requirement for Volume Control Tank Level and Boric Acid Makeup Flow Channel
T4.1-1(5)	169;98-043	185	Instrument Channel Surveillance Interval increased from 18 to 24 months
4.5-1	142	142	
4.5-2	172;98-043	185	One time extension for containment spray nozzle test
4.7-1	133	133	

Paragraph b of DOCs A.3 to A.30

3.3.2, Req Action	~~3.5.4~~	In the event of instrumentation channel failure permitted by specification 3.5.2, the Minimum Degree of Redundancy listed in Tables 3.5-2 through 3.5-4 may be reduced by one, but to not less than zero, and the Minimum Number of Operable Channels listed in these tables may be reduced by one, but not to less than one (except as noted in Table 3.5-3) for a period of 8 hours while instrument channels are tested. The failed channel may be blocked to prevent an unnecessary reactor trip during this time. ~~In the case of three loop operation, the out-of-service channel is permitted to be bypassed during the test period.~~ (A.34) (A.33) R.1
Note to Req Action C.1, D.1, E.1, G.1, H.1		
T3.3.2-1, #7, T3.3.2-1, Note b, Action J.1,	~~3.5.5~~	The low pressurizer pressure safety injection trip shall be unblocked when the pressurizer pressure is ≥ ~~2000~~ 1990 psig. (A.30) R.1
SEE ITS 3.3.1	3.5.6	At least one source range and one intermediate range nuclear instrument channel shall be operable prior to reactor start-up.
SEE ITS 3.3.3	3.5.7	When the reactor is not in the cold shutdown condition, the instrumentation requirements as stated in Table 3.5-5 shall be met.
T3.3.2-1, #1c	3.5.8	A minimum of two channels of containment pressure must be operable when T_{avg} is greater than 350°F. (A.5)

Amendment No. ~~28~~, 65

TSCR 96-124 not shown

TABLE 3.5-1 (Sheet 1 of 2)

ENGINEERED SAFETY FEATURES INITIATION INSTRUMENT ALLOWABLE VALUES

	No. FUNCTIONAL UNIT	CHANNEL	ALLOWABLE VALUE		
T3.3.2-1, #1.c	1. High Containment Pressure (Hi Level)	Safety Injection	≤ 4.5 psig 4.80 L.1	A.5	
T3.3.2-1, #2.c 4.c 3.b.(3)	2. High Containment Pressure (Hi-Hi Level)	a. Containment Spray b. Steam Line Isolation	≤ 24 psig	A.12 A.21 A.18	R.1
T3.3.2-1, #1.d	3. Pressurizer Low Pressure	Safety Injection	≥ 1700 psig 1695 L.1	A.6	R.1
T3.3.2-1, #1.e	4. High Differential Pressure Between Steam Lines	Safety Injection	≤ 150 psi 200	A.7	R.1
T3.3.2-1, #1.f 1.g	5. High Steam Flow in 2/4 Steam Lines Coincident with Low T_{avg} or Low Steam Line Pressure	a. Safety Injection	≤ 6 sec. time delay for SI actuation ≤ 49% of full steam flow at zero load 54.0 L.1 ≤ 49% of full steam flow at 20% load ≤ 110% of full steam flow at full load ≥ 540°F T_{avg} 538.0 L.1 ≥ 600 psig steam line pressure 500.0 L.1	A.8 A.9 A.22 A.23	R.1
T3.3.2-1, 4.d 4.e		b. Steam Line Isolation T3.3.2-1, Note (C)			R.1
T3.3.2-1, 6.b	6. Steam Generator Water Level (low-low)	Auxiliary Feedwater	≥ 5% of narrow range instrument span each steam generator 4.0 L.1	A.26	R.1
T3.3.2-1 #6.d	7.*a. 480v Bus Undervoltage Relay		≥ 200v**		
SEE ITS 3.3.5	b. 480v Bus Degraded Voltage Relay (Non-SI)		≥ 414v with a ≤45 sec time delay	SEE 3.3.5	
SEE 3.3.5	c. 480v Bus Degraded Voltage Relay (Coincident SI)		≥ 414v with a ≤10 sec time delay	SEE 3.3.5	

ITS 3.3.2

Amendment No. ~~28~~, ~~38~~, ~~34~~, ~~108~~, 154

Add Function 3.a.2 and Cond C — A.14

Add Function 3.b.2 and Cond C — A.17

Add Function 1.a and Condition C — A4

Add Function 2.b and Condition C — A.11

Add Function 4.b and Cond G — A20

Add Function 6.a and Cond G — A25

TABLE 3.5-3 (Sheet 3 of 3)

INSTRUMENTATION OPERATING CONDITION FOR ENGINEERED SAFETY FEATURES

No. FUNCTIONAL UNIT	1 NO. OF CHANNELS	2 NO. OF CHANNELS TO TRIP	3 MIN. NUMBER OF OPERABLE CHANNELS	4 MIN. DEGREE OF REDUNDANCY	5 OPERATOR ACTION IF CONDITIONS OF COL. 3 OR 4 CANNOT BE MET (Note 6)
SEE ITS 3.3.5 — 4. LOSS OF POWER					
a. 480v Bus Undervoltage Relay	2/bus	1/bus	1/bus	0	See Note 1
b. 480v Bus Degraded Voltage Relay	2/bus	2/bus	2/bus (See Note 2)	0	See Note 1
SEE ITS 3.4.12 — 5. OVERPRESSURE PROTECTION SYSTEM (OPS)	3	2	2	1	See Note 7

SEE ITS 3.3.5

Note 1. If the 138KV and 13.8KV sources of offsite power are available and the conditions of column 3 or 4 cannot be met within 72 hours, then the requirements of 3.7.C.1 or 2 shall be met.

Note 2. If one channel becomes inoperable, it is placed in the trip position and the minimum number of operable channels is reduced by one.

T3.3.2-1, Note 8 — Note 3. Permissible to bypass if reactor coolant pressure is less than 2000 psig. 1990.0 R.1 A.6 A.30

~~Note 4. Must actuate 2 switches simultaneously.~~ LA.1

Reg Act K.1 — Note 5. The Minimum Number of Operable Channels and the Minimum Degree of Redundancy may be reduced to zero if the SI bypass is in the unblocked position. A.30

Reg Actions B.1 through J.1 — Note 6. If the condition of Column 3 or 4 cannot be met, the reactor shall be placed in the hot shutdown condition, utilizing normal operating procedures, within 4 hours of the occurrence. ~~If the conditions are not met within 24 hours of the occurrence, the reactor shall be placed in the cold shutdown condition, or the alternate condition, if applicable, within an additional 24 hours.~~

(within 6 hours if no loss of function, immediately if loss of function) L.3

M.5

A.3 to A.30

SEE ITS 3.4.12 — Note 7. Refer to Specification 3.1.A.8.

SEE ITS 3.4.12

~~Note 8. Main steam isolation valves may be closed in lieu of going to cold shutdown if the circuitry associated with closing the valves is the only portion inoperable.~~

A.12.C A.35

ITS 3.3.2

Amendment No. ~~38~~, ~~44~~, ~~54~~, ~~67~~, ~~113~~, 151

Add Automatic Actuation Logic and Actuation Relays

- Safety Injection — A.4
- Containment Spray — A.11
- Phase A Isol — A.14
- Phase B Isol — A.17
- Steam Line Isol — A.20
- AFW — A.25

TSCR 96-124 not shown

SR 3.3.7.1 SR 3.3.7.7 SR 3.3.7.4

TABLE 4.1-1 (Sheet 2 of 6)

	Channel Description	Check	Calibrate	Test	Remarks
SEE 3.3.1	8. 6.9 KV Voltage 6.9 KV Frequency	N.A. N.A.	18M 24M	Q Q	Reactor protection circuits only Reactor protection circuits only
SEE 3.1.7	9. Analog Rod Position	S	24M	M	
T3.3.2-1, #6.b	10. Steam Generator Level	S SR 3.3.2.1	24M SR 3.3.2.7	Q SR 3.3.2.4	
SEE ITS 3.3.3	11. Residual Heat Removal Pump Flow	N.A.	24M	N.A.	A.26
	12. Boric Acid Tank Level	S	24M	N.A.	Bubbler tube rodded during calibration } Deleted by Amend 200
	13. Refueling Water Storage Tank Level a. Transmitter b. Indicating Switch	W W	18M 6M	N.A. N.A.	Low level alarm Low level alarm
SEE 3.3.3	14a. Containment Pressure - narrow range 14b. Containment Pressure - wide range	S M	24M 18M	Q N.A.	High and High-High A.5 A.12 A.18 A.21
SEE CTS MASTER MARKUP	15. Process and Area Radiation Monitoring:				
	a. Fuel Storage Building Area Radiation Monitor (R-5)	D	24M	Q	SR 3.3.2.4
	b. Vapor Containment Process Radiation Monitors (R-11 and R-12)	D	24M	Q	SR 3.3.2.7 SR 3.3.2.1
	c. Vapor Containment High Radiation Monitors (R-25 and R-26)	D	24M	Q	
	d. Wide Range Plant Vent Gas Process Radiation Monitor (R-27)	D	24M	Q	

Amendment No. 8, 38, 65, 68, 74, 93, 107, 125, 137, 140, 144, 148, 150, 154, 169

T 3.3.2-1, # 1.C A.5
" 2.C A.12
" 3.b.3 A.18
" 4.C A.21

(See next page for Amendment 200)

R.1

ITS 3.3.2

R.1

TABLE 4.1-1 (Sheet 2 of 6)

Channel Description	Check	Calibrate	Test	Remarks
8. 6.9 KV Voltage	N.A.	18M	Q	Reactor protection circuits only
6.9 KV Frequency	N.A.	24M	Q	Reactor protection circuits only
9. Analog Rod Position	S	24M	M	
10. Steam Generator Level	S	24M	Q	
11. Residual Heat Removal Pump Flow	N.A.	24M	N.A.	
12. Deleted				
13. Refueling Water Storage Tank Level				
a. Transmitter	W	18M	N.A.	Low level alarm
b. Indicating Switch	W	6M	N.A.	Low level alarm
14a. Containment Pressure - narrow range	S	24M	Q	High and High-High
14b. Containment Pressure - wide range	M	18M	N.A.	
15. Process and Area Radiation Monitoring:				
a. Fuel Storage Building Area Radiation Monitor (R-5)	D	24M	Q	
b. Vapor Containment Process Radiation Monitors (R-11 and R-12)	D	24M	Q	
c. Vapor Containment High Radiation Monitors (R-25 and R-26)	D	24M	Q	
d. Wide Range Plant Vent Gas Process Radiation Monitor (R-27)	D	24M	Q	

Amendment No. 8, 38, 65, 68, 74, 93, 107, 125, 137, 140, 144, 148, 150, 154, 169, 200

TABLE 4.1-1 (Sheet 4 of 6)

	Channel Description	Check	Calibrate	Test	Remarks
SEE CTS MASTER MARKUP	25. Level Sensors in Turbine Building	N.A.	N.A.	24M	
	26. Volume Control Tank Level	N.A.	24M	N.A.	deleted by Amend 200
	27. Boric Acid Makeup Flow Channel	N.A.	24M	N.A.	
T3.3.2-1, #6.b	28. Auxiliary Feedwater:	SR 3.3.2.1	SR 3.3.2.7	SR 3.3.2.4	SR 3.3.2.6
	a. Steam Generator Level	S	24M	Q	Low-Low
6.d	b. Undervoltage	N.A.	24M	24M	
6.e	c. Main Feedwater Pump Trip	N.A.	N.A.	24M	
SEE CTS MASTER MARKUP	29. Reactor Coolant System Subcooling Margin Monitor	D	24M	N.A.	
	30. PORV Position Indicator	N.A.	N.A.	24M	Limit Switch
	31. PORV Position Indicator	D	24M	24M	Acoustic Monitor
	32. Safety Valve Position Indicator	D	24M	24M	Acoustic Monitor
	33. Auxiliary Feedwater Flow Rate	N.A.	18M	N.A.	
	34. Plant Effluent Radioiodine/ Particulate Sampling	N.A.	N.A.	18M	Sample line common with monitor R-13
	35. Loss of Power				
	a. 480v Bus Undervoltage Relay	N.A.	24M	M	
	b. 480v Bus Degraded Voltage Relay	N.A.	18M	M	
	c. 480v Safeguards Bus Undervoltage Alarm	N.A.	24M	M	
	36. Containment Hydrogen Monitors	D	Q	M	

R.1

A.26

A.28

A.29

Amendment No. 38, 44, 54, 65, 67, 74, 93, 125, 136, 137, 142, 144, 150, 168, 169, TSCR 98-043

Superseded by Amendment 200 See next page

ITS 3.3.2

R.1

TABLE 4.1-1 (Sheet 4 of 6)

Channel Description	Check	Calibrate	Test	Remarks
25. Level Sensors in Turbine Building	N.A.	N.A.	24M	
26. Deleted				
27. Deleted				
28. Auxiliary Feedwater:				
a. Steam Generator Level	S	24M	Q	Low-Low
b. Undervoltage	N.A.	24M	24M	
c. Main Feedwater Pump Trip	N.A.	N.A.	24M	
29. Reactor Coolant System Subcooling Margin Monitor	D	18M****	N.A.	
30. PORV Position Indicator	N.A.	N.A.	24M	Limit Switch
31. PORV Position Indicator	D	24M	24M	Acoustic Monitor
32. Safety Valve Position Indicator	D	24M	24M	Acoustic Monitor
33. Auxiliary Feedwater Flow Rate	N.A.	18M	N.A.	
34. Plant Effluent Radioiodine/ Particulate Sampling	N.A.	N.A.	18M	Sample line common with monitor R-13
35. Loss of Power				
a. 480v Bus Undervoltage Relay	N.A.	24M	M	
b. 480v Bus Degraded Voltage Relay	N.A.	18M	M	
c. 480v Safeguards Bus Undervoltage Alarm	N.A.	24M	M	
36. Containment Hydrogen Monitors	D	Q	M	

Amendment No. 38, 44, 54, 63, 67, 74, 93, 123, 136, 137, 142, 144, 150, 168, 169, 183, 200

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.2:

"Engineered Safety Feature Actuation System (ESFAS) Instrumentation"

PART 3:

DISCUSSION OF CHANGES

Differences between CTS and ITS

every 24 months which maintains the existing requirement and Frequency. Therefore, there is no change to the CTS Surveillance requirements or the associated Frequency.

CTS allowances for bypassing channels and deferring entry into Conditions and Required Actions during testing are maintained (See ITS 3.3.2, DOC A.36).

e. CTS Table 3.5-1, Item 3, establishes the allowable value for Pressurizer Low Pressure at ≥1700 psig. ITS 3.3.2, Function 1.d, Safety Injection-Pressurizer Pressure-Low, establishes the allowable value at ≥1690 psig because ITS uses allowable values calculated in accordance with Engineering Standards Manual IES-3 and IES-3B, Instrument Loop Accuracy and Setpoint Calculation Methodology (IP3) (See ITS 3.3.1, DOC L.1).

f. Confirmation of the applicability of WCAP-10271 to the Indian Point 3 design and operation has already been confirmed by NYPA and reviewed by the NRC as part of Technical Specification Amendment 107, dated March 22, 1991.

Each of the changes described above is an administrative change with no adverse impact on safety except as noted with a cross reference to the associated justification.

A.7 **ITS 3.3.2, Function 1.e. Safety Injection-High Differential Pressure Between Steam Lines**, is equivalent to CTS Table 3.5-1, Item 4, and CTS Table 3.5-3, Item 1.c. (Safety Injection) High Differential Pressure Between Steam Lines. The ITS conversion modifies the CTS requirements as follows:

a. CTS 3.5.1 establishes the Applicability for Engineered Safety Features initiation instrumentation as whenever the plant is not in the cold shutdown condition. ITS requires this function operable in Modes 1, 2 and 3 (i.e., Tavg ≥ 350°F). This is a less restrictive change because ITS 3.3.2 does not require automatic

e. CTS Table 3.5-1, Item 4, (Safety Injection) High Differential Pressure Between Steam Lines, establishes the allowable value at ≤150 psi. ITS 3.3.2, Function 1.e, Safety Injection-High Differential Pressure Between Steam Lines, states 'NA' for allowable value because there is no safety analysis analytical limit for this function. Alternatively, a surveillance acceptance criterion for perfomance monitoring of this instrument loop is stated in the Bases.

f. Confirmation of the applicability of WCAP-10271 to the Indian Point 3 design and operation has already been confirmed by NYPA and reviewed by the NRC as part of Technical Specification Amendment 107, dated March 22, 1991.

Each of the changes described above is an administrative change with no adverse impact on safety except as noted with a cross reference to the associated justification.

A.8 **ITS 3.3.2, Function 1.f. Safety Injection-High Steam Flow in Two Steam Lines Coincident with Tavg-Low**, is equivalent to CTS Table 3.5-1, Item 5.a, and CTS Table 3.5-3, Item 1.e.1 (Safety Injection) High Steam Flow in 2/4 Steam Lines Coincident with Low Tavg. The ITS conversion modifies the CTS requirements as follows:

a. CTS 3.5.1 establishes the Applicability for Engineered Safety Features initiation instrumentation as whenever the plant is not in the cold shutdown condition and CTS Table 3.5-3 establishes an implied Applicability by requiring either plant be in cold shutdown (Mode 5) or all MSIVs closed if requirements cannot be met. ITS 3.3.2 requires this function operable in Mode 1 and in Modes 2 and 3 unless all MSIVs are closed. This is a less restrictive change because ITS 3.3.2 does not require automatic initiation capability for Safety Injection in Mode 4 (See 3.3.2, DOC L.4).

b. For the High Steam Flow Function, the IP3 design consists of 2

existing requirement and Frequency. Therefore, there is no change to the CTS Surveillance requirements or the associated Frequency.

CTS allowances for bypassing channels and deferring entry into Conditions and Required Actions during testing are maintained (See ITS 3.3.2, DOC A.36).

e. CTS Table 3.5-1, Item 5, Safety Injection-High Steam Flow in 2/4 Steam Lines Coincident with Low Tavg. establishes allowable values for steam flow at ≤ 49% of full steam flow at zero load, ≤ 49% of full steam flow at 20% load, and ≤ 110% of full steam flow at full load. Establishing allowable values for this Function requires an allowable value for the steam flow instruments and an allowable value for the turbine first stage pressure which adjusts the steam flow setpoint. CTS Table 3.5-1, Item 5, establishes allowable value for low Tavg at ≥ 540°F.

ITS 3.3.2, Function 1.f, establishes the allowable value for steam flow at less than or equal to turbine first stage pressure corresponding to 54% full steam flow below 20% load, and increasing linearly from 54% full steam flow at 20% load to 110% full steam flow at 100% load, and corresponding to 110% full steam flow above 100% load. ITS 3.3.2, Function 1.f, establishes the allowable value for low Tavg at ≥ 538°F. These changes to the allowable values were calculated in accordance with Engineering Standards Manual IES-3 and IES-3B, Instrument Loop Accuracy and Setpoint Calculation Methodology (IP3) (See ITS 3.3.1, DOC L.1).

f. Confirmation of the applicability of WCAP-10271 to the Indian Point 3 design and operation has already been confirmed by NYPA and reviewed by the NRC as part of Technical Specification Amendment 107, dated March 22, 1991. However, to conform to the assumptions of WCAP-10271, ITS 3.3.2, Function 1.f will increase requirements for steam flow channels to require 2 channels per steam line on all 4 steam lines (versus the CTS requirement for 3 of 4 steam lines) (See 3.2.2, DOC M.2).

e. (See 3.3.2, DOC A.8.e for the Steam Flow portion of this Function) Additionally, CTS Table 3.5-1, Item 5, Safety Injection) High Steam Flow in 2/4 Steam Lines Coincident with Low Steam Line Pressure establishes allowable for Low Steam Line Pressure at ≥ 600 psig. ITS 3.3.2, Function 1.g, establishes the allowable value for low steam line pressure at ≥ 500 psig. These changes to the allowable values were calculated in accordance with Engineering Standards Manual IES-3 and IES-3B, Instrument Loop Accuracy and Setpoint Calculation Methodology (IP3) (See ITS 3.3.1, DOC L.1).

f. (See 3.3.2, DOC A.8.f)

Each of the changes described above is an administrative change with no adverse impact on safety except as noted with a cross reference to the associated justification.

A.10 **ITS 3.3.2, Function 2.a. Containment Spray-Manual Initiation**, is equivalent to CTS Table 3.5-3, Item 2.a. (Containment Spray) Manual. The ITS conversion modifies the CTS requirements as follows:

a. CTS 3.5.1 establishes the Applicability for Engineered Safety Features initiation instrumentation as whenever the plant is not in the cold shutdown condition. ITS requires this function operable in Modes 1, 2, 3 and 4 (i.e., above cold shutdown). Therefore, there is no change to the existing Applicability.

b. CTS Table 3.5-3 requires 2 operable channels with a minimum degree of redundancy of zero. ITS 3.3.2 requires 2 channels per train and 2 trains. Both CTS (i.e., Table 3.5-3, Note 4) and ITS recognize and require the following: manual initiation of containment spray (CS) requires that two pushbuttons in the control room be depressed simultaneously to actuate both trains of CS. Each CS pushbutton closes one of the two contacts required to start CS train A and one of the two contacts required to start CS train B; depressing both pushbuttons closes both of the contacts required to start CS train A and both of the contacts required to

requirement and Frequency; and, ITS SR 3.3.2.7 requires a channel calibration every 24 months which maintains the existing requirement and Frequency. Therefore, there is no change to the CTS Surveillance requirements or the associated Frequency.

CTS allowances for bypassing channels and deferring entry into Conditions and Required Actions during testing are maintained (See ITS 3.3.2, DOC A.36).

e. CTS Table 3.5-1, Item 6, (Auxiliary Feedwater) Steam Generator Water Level, establishes the allowable value at ≥ 5% of the narrow range instrument span. ITS 3.3.2, Function 6.b, establishes the allowable value at ≥ 4.0% of the narrow range instrument span because ITS uses allowable values calculated in accordance with Engineering Standards Manual IES-3 and IES-3B, Instrument Loop Accuracy and Setpoint Calculation Methodology (IP3) (See ITS 3.3.1, DOC L.1).

f. Confirmation of the applicability of WCAP-10271 to the Indian Point 3 design and operation has already been confirmed by NYPA and reviewed by the NRC as part of Technical Specification Amendment 107, dated March 22, 1991.

Each of the changes described above is an administrative change with no adverse impact on safety except as noted with a cross reference to the associated justification.

A.27 **ITS 3.3.2, Function 6.c. Auxiliary Feedwater-Safety Injection**, is equivalent to CTS Table 3.5-3, Item 3.b. (Auxiliary Feedwater) Safety Injection Signal (Start Motor Pumps). This Function consists of a contact that initiates Auxiliary Feedwater as result of a Safety Injection Signal. CTS Table 3.5-3, Item 3.b. references CTS Table 3.5-3, Item 1, Safety Injection, for the CTS requirements for this Function. ITS 3.3.2, Function 6.c. Auxiliary Feedwater-Safety Injection, refers to Function 1 (Safety Injection) for all initiation functions and

conservative than CTS requirements (See 3.3.2, DOC M.4), accident scenarios are protected by Functions addressed in WCAP-10271, and the requirements specified in ITS 3.3.2 are consistent with plant design as described in the FSAR.

A.30 **ITS 3.3.2, Function 7, ESFAS Interlocks-Pressurizer Pressure**, is equivalent to CTS Table 3.5-3, Item 1.f, Pressurizer Low Pressure (Automatic Unblock), and CTS 3.5.5. The ITS conversion modifies the CTS requirements as follows:

a. (See ITS 3.3.2, DOC A.6.a and DOC L.4 for changes to the Applicability.)

b. (See ITS 3.3.2, DOC A.6.b for changes to the number of required channels.)

c. CTS Table 3.5-3, Note 5, specifies that the Minimum Number of Operable Channels and the Minimum Degree of Redundancy may be reduced to zero if the SI bypass is in the unblocked position. ITS 3.3.2, Required Action K.1, maintains thins requirement by requiring that if one or more channels are inoperable, then verify the interlock is in the required state for existing plant conditions. If this requirement cannot be met, then the shutdown requirements for an inoperable Pressurizer Pressure-Low Function are Applicable (See ITS 3.3.2, DOC A.6.c).

d. (See ITS 3.3.2, DOC A.6.d for changes to surveillance testing requirements.)

e. CTS 3.5.5 specifies that low pressurizer pressure safety injection trip shall be unblocked when the pressurizer pressure is > 2000 psig. ITS 3.3.2, Function 7, ESFAS Interlocks- Pressurizer Pressure, states 'NA' for allowable value because there is no safety analysis analytical limit for this function. Alternatively, a surveillance acceptance criterion for perfomance monitoring of this instrument loop is stated in the Bases.

channels and a specific requirement to restore or trip an inoperable channel. This is an administrative change with no adverse impact on safety because there is no change to the existing requirements except as identified and justified in the discussion associated with each Function.

A.35 CTS Table 3.5-3, Item 2.b. (Containment Spray) High Containment Pressure (Hi Hi Level), references CTS Table 3.5-3, Note 8; and, CTS Table 3.5-4, Item 2.b. (Steam Line Isolation) High Containment Pressure (Hi Hi Level), references CTS Table 3.5-4, Note 2. These Notes specify that only MSIVs need be closed if the only portion of the circuit affected is MSIV closure circuitry. These Notes provide recognition that the same containment high pressure transmitters are used for both MSIV isolation and containment spray. This note is not needed in either CTS or ITS because if containment high pressure transmitters are inoperable, then Required Actions for both the steam line isolation and containment spray are applicable. If the inoperability affects only steam line isolation or containment spray, then only the Required Actions associated with the inoperable function are required. Not including these Notes in ITS is an administrative change with no impact on safety.

A.36 Not Used.

MORE RESTRICTIVE

M.1 CTS Table 3.5-3 and CTS Table 3.5-4 require only 1 operable channel with a minimum degree of redundancy of zero for ESFAS manual initiation Functions. ITS LCO 3.3.2 increases the requirement for each of these Functions to minimum of 2 Operable channels and establishes Conditions, Required Actions and Completions Times requiring that redundancy be re-established within 48 hours if one of the two required channels is not Operable. This more restrictive change is needed because the Manual ESFAS initiation Functions are designed with redundant capability even though manual Functions are not specifically credited in the accident safety analysis. Redundancy is needed because these Functions are

M.6 CTS Table 3.5-4 item 3, establishes a feedwater isolation function for the safety injection signal. However, the feedwater isolation function is also accomplished by a steam generator high-high water level signal. This signal provides protection against an excess feedwater flow accident that can result in positive reactivity addition. ITS Function 5.b is added to provide operability requirements, surveillances, and an instrument channel allowable value. This change is acceptable because it does not introduce any new condition that is not analyzed and the new requirement is consistent with plant design as described in the FSAR.

LESS RESTRICTIVE

L.1 CTS trip setpoint limiting safety system setting (allowable value) are based on the IP3 Plant Manual, Volume VI: Precautions, Limitations, and Setpoints, March 1975. ITS will use allowable values calculated using methodologies that conform to Regultory Guide 1.105, Instrument Setpoints for Safety-Related Systems, Rev. 2 dated February 1986, and ISA-RP67.04, Part II, Draft 9, Methodologies for the Determination of Setpoints for Nuclear Safety Related Instrumentation, dated 3/22/91. This change is needed because the limiting safety system settings established by IP3 Plant Manual, Volume VI, were based on information available at the time regarding instrument performance and methods available at the time for calculating setpoints. This change is acceptable because the allowable values will ensure that sufficient allowance exists between this actual setpoint and the analytical limit to account for known instrument uncertainties. For example these may include design basis accident temperature and radiation effects or process dependent effects. This will provide assurance that the analytical limit will not be exceeded if the allowable value is satisfied. This change has no significant adverse impact on safety because the existing limiting safety system setting and the proposed allowable values used the information and methods available at the time to determine instrument settings that ensure that safety limits are not exceeded during any event.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.2:

"Engineered Safety Feature Actuation System (ESFAS) Instrumentation"

PART 5:

NUREG-1431
Annotated to show differences between NUREG-1431 and ITS

Status of NUREG 1431 Generic Changes for ITS 3.3.2

This ITS Specification is based on NUREG-1431 Specification No. **3.3.2**
as modified by the following Generic Changes:

OG No.	TSTF No.	Generic Change Description	NRC STATUS	IP3 STATUS	JD No.
WOG-052	**111 R5**	REVISE BASES FOR SR 3.3.1.16 AND 3.3.2.10 TO ELIMINATE PRESSURE SENSOR RESPONSE TIME TESTING	NRC Review	IP3 has no requirement for response time testing.	**N/A**
WOG-058	**135 R3**	RPS AND ESFAS INSTRUMENTATION	APPROVED/NOT INCORP	Incorporated.	**T.1**

3.3 INSTRUMENTATION

(CTS) 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

(3.5) LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1.

ACTIONS R.1

----------NOTE----------
(DOC A.32) Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
(3.5.3) A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
(DOC A.3) (DOC A.10) (DOC A.13) (DOC A.16) B. One channel or train inoperable.	B.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	B.2.1 Be in MODE 3.	54 hours
	AND	
	B.2.2 Be in MODE 5.	84 hours

(continued)

Table 3.3.2-1 (page 1 of 8)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT[a]	
<CTS>	1. Safety Injection							
<DOC A.3>	a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.~~8~~ (6)	NA	NA	R.1
<DOC A.4>	b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 (3) SR 3.3.2.4 (5) SR 3.3.2.6	NA	NA	
<DOC A.5>	c. Containment Pressure – High (X)	1,2,3	3	D	SR 3.3.2.1 (4) SR 3.3.2.5 (7) SR 3.3.2.9 ~~SR 3.3.2.10~~	≤ ~~[3.86]~~ (4.80) psig	≤ [3.6] psig	
<DOC A.6>	d. Pressurizer Pressure – Low	1,2,3[b]	~~[3]~~	D	SR 3.3.2.1 (4) SR 3.3.2.5 (7) SR 3.3.2.9 ~~SR 3.3.2.10~~	≥ ~~[1850]~~ (1695) psig	≥ [1850] psig	R.1
	(e) Steam Line Pressure							
	(1) Low	1,2,3[(b)]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [635][(e)] psig	≥ [675][(c)] psig	
<DOC A.7>	(2) High Differential Pressure Between Steam Lines	1,2,3	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 (4) SR 3.3.2.9 (7) ~~SR 3.3.2.10~~	≤ ~~[100]~~ (NA) psid	≤ [97] psid	R.1
<DOC A.8>	f. High Steam Flow in Two Steam Lines	1,2,3[(c)] (d)	2 per steam line	D	SR 3.3.2.1 (4) SR 3.3.2.5 (7) SR 3.3.2.9 ~~SR 3.3.2.10~~	(f) (C)	(f)	R.1
	Coincident with T_{avg} – Low (Low)	1,2,3[(d)]	1 per loop	D	SR 3.3.2.1 (4) SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~ (7)	≥ ~~[550.6]~~ (538) °F	≥ [553] °F	R.1

(continued)

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
(b) Above the P-11 (Pressurizer Pressure) interlock.
(c) Time constants used in the lead/lag controller are $t_1 \geq$ [50] seconds and $t_2 \leq$ [5] seconds.
(d) Above the P-12 (T_{avg} – Low Low) interlock.
(e) Less than or equal to a function defined as ΔP corresponding to [44]% full steam flow below [20]% load, and ΔP increasing linearly from [44]% full steam flow at [20]% load to [114]% full steam flow at [100]% load, and ΔP corresponding to [114]% full steam flow above 100% load.
(f) Less than or equal to a function defined as ΔP corresponding to [40]% full steam flow between [0]% and [20]% load and then a ΔP increasing linearly from [40]% steam flow at [20]% load to [110]% full steam flow at [100]% load.

Insert 3.3.32-01

Insert: 3.3-32-01

(b) Above the Pressurizer Pressure interlock.

<3,5,5> (c) Less than or equal to turbine first stage pressure corresponding to 54% full steam flow below 20% load, and increasing linearly from 54% full steam flow at 20% load to 110% full steam flow at 100% load, and corresponding to 110% full steam flow above 100% load. Time delay for SI ≤ 6 seconds.

(d) Except when all MSIVs are closed.

Table 3.3.2-1 (page 2 of 8)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT[a]	
	1. Safety Injection (continued)							
<DOC A.9>	g. High Steam Flow in Two Steam Lines	1,2,3 (d)	2 per steam line	D	SR 3.3.2.1 (4) SR 3.3.2.5 (7) SR 3.3.2.9 ~~SR 3.3.2.10~~	(e) (c)	(f)	R.1
	Coincident with Steam Line Pressure – Low	1,2,3 (d)	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 (4) SR 3.3.2.9 (7) ~~SR 3.3.2.10~~	≥ (635) (500) psig	≥ [675] psig	R.1
	2. Containment Spray							
<DOC A.10>	a. Manual Initiation	1,2,3,4	2 per train, 2 trains	B	SR 3.3.2.~~8~~ (6)	NA	NA	
<DOC A.11>	b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 (3) SR 3.3.2.4 SR 3.3.2.~~6~~ (5)	NA	NA	R.1
<DOC A.12>	c. Containment Pressure ~~High – 2~~ (High High)	1,2,3	~~4~~ 2 sets of 3	E	SR 3.3.2.1 (4) SR 3.3.2.5 SR 3.3.2.9 (7) ~~SR 3.3.2.10~~	≤ (12.31) (24) psig	≤ [12.05] psig	R.1
	~~High – 3 (Two Loop Plants)~~	~~1,2,3~~	~~[3] sets of [2]~~	~~E~~	~~SR 3.3.2.1~~ ~~SR 3.3.2.5~~ ~~SR 3.3.2.9~~ ~~SR 3.3.2.10~~	~~≤ [12.31] psig~~	~~≤ [12.05] psig~~	

(continued)

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
(c) Time constants used in the lead/lag controller are $t_1 \geq$ [50] seconds and $t_2 \leq$ [5] seconds.
(d) Above the P-12 (T_{avg} – Low Low) interlock.
(e) Less than or equal to a function defined as ΔP corresponding to [44]% full steam flow below [20]% load, and ΔP increasing linearly from [44]% full steam flow at [20]% load to [114]% full steam flow at [100]% load, and ΔP corresponding to [114]% full steam flow above 100% load.
(f) Less than or equal to a function defined as ΔP corresponding to [40]% full steam flow between [0]% and [20]% load and then a ΔP increasing linearly from [40]% steam flow at [20]% load to [110]% full steam flow at [100]% load.

Insert 3.3-33-01

Insert: 3.3-33-01

(c) Less than or equal to turbine first stage pressure corresponding to 54% full steam flow below 20% load, and increasing linearly from 54% full steam flow at 20% load to 110% full steam flow at 100% load, and corresponding to 110% full steam flow above 100% load. Time delay for SI ≤ 6 seconds.

(d) Except when all MSIVs are closed.

Table 3.3.2-1 (page 3 of 8)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT[a]	
	3. Containment Isolation							
	a. Phase A Isolation							
<DOC A.13>	(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.~~5~~ (6)	NA	NA	
<DOC A.14>	(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 (3) SR 3.3.2.~~4~~ SR 3.3.2.~~6~~ (5)	NA	NA	R.1
<DOC A.15>	(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.						
	b. Phase B Isolation							
<DOC A.16>	(1) Manual Initiation	1,2,3,4	(2) ~~2 per train, 2 trains~~	B	SR 3.3.2.~~5~~ (6)	NA	NA	
<DOC A.17>	(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 (3) SR 3.3.2.~~4~~ SR 3.3.2.~~6~~ (5)	NA	NA	R.1
<DOC A.18>	(3) Containment Pressure ~~High-3~~ (High High)	1,2,3	~~(4)~~ 2 sets of 3	E	SR 3.3.2.1 (4) SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~ (7)	≤ ~~(12.31)~~ 24 psig	≤ (12.05) psig	R.1
	4. Steam Line Isolation							
<DOC A.19>	a. Manual Initiation	1,2(d),3(d)	(2) 2 per steam line	F	SR 3.3.2.~~5~~ (6)	NA	NA	
<DOC A.20>	b. Automatic Actuation Logic and Actuation Relays	1,2(d),3(d) (d)	2 trains	G	SR 3.3.2.2 (3) SR 3.3.2.~~4~~ SR 3.3.2.~~6~~ (5)	NA	NA	

(continued)

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
(d) Except when all MSIVs are closed and [de-activated].

Insert 3.3-34-01

Insert: 3.3-34-01

(d) Except when all MSIVs are closed.

Table 3.3.2-1 (page 4 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT[a]
4. Steam Line Isolation (continued)						
c. Containment ~~Pressure – High-2~~ (High-High)	1,2[h], 3[i]	2 sets of 3	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~	≤ ~~[6.61]~~ 24 psig	≤ [6.35] psig
d. Steam Line Pressure						
(1) Low	1,2[i], 3[b][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [635][e] psig	≥ [675][e] psig
(2) Negative Rate – High	3[g][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [121.6][h] psi/sec	≤ [110][h] psi/sec
e. High Steam Flow in Two Steam Lines	1,2[i], 3[i]	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~	(f)	(f)
Coincident with T_{avg} – Low	1,2[i], 3[b][i]	1 per loop	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~	≥ ~~[530.6]~~ 538 °F	≥ [553] °F

(continued)

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
(b) Above the P-11 (Pressurizer Pressure) interlock.
(c) Time constants used in the lead/lag controller are $t_1 \geq$ [50] seconds and $t_2 \leq$ [5] seconds.
(d) Above the P-12 (T_{avg} – Low Low) interlock.
(e) Less than or equal to a function defined as ΔP corresponding to [44]% full steam flow below [20]% load, ΔP increasing linearly from [44]% full steam flow at [20]% load to [114]% full steam flow at [100]% load, and ΔP corresponding to [114]% full steam flow above 100% load.
(f) Less than or equal to a function defined as ΔP corresponding to [40]% full steam flow between [0]% and [20]% load and then a ΔP increasing linearly from [40]% steam flow at [20]% load to [110]% full steam flow at [100]% load.
(g) Below the P-11 (Pressurizer Pressure) interlock.
(h) Time constant utilized in the rate/lag controller is ≤ [50] seconds.
(i) Except when all MSIVs are closed and [de-activated].

Insert: 3.3-35-01

NUREG-1431 Markup Inserts
ITS SECTION 3.3.2 - ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

Insert: 3.3-35-01

(c) Less than or equal to turbine first stage pressure corresponding to 54% full steam flow below 20% load, and increasing linearly from 54% full steam flow at 20% load to 110% full steam flow at 100% load, and corresponding to 110% full steam flow above 100% load. Time delay for SI ≤ 6 seconds.

(d) Except when all MSIVs are closed.

Table 3.3.2-1 (page 5 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT(a)
4. Steam Line Isolation (continued)						
~~f.~~ High Steam Flow in Two Steam Lines	1,2~~(f)~~, 3~~(f)~~	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~	~~(d)~~	~~(f)~~
Coincident with Steam Line Pressure – Low	1,2,~~(f)~~ 3~~(f)~~	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~	≥ ~~[675]~~ 500 psig	≥ ~~[675]~~(c) psig
~~g. High Steam Flow~~	~~1,2(i), 3(i)~~	~~2 per steam line~~	~~D~~	~~SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10~~	~~≤ [25]% of full steam flow at no load steam pressure~~	~~≤ [ ] full steam flow at no load steam pressure~~
~~Coincident with Safety Injection~~	~~Refer to Function 1 (Safety Injection) for all initiation functions and requirements.~~					
~~and~~						
~~Coincident with T_{avg} – Low Low~~	~~1,2(i), 3(d)(i)~~	~~[2] per loop~~	~~D~~	~~SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10~~	~~≥ [550.6]°F~~	~~≥ [553]°F~~
~~h. High High Steam Flow~~	~~1,2(i), 3(i)~~	~~2 per steam line~~	~~D~~	~~SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10~~	~~≤ [130]% of full steam flow at full load steam pressure~~	~~≤ [ ] of full steam flow at full load steam pressure~~
~~Coincident with Safety Injection~~	~~Refer to Function 1 (Safety Injection) for all initiation functions and requirements.~~					

(continued)

~~(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~
~~(d) Above the P-12 (T_{avg} – Low Low) interlock.~~
~~(f) Except when all MSIVs are closed and [de-activated].~~

Insert 3.3-36-01

NUREG-1431 Markup Inserts
ITS SECTION 3.3.2 - ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

Insert: 3.3-36-01

(c) Less than or equal to turbine first stage pressure corresponding to 54% full steam flow below 20% load, and increasing linearly from 54% full steam flow at 20% load to 110% full steam flow at 100% load, and corresponding to 110% full steam flow above 100% load. Time delay for SI ≤ 6 seconds.

(d) Except when all MSIVs are closed.

Table 3.3.2-1 (page 6 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT[a]
5. Turbine Trip and Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1,2[j], [3][i]	2 trains	~~H[G]~~ H	SR 3.3.2.2 ~~SR 3.3.2.4~~ SR 3.3.2.6	NA	NA
b. SG Water Level – High High (P-14)	1,2[j], [3][j]	[3] per SG	~~[D]~~ L	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~	≤ [84.2]% 81%	≤ [82.4]%
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
6. Auxiliary Feedwater						
a. Automatic Actuation Logic and Actuation Relays ~~(Solid State Protection System)~~	1,2,3	2 trains	G	SR 3.3.2.2 ~~SR 3.3.2.4~~ SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays (Balance of Plant ESFAS)	1,2,3	2 trains	G	SR 3.3.2.3	NA	NA
c. SG Water Level – Low Low	1,2,3	[3] per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 ~~SR 3.3.2.10~~	≥ [30.6]% 4.0% NR	≥ [32.2]%

(continued)

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.
(j) Except when all MFIVs, MFRVs, [and associated bypass valves] are closed and [de-activated] [or isolated by a closed manual valve].

Insert 3.3-37-01

NUREG-1431 Markup Inserts
ITS SECTION 3.3.2 - ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

Insert: 3.3-37-01

(f) Except when all MBFPDVs or MBFRVs and associated bypass valves are closed or isolated by a closed manual valve.

Table 3.3.2-1 (page 7 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT[a]
6. Auxiliary Feedwater (continued) (g)						
(DOC 27) (c) ~~g.~~ Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
(DOC 28) (d) ~~g.~~ Loss of Offsite Power	1,2,3	~~[3] per bus~~ 2	F	SR 3.3.2.7 (6) SR 3.3.2.9 (7) ~~SR 3.3.2.10~~	≥ ~~[2975]~~ (200) V with ≤ 0.8 sec time delay	≥ [2975] V with ≤ 0.8 sec time delay
Insert: 3.3-38-01						
~~f. Undervoltage Reactor Coolant Pump~~	~~1,2~~	~~[3] per bus~~	~~I~~	~~SR 3.3.2.7 SR 3.3.2.9 SR 3.3.2.10~~	~~≥ [69]% bus voltage~~	~~≥ [70]% bus voltage~~
(DOC 29) (e) ~~g.~~ Trip of ~~all~~ Main Feedwater Pumps (Boiler)	~~1,2~~	~~[2] per pump~~ 1 per MBFP	~~I~~	SR 3.3.2.6 (6) ~~SR 3.3.2.9~~ ~~SR 3.3.2.10~~	≥ [ ] psig (NA)	≥ [ ] psig
~~h. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure – Low~~	~~1,2,3~~	~~[2]~~	~~F~~	~~SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9~~	~~≥ [20.5] [psig]~~	~~≥ [ ] [psig]~~
7. Automatic Switchover to Containment Sump						
~~a. Automatic Actuation Logic and Actuation Relays~~	~~1,2,3,4~~	~~2 trains~~	~~C~~	~~SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6~~	~~NA~~	~~NA~~
~~b. Refueling Water Storage Tank (RWST) Level – Low Low~~	~~1,2,3,4~~	~~4~~	~~K~~	~~SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10~~	~~≥ [15]% and ≤ [ ]%~~	~~≥ [ ] and ≤ [ ]~~
~~Coincident with Safety Injection~~	~~Refer to Function 1 (Safety Injection) for all initiation functions and requirements.~~					
						(continued)

(a) Reviewer's Note: ~~Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.~~

Insert 3.3-38-02

R.1

Table 3.3.2-1 (page 8 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT[a]
7. Automatic Switchover to Containment Sump (continued)						
c. RWST Level – Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [15]%	≥ [18]%
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
and						
Coincident with Containment Sump Level – High	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [30] in. above el. [703] ft	≥ [ ] in. above el. [ ] ft
7 ~~8.~~ ESFAS Interlocks –						
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	F	SR 3.3.2.11	NA	NA
~~b.~~ Pressurizer Pressure, P-11	1,2,3	3	K	SR 3.3.2.1 SR 3.3.2.8 SR 3.3.2.9	≤ [1996] psig (NA)	≤ [ ] psig
c. T_{avg} – Low Low, P-12	1,2,3	[1] per loop	L	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≥ [550.6] °F	≥ [553] °F

(a) Reviewer's Note: Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.

NUREG-1431 Markup Inserts
ITS SECTION 3.3.2 - ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

INSERT B 3.3-63-01:

The following describes the relationship between the safety limit, analytical limit, allowable value and channel component calibration acceptance criteria:

a. A Safety Limit (SL) is a limit on the combination of THERMAL POWER, RCS highest loop average temperature, and RCS pressure needed to protect the integrity of physical barriers that guard against the uncontrolled release of radioactivity (i.e., fuel, fuel cladding, RCS pressure boundary and containment). The safety limits are identified in Technical Specification 2.0, Safety Limits (SLs).

b. An Analytical Limit (AL) is the trip actuation point used as an input to the accident analyses presented in FSAR, Chapter 14 (Ref. 3). Analytical limits are developed from event analyses models which consider parameters such as process delays, rod insertion times, reactivity changes, instrument response times, etc. An analytical limit for a trip actuation point is established at a point that will ensure that a Safety Limit (SL) is not exceeded.

c. An Allowable Value (AV) is the limiting actuation point for the entire channel of a trip function that will ensure, within the required level of confidence, that sufficient allocation exists between this actual trip function actuation point and the analytical limit. The Allowable Value is more conservative than the Analytical Limit to account for instrument uncertainties that either are not present or are not measured during periodic testing. Channel uncertainties that either are not present or are not measured during periodic testing may include design basis accident temperature and radiation effects (Ref. 6) or process dependent effects. The channel allowable value for each ESFAS function is controlled by Technical Specifications and is listed in Table 3.3.2-1, Engineered Safety Feature Actuation System Instrumentation.

d. Calibration acceptance criteria (i.e., setpoints) are established by plant administrative programs for the components of a channel (i.e., required sensor, alarm, interlock, display, and trip function). The calibration acceptance criteria are established to ensure, within the required level of confidence, that the Allowable Value for the entire channel will not be exceeded during the calibration interval.

A description of the methodology used to calculate the channel allowable values and calibration acceptance criteria is provided in References 6 and 8.

BASES

BACKGROUND

Trip Setpoints and Allowable Values (continued)

required to be OPERABLE

Each channel can be tested on line to verify that the signal processing equipment and setpoint accuracy is within the specified allowance requirements of Reference 2. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SR section.

Insert: B 3.3-64.01

The Trip Setpoints and Allowable Values listed in Table 3.3.2-1 are based on the methodology described in Reference 6, which incorporates all of the known uncertainties applicable for each channel. The magnitudes of these uncertainties are factored into the determination of each Trip Setpoint. All field sensors and signal processing equipment for these channels are assumed to operate within the allowances of these uncertainty magnitudes.

Insert: B 3.3-64.02

ESFAS Relay Logic

Solid State Protection System

relay logic

The SSPS equipment is used for the decision logic processing of outputs from the signal processing equipment bistables. To meet the redundancy requirements, two trains of SSPS, each performing the same functions, are provided. If one train is taken out of service for maintenance or test purposes, the second train will provide ESF actuation for the unit. If both trains are taken out of service or placed in test, a reactor trip will result. Each train is packaged in its own cabinet for physical and electrical separation to satisfy separation and independence requirements.

The SSPS performs the decision logic for most ESF equipment actuation; generates the electrical output signals that initiate the required actuation; and provides the status, permissive, and annunciator output signals to the main control room of the unit.

The bistable outputs from the signal processing equipment are sensed by the SSPS equipment and combined into logic matrices that represent combinations indicative of various

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

b. Safety Injection—Automatic Actuation Logic and Actuation Relays (continued)

because of the large number of components actuated on a SI, actuation is simplified by the use of the manual actuation push buttons. ~~Automatic actuation logic and actuation relays must be OPERABLE in MODE 4 to support system level manual initiation.~~

These Functions are not required to be OPERABLE in MODES 5 and 6 because there is adequate time for the operator to evaluate unit conditions and respond by manually starting individual systems, pumps, and other equipment to mitigate the consequences of an abnormal condition or accident. Unit pressure and temperature are very low and many ESF components are administratively locked out or otherwise prevented from actuating to prevent inadvertent overpressurization of unit systems.

c. Safety Injection—Containment Pressure—High X

This signal provides protection against the following accidents:

- SLB inside containment; and
- LOCA; ~~and~~.
- ~~Feed line break inside containment.~~

Containment Pressure—High 1 provides no input to any control functions. Thus, three OPERABLE channels are sufficient to satisfy protective requirements with a two-out-of-three logic. The transmitters (d/p cells) and electronics are located outside of containment with the sensing line (high pressure side of the transmitter) located inside containment.

Thus, the high pressure Function will not experience any adverse environmental conditions and the Trip Setpoint reflects only steady state instrument uncertainties.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

d. Safety Injection—Pressurizer Pressure—Low (continued)

The transmitters are located inside containment, with the taps in the vapor space region of the pressurizer, and thus possibly experiencing adverse environmental conditions (LOCA, SLB inside containment, rod ejection). Therefore, the Trip Setpoint reflects the inclusion of both steady state and adverse environmental instrument uncertainties.

Allowable Value

R.1

This Function must be OPERABLE in MODES 1, 2, and 3 (above P-11) to mitigate the consequences of an HELB inside containment. This signal may be manually blocked by the operator below the P-11 setpoint. Automatic SI actuation below this pressure setpoint is ~~then~~ performed by the Containment Pressure—High 2 signal.

the Pressurizer Pressure Interlock (Function 7)

This Function is not required to be OPERABLE in MODE 3 below the P-11 setpoint. Other ESF functions are used to detect accident conditions and actuate the ESF systems in this MODE. In MODES 4, 5, and 6, this Function is not needed for accident detection and mitigation.

e. Safety Injection—Steam Line Pressure

(1) Steam Line Pressure—Low

Steam Line Pressure—Low provides protection against the following accidents:

- SLB;
- Feed line break; and
- Inadvertent opening of an SG relief or an SG safety valve.

Steam Line Pressure—Low provides no input to any control functions. Thus, three OPERABLE channels on each steam line are sufficient to satisfy the protective

(continued)

BASES

Safety Injection

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

(2) ~~Steam Line Pressure~~—High Differential Pressure Between Steam Lines (continued)

- Inadvertent opening of an ~~SG relief~~ or an SG safety valve. ADV

~~Steam Line Pressure~~—High Differential Pressure Between Steam Lines provides no input to any control functions. Thus, three OPERABLE channels on each steam line are sufficient to satisfy the requirements, with a two-out-of-three logic on each steam line.

With the transmitters ~~typically~~ located inside the ~~steam tunnels~~, it is possible for them to experience adverse environmental conditions during ~~an SLB~~ a HELB event. Therefore, the ~~trip setpoint~~ Surveillance Acceptance Criterion reflects both steady state and adverse environmental instrument uncertainties. Steam line high differential pressure must be OPERABLE in MODES 1, 2, and 3 when a secondary side break or stuck open valve could result in the rapid depressurization of the steam line(s). This Function is not required to be OPERABLE in MODE 4, 5, or 6 because there is not sufficient energy in the secondary side of the unit to cause an accident.

Auxiliary feed pump room

9

R.1

DB.1

The surveillance acceptance criterion used for this function is ≤ 142 psid.

R.1

f, g. Safety Injection—High Steam Flow in Two Steam Lines Coincident With T_{avg}—Low ~~Low~~ or Coincident With Steam Line Pressure—Low

These Functions (1.f and 1.g) provide protection against the following accidents:

- SLB; and
- the inadvertent opening of ~~an SG relief or~~ an SG safety valve. DB.1

Two steam line flow channels per steam line are required OPERABLE for these Functions. The steam line flow channels are combined in a one-out-of-

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

f, g. Safety Injection—High Steam Flow in Two Steam Lines Coincident With T_{avg}—Low (~~Lag~~) or Coincident With Steam Line Pressure—Low (continued)

The Allowable Value for high steam flow is a linear function that varies with power level. The function is a (ΔP) corresponding to (44%) of full steam flow between 0% and 20% load to (114%) of full steam flow at 100% load. The nominal trip setpoint is similarly calculated.

turbine first stage pressure

approximately 54%

approximately 110%

With the transmitters ~~typically~~ located inside the containment (T_{avg}) or inside the steam tunnels (High Steam Flow), it is possible for them to experience adverse steady state environmental conditions during an SLB event. Therefore, the Trip Setpoint reflects both steady state and adverse environmental instrument uncertainties. ~~The Steam Line Pressure—Low signal was discussed previously under Function 1.e.(1).~~

auxiliary feedwater building

RCS temperature and steam line flow

Steam Pressure

Allowable Value

This Function must be OPERABLE in MODES 1, 2, and 3 (above P-12) when a secondary side break or stuck open valve could result in the rapid depressurization of the steam line(s). ~~This signal may be manually blocked by the operator when below the P-12 setpoint. Above P-12, this Function is automatically unblocked. This Function is not required OPERABLE below P-12 because the reactor is not critical, so feed line break is not a concern.~~ SLB may be addressed by Containment Pressure High (1) (inside containment) or by High Steam Flow in Two Steam Lines coincident with Steam Line Pressure—Low, for Steam Line Isolation, followed by High Differential Pressure Between Two Steam Lines, for SI. This Function is not required to be OPERABLE in MODE 4, 5, or 6 because there is insufficient energy in the secondary side of the unit to cause an accident.

when any MSIV is open because

R.1

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

c. Containment Spray—Containment Pressure (Hi-Hi)

This signal provides protection against a LOCA or an SLB inside containment. The transmitters (d/p cells) are located outside of containment with the sensing line (high pressure side of the transmitter) located inside containment. The transmitters and electronics are located outside of containment. Thus, they will not experience any adverse environmental conditions and the Trip Setpoint reflects only steady state instrument uncertainties. (Allowable Value) R.1

This ~~is one of the only~~ Function~~s~~ ~~that~~ requires the bistable output to energize to perform its required action. It is not desirable to have a loss of power actuate containment spray, ~~since~~ because the consequences of an inadvertent actuation of containment spray could be serious. ~~Note that this Function also has the inoperable channel placed in bypass rather than trip to decrease the probability of an inadvertent actuation.~~

Insert: B3.3-78-01

~~Two different logic configurations are typically used. Three and four loop units use four channels in a two-out-of-four logic configuration. This configuration may be called the Containment Pressure—High 3 Setpoint for three and four loop units, and Containment Pressure—High High Setpoint for other units. Some two loop units use three sets of two channels, each set combined in a one-out-of-two configuration, with these outputs combined so that two-out-of-three sets tripped initiates containment spray. This configuration is called Containment Pressure—High 3 Setpoint. Since containment pressure is not used for control, ~~both of these~~ arrangements exceed the minimum redundancy requirements. ~~Additional redundancy is warranted because this Function is energize to trip.~~~~ Containment Pressure ~~[High 3]~~ [High High] must be OPERABLE in MODES 1, 2, and 3 when there is sufficient energy in the primary and secondary sides to pressurize the containment following a pipe break. In MODES 4, 5, and 6, there is insufficient energy in the primary and secondary

(A) (S) (S) (A) Therefore, this

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

a. Containment Isolation—Phase A Isolation

(1) Phase A Isolation—Manual Initiation

Manual Phase A Containment Isolation is actuated by either of two switches in the control room. Either switch actuates both trains. Note that manual initiation of Phase A Containment Isolation also actuates Containment Purge Isolation.

(2) Phase A Isolation—Automatic Actuation Logic and Actuation Relays

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

Manual and automatic initiation of Phase A Containment Isolation must be OPERABLE in MODES 1, 2, and 3, when there is a potential for an accident to occur. Manual initiation is also required in MODE 4 even though automatic actuation is not required. In this MODE, adequate time is available to manually actuate required components in the event of a DBA, but because of the large number of components actuated on a Phase A Containment Isolation, actuation is simplified by the use of the manual actuation push buttons. Automatic actuation logic and actuation relays must be OPERABLE in MODE 4 to support system level manual initiation. In MODES 5 and 6, there is insufficient energy in the primary or secondary systems to pressurize the containment to require Phase A Containment Isolation. There also is adequate time for the operator to evaluate unit conditions and manually actuate individual isolation valves in response to abnormal or accident conditions.

(3) Phase A Isolation—Safety Injection

Phase A Containment Isolation is also initiated by all Functions that initiate SI. The Phase A Containment Isolation

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

b. Steam Line Isolation—Automatic Actuation Logic and Actuation Relays

Automatic actuation logic and actuation relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

Manual and automatic initiation of steam line isolation must be OPERABLE in MODES 1, 2, and 3 when there is sufficient energy in the RCS and SGs to have an SLB or other accident. This could result in the release of significant quantities of energy and cause a cooldown of the primary system. The Steam Line Isolation Function is required in MODES 2 and 3 unless all MSIVs are closed ~~and de-activated~~. In MODES 4, 5, and 6, there is insufficient energy in the RCS and SGs to experience an SLB or other accident releasing significant quantities of energy.

Hi-Hi

c. Steam Line Isolation—Containment Pressure—High 2

This Function actuates closure of the MSIVs in the event of a LOCA or an SLB inside containment ~~to maintain at least one unfaulted SG as a heat sink for the reactor, and~~ to limit the mass and energy release to containment. The transmitters (d/p cells) are located outside containment ~~with the sensing line (high pressure side of the transmitter) located inside containment.~~ Containment Pressure—High 2 ~~provides no input to any control functions. Thus, three OPERABLE channels are sufficient to satisfy protective requirements with two-out-of-three logic. However, for enhanced reliability, this function was designed with four channels and a two-out-of-four logic.~~ The transmitters and electronics are located outside of containment. Thus, they will not experience any adverse environmental conditions, and the Trip Setpoint reflects only steady state instrument uncertainties.

Allowable Value

R.1

Insert: B3.3-84-01

Containment Pressure—High 2 must be OPERABLE in MODES 1, 2, and 3, when there is sufficient energy in the primary and secondary side to pressurize the containment following a pipe

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

5. Turbine Trip and Feedwater Isolation

The primary function of the Turbine Trip and Feedwater Isolation signal are to prevent damage to the turbine due to water in the steam lines, and to stop the excessive flow of feedwater into the SGs. These Functions are necessary to mitigate the effects of a high water level in the SGs, which could result in carryover of water into the steam lines and excessive cooldown of the primary system. The SG high water level is due to excessive feedwater flows.

The Function is actuated when the level in any SG exceeds the high high setpoint, and performs the following functions:

- Trips the main turbine;
- Trips the MFW pumps;
- Initiates feedwater isolation; and
- Shuts the MFW regulating valves and the bypass feedwater regulating valves.

RPS

This Function is actuated by SG Water Level—High High, or by an SI signal. The RTS also initiates a turbine trip signal whenever a reactor trip (P-4) is generated. In the event of SI, the unit is taken off line and the turbine generator must be tripped. The MFW System is also taken out of operation and the AFW System is automatically started. The SI signal was discussed previously.

a. Turbine Trip and Feedwater Isolation—Automatic Actuation Logic and Actuation Relays

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

b. Turbine Trip and Feedwater Isolation—Steam Generator Water Level—High High (P-14)

This signal provides protection against excessive feedwater flow. The ESFAS SG water level

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

b. ~~Turbine Trip and~~ Feedwater Isolation—Steam Generator Water Level—High High (P-14) (continued)

INSERT B 3.3-92-02

instruments provide input to the SG Water Level Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system (which may then require the protection function actuation) and a single failure in the other channels providing the protection function actuation. Thus, four OPERABLE channels are required to satisfy the requirements with a two-out-of-four logic. For units that have dedicated protection and control channels, only three protection channels are necessary to satisfy the protective requirements. For other units that have only three channels, a median signal selector is provided or justification is provided in NUREG-1218 (Ref. 7).

The transmitters (d/p cells) are located inside containment. However, the events that this Function protects against cannot cause a severe environment in containment. Therefore, the ~~Trip Setpoint~~ reflects only steady state instrument uncertainties. Allowable Value

move 'b.' to after 'a.'

a. ~~c.~~ ~~Turbine Trip and~~ Feedwater Isolation—Safety Injection

Insert: B 3.3-92-01

~~Turbine Trip and~~ Feedwater Isolation is also initiated by all Functions that initiate SI. The Feedwater Isolation Function requirements for these Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements.

start 'b' here

~~Turbine Trip and~~ Feedwater Isolation Functions must be OPERABLE in MODES 1 and 2 [and 3] except when all ~~MFIVs, MFRVs,~~ [and associated bypass valves] are closed ~~and de-activated~~ [or isolated by a closed manual valve] when the MFW System is in operation ~~and the turbine generator may be in operation~~. In MODES ~~[3,]~~ 4, 5, and 6, the MFW System ~~and the turbine~~

MBFPDVs or MBFRVs

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.2 - ENGINEERED SAFETY FEATURE ACTUATION SYSTEM (ESFAS) INSTRUMENTATION

INSERT: B 3.3-92-01

Therefore, there are two trains of this Function, one initiated by SI train A and one initiated by SI train B.

INSERT: B 3.3-92-02

Signals from two-out-of-three channels from any one SG will isolate feedwater flow by closing the MBFPDVs and the MBFRVs. The LCO requires three OPERABLE channels per steam generator.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

b. Auxiliary Feedwater—Steam Generator Water Level—Low Low (continued)

Insert: B 3.3.94.01

~~Level Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system which may then require a protection function actuation and a single failure in the other channels providing the protection function actuation. Thus, four OPERABLE channels are required to satisfy the requirements with two-out-of-four logic. For units that have dedicated protection and control channels, only three protection channels are necessary to satisfy the protective requirements. For other units that have only three channels, a median signal selector is provided or justification is provided in Reference 7.~~

With the transmitters (d/p cells) located inside containment and thus possibly experiencing adverse environmental conditions ~~(feed line break)~~, the ~~Trip Setpoint~~ Allowable Value reflects the inclusion of both steady state and adverse environmental instrument uncertainties.

R. 1

c. Auxiliary Feedwater—Safety Injection

actuation

An SI ~~signal~~ starts the motor ~~driven and turbine~~ driven AFW pumps. The AFW initiation functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating functions and requirements.

d. Auxiliary Feedwater—Loss of Offsite Power

A turbine trip in conjunction with a (Non-SI blackout signal)

A loss of offsite power to the ~~service~~ buses will be accompanied by a loss of reactor coolant pumping power and the subsequent need for some method of decay heat removal. The loss of offsite power is detected by a voltage drop on ~~each service bus~~ 480 V bus 3A and/or 6A. Loss of power to either ~~service~~ bus will start the turbine driven AFW ~~pumps~~ 32, to ensure that at least one SG contains enough water to serve as the heat sink for safeguards

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

d. Auxiliary Feedwater—Loss of Offsite Power (continued)

reactor decay heat and sensible heat removal following the reactor trip.

Insert: B3.3-95-01

Functions 6.a through 6.d must be OPERABLE in MODES 1, 2, and 3 to ensure that the SGs remain the heat sink for the reactor. SG Water Level—Low Low in any operating SG will cause the motor driven AFW pumps to start. The system is aligned so that upon a start of the pump, water immediately begins to flow to the SGs. SG Water Level—Low Low in any two operating SGs will cause the turbine driven pumps to start. These Functions do not have to be OPERABLE in MODES 5 and 6 because there is not enough heat being generated in the reactor to require the SGs as a heat sink. In MODE 4, AFW actuation does not need to be OPERABLE because either AFW or residual heat removal (RHR) will already be in operation to remove decay heat or sufficient time is available to manually place either system in operation.

Operator action is required to initiate flow to an SG.

Insert: B3.3-95-02

f. Auxiliary Feedwater—Undervoltage Reactor Coolant Pump

A loss of power on the buses that provide power to the RCPs provides indication of a pending loss of RCP forced flow in the RCS. The Undervoltage RCP Function senses the voltage downstream of each RCP breaker. A loss of power, or an open RCP breaker, on two or more RCPs, will start the turbine driven AFW pump to ensure that at least one SG contains enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip.

e. Auxiliary Feedwater—Trip of ~~All~~ Either Main Feedwater Pumps

A Trip of ~~all~~ either MFW pump is an potential indication of a loss of MFW and the ~~subsequent~~ need for some method of decay heat and sensible heat removal to bring the reactor back to no load temperature and pressure. Each turbine driven MFW pump is equipped with ~~two~~ a pressure switch~~es~~ on the control ~~oil~~ oil

(continued)

INSERT: B 3.3-95-01

following a loss of offsite power.

The LCO requires two channels OPERABLE, one Operable channel for bus 3A and one Operable channel for bus 6A. Either channel will start the turbine driven AFW pump. Therefore, a single failure of one channel of non-Safety Injection blackout sequence will not result in a loss of Function.

INSERT: B 3.3-95-02

The Allowable Value for this Function is based on anticipated 480V bus voltage transient conditions to prevent spurious trips and needless disconnection of safety buses from preferred (offsite power). The analytical limit for event analysis purposes is 0 Vac (i.e. complete loss of offsite power). The allowable value is therefore conservative relative to the actual operability limit.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

~~b. Engineered Safety Feature Actuation System Interlocks—Pressurizer Pressure, P-11 (continued)~~

5, or 6 because system pressure must already be below the P-11 setpoint for the requirements of the heatup and cooldown curves to be met.

~~c. Engineered Safety Feature Actuation System Interlocks—T_{avg}—Low Low, P-12~~

~~On increasing reactor coolant temperature, the P-12 interlock reinstates SI on High Steam Flow Coincident With Steam Line Pressure—Low or Coincident With T_{avg}—Low Low and provides an arming signal to the Steam Dump System. On decreasing reactor coolant temperature, the P-12 interlock allows the operator to manually block SI on High Steam Flow Coincident With Steam Line Pressure—Low or Coincident with T_{avg}—Low Low. On a decreasing temperature, the P-12 interlock also removes the arming signal to the Steam Dump System to prevent an excessive cooldown of the RCS due to a malfunctioning Steam Dump System.~~

~~Since T_{avg} is used as an indication of bulk RCS temperature, this Function meets redundancy requirements with one OPERABLE channel in each loop. In three loop units, these channels are used in two-out-of-three logic. In four loop units, they are used in two-out-of-four logic.~~

~~This Function must be OPERABLE in MODES 1, 2, and 3 when a secondary side break or stuck open valve could result in the rapid depressurization of the steam lines. This Function does not have to be OPERABLE in MODE 4, 5, or 6 because there is insufficient energy in the secondary side of the unit to have an accident.~~

DB.1

R.1

The surveillance acceptance criterion used for this function is ≤ 1980 psig

The ESFAS instrumentation satisfies Criterion 3 of ~~the NRC Policy Statement~~.

10 CFR 50.36

(continued)

BASES (continued)

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.2-1.

In the event a channel's ~~trip~~ Setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument Loop, signal processing electronics, or bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition(s) entered for the protection Function(s) affected. When the Required Channels in Table 3.3.2-1 are specified (e.g., on a per steam line, per loop, per SG, etc., basis), then the Condition may be entered separately for each steam line, loop, SG, etc., as appropriate. R.1

When the number of inoperable channels in a trip function exceed those specified in one or other related Conditions associated with a trip function, then the unit is outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered if applicable in the current MODE of operation.

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

A.1

Condition A applies to all ESFAS protection functions.

Condition A addresses the situation where one or more channels or trains for one or more Functions are inoperable at the same time. The Required Action is to refer to Table 3.3.2-1 and to take the Required Actions for the protection functions affected. The Completion Times are those from the referenced Conditions and Required Actions.

(continued)

INSERT: B 3.3-112-01

The single channel associated with each operating MBFP will start both motor driven AFW pumps. However, there is no single failure tolerance for this Function unless both MBFPs are operating. Therefore, when a channel is inoperable, Required Action I.1 verifies that one channel associated with an operating MBFP is OPERABLE to ensure that there is no loss of function. Otherwise, entry into LCO 3.0.3 is required. If both MBFPs are operating, Required Action I.2 allows 48 hours to restore redundancy by requiring one channel associated with each operating MBFP to be OPERABLE. Continued operation without redundant channels for 48 hours is acceptable because this is a backup method for starting AFW and other Functions, in particular SG Water Level – Low Low, provide the primary protection against a loss of heat sink.

INSERT: B 3.3-114-01

When testing an individual channel, the SR is not met until both train A and train B logic are tested.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.3:

"Post Accident Monitoring (PAM) Instrumentation"

PART 1:

Indian Point 3
Improved Technical Specifications and Bases

3.3 INSTRUMENTATION

3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

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

1. LCO 3.0.4 is not applicable.

2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.7.	Immediately
C. One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
E. As required by Required Action D.1 and referenced in Table 3.3.3-1.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	6 hours 12 hours
F. As required by Required Action D.1 and referenced in Table 3.3.3-1.	F.1 Initiate action in accordance with Specification 5.6.7.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------

SR 3.3.3.1 and SR 3.3.3.2 apply to each PAM instrumentation Function in Table 3.3.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.3.2	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION.	 As specified in Table 3.3.3-1

Table 3.3.3-1 (page 1 of 2)
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION D.1	SR 3.3.3.2 FREQUENCY
1.	Neutron Flux	2	F	24 months
2.	RCS Hot Leg Temperature (Wide Range)	1 per loop (a)	E	24 months
3.	RCS Cold Leg Temperature (Wide Range)	1 per loop (b)	E	24 months
4.	RCS Pressure (Wide Range)	2	E	24 months
5.	Reactor Vessel Water Level	2	E	24 months
6.	Containment Water Level (Wide Range)	2	E	24 months
7.	Containment Water Level (Recirculation Sump)	2	E	24 months
8.	Containment Pressure	2	E	18 months
9.	Automatic Containment Isolation Valve Position	2 per penetration flow path(c)(d)	F	24 months
10.	Containment Area Radiation (High Range)	2	F	24 months
11.	Containment Hydrogen Monitors	2(e)	E	92 days
12.	Pressurizer Level	2	E	24 months
13.	SG Water Level (Narrow Range)	2 per SG	E	24 months
14.	SG Water Level (Wide Range)	1 per SG (f)	E	24 months
15.	Auxiliary Feedwater Flow	1 per SG	E	18 months
16.	Steam Generator Pressure	2 per SG	E	24 months
17.	Condensate Storage Tank Level	2	F	24 months
18.	Core Exit Thermocouples-Quadrant 1	2 per train	E	24 months
19.	Core Exit Thermocouples-Quadrant 2	2 per train	E	24 months
20.	Core Exit Thermocouples-Quadrant 3	2 per train	E	24 months
21.	Core Exit Thermocouples-Quadrant 4	2 per train	E	24 months
22.	Main Steam Line Radiation	1 per steam line	F	24 months
23.	Gross Failed Fuel Detector	2	F	24 months
24.	RCS Subcooling	2	E	24 months

See NOTES, next page.

(continued)

Table 3.3.3-1 (page 2 of 2)
Post Accident Monitoring Instrumentation

NOTES:

(a) The redundant channel in each of four loops is any qualified CET in the quadrant associated with that loop.

(b) The redundant channel in each of four loops is any channel of steam generator pressure for that loop.

(c) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(d) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

(e) Hydrogen monitor OPERABILITY requires that at least one of the associated containment fan cooler unit is OPERABLE.

(f) The redundant channel in each steam generator is the auxiliary feedwater flow rate channel for that steam generator.

(g) The redundant channel in each steam line is any one steam generator narrow range level indicator for that loop.

B 3.3 INSTRUMENTATION

B 3.3.3 Post Accident Monitoring (PAM) Instrumentation

BASES

BACKGROUND

The primary purpose of the PAM instrumentation is to display unit variables that provide information required by the control room operators during accident situations. This information provides the necessary support for the operator to take the manual actions for which no automatic control is provided and that are required for safety systems to accomplish their safety functions for Design Basis Accidents (DBAs).

The OPERABILITY of the accident monitoring instrumentation ensures that there is sufficient information available on selected unit parameters to monitor and to assess unit status and behavior following an accident.

The availability of accident monitoring instrumentation is important so that responses to corrective actions can be observed and the need for, and magnitude of, further actions can be determined. These instruments are identified by unit specific documents (Ref. 1) addressing the recommendations of Regulatory Guide 1.97 (Ref. 2) as required by Supplement 1 to NUREG-0737 (Ref. 3).

The instrument channels required to be OPERABLE by this LCO include two classes of parameters identified during unit specific implementation of Regulatory Guide 1.97. The instruments governed by this LCO are the Type A and Category I variables which are defined as follows:

Type A variables are included in this LCO because they provide the primary information required for the control room operator to take specific manually controlled actions for which no automatic control is provided, and that are required for safety systems to accomplish their safety functions for DBAs.

(continued)

BASES

BACKGROUND (continued)

Category I variables are the key variables deemed risk significant because they are needed to:

- Determine whether other systems important to safety are performing their intended functions;
- Provide information to the operators that will enable them to determine the likelihood of a gross breach of the barriers to radioactivity release; and
- Provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public, and to estimate the magnitude of any impending threat.

These key variables are identified by the unit specific Regulatory Guide 1.97 analyses (Ref. 1). These analyses identify the unit specific Type A and Category I variables and provide justification for deviating from the NRC proposed list of Category I variables.

The specific instrument Functions listed in Table 3.3.3-1 are discussed in the LCO section.

APPLICABLE SAFETY ANALYSES

The PAM instrumentation ensures the operability of Regulatory Guide 1.97 Type A and Category I variables so that the control room operating staff can:

- Perform the diagnosis specified in the emergency operating procedures (these variables are restricted to preplanned actions for the primary success path of DBAs), e.g., loss of coolant accident (LOCA);
- Take the specified, pre-planned, manually controlled actions, for which no automatic control is provided, and that are required for safety systems to accomplish their safety function;

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

- Determine whether systems important to safety are performing their intended functions;
- Determine the likelihood of a gross breach of the barriers to radioactivity release;
- Determine if a gross breach of a barrier has occurred; and
- Initiate action necessary to protect the public and to estimate the magnitude of any impending threat.

PAM instrumentation that meets the definition of Type A in Regulatory Guide 1.97 satisfies Criterion 3 of 10 CFR 50.36. Category I, non-Type A, instrumentation must be retained in TS because it is intended to assist operators in minimizing the consequences of accidents. Therefore, Category I, non-Type A, variables are important for reducing public risk and therefore, meet Criterion 4 of 10 CFR 50.36.

LCO

The PAM instrumentation LCO provides OPERABILITY requirements for Regulatory Guide 1.97 Type A monitors, which provide information required by the control room operators to perform certain manual actions specified in the unit Emergency Operating Procedures. These manual actions ensure that a system can accomplish its safety function, and are credited in the safety analyses. Additionally, this LCO addresses Regulatory Guide 1.97 instruments that have been designated Category I, non-Type A.

The OPERABILITY of the PAM instrumentation provides information about selected unit parameters to monitor and assess unit status following an accident. This capability is consistent with the recommendations of Reference 1.

LCO 3.3.3 requires two OPERABLE channels for most functions. Two OPERABLE channels ensure no single failure prevents operators from getting the information necessary for them to determine the safety status of the unit, and to bring the unit to and maintain it in a safe condition following an accident.

(continued)

BASES

LCO (continued)

Furthermore, OPERABILITY of two channels allows a CHANNEL CHECK during the post accident phase to confirm the validity of displayed information.

An exception to the two channel requirement is Containment Isolation Valve (CIV) Position. In this case, the important information is the status of the containment penetrations. The LCO requires one position indicator for each active CIV. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve, or via system boundary status. If a normally active CIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

Table 3.3.3-1 provides a list of all Type A and Category I variables identified by the IP3 Regulatory Guide 1.97 analyses, as amended by the NRC's SER (Ref. 1), with one exception. Requirements for RWST level, which is a Type A and Category I variable, are stated in LCO 3.5.4.

Type A and Category I variables are required to meet Regulatory Guide 1.97 Category I (Ref. 2) design and qualification requirements for seismic and environmental qualification, utilization of emergency standby power, immediately accessible display, continuous readout, and recording of display.

The Safety Parameter Display System (SPDS) is provided to the Control Room to continuously display information from which plant status can be assessed. The SPDS consists of the Critical Functions Monitoring System (CFMS) and the Qualified Safety Parameters Display System (QSPDS). The CFMS displays and alarms critical safety functions (actions which preserve integrity of one or more physical barriers against radiation) in the Control Room and the emergency response facilities. The CFMS provides for historical data storage and retrieval capability. The CFMS is a redundant computer system not designed to seismic and electrical class 1E criteria. The QSPDS is a backup display system and is qualified to seismic and electrical class 1E standards (Ref. 4).

(continued)

BASES

LCO (continued)

Listed below are discussions of the specified instrument Functions listed in Table 3.3.3-1.

1. Neutron Flux

Neutron Flux indication covering full range of flux that may occur post accident is provided to verify reactor shutdown. Neutron flux is used for accident diagnosis, verification of subcriticality, and diagnosis of positive reactivity insertion.

To satisfy these requirements, an Excore Neutron Flux Detection System consisting of two detectors (N38, N39) provides two channels of neutron flux indication capable of providing indication from the source range to 100% RTP. The Excore Neutron Flux Detection System is an indication only system that displays on the QSPDS in the Control Room.

2,3. Reactor Coolant System (RCS) Hot and Cold Leg Temperatures (Wide Range)

RCS Hot and Cold Leg Temperatures are Category I variables required for verification of core cooling and long term surveillance. RCS cold leg temperature is used in conjunction with RCS hot leg temperature and steam gnerator pressure to verify the unit conditions necessary to establish natural circulation in the RCS.

This LCO is satisfied by the OPERABILITY of one hot leg channel and one cold leg channel in each of the four RCS loops:

Hot Leg Loop No. 1 (T413A)	Cold Leg Loop No. 1 (T413B)
Hot Leg Loop No. 2 (T423A)	Cold Leg Loop No. 2 (T423B)
Hot Leg Loop No. 3 (T433A)	Cold Leg Loop No. 3 (T433B)
Hot Leg Loop No. 4 (T443A)	Cold Leg Loop No. 4 (T443B)

The channels provide indication over a range of 0 °F to 700°F .

(continued)

BASES

LCO (continued)

Redundancy for the Hot Leg RCS Temperature is provided by the core exit thermocouples (Functions 18, 19, 20 and 21) which is considered a diverse variable for the RCS Hot Leg indication.

Redundancy for the Cold Leg RCS Temperature is provided by Steam Generator Pressure (Function 16).

4. Reactor Coolant System Pressure (Wide Range)

RCS wide range pressure is a Category I variable required for verification of core cooling and RCS integrity long term surveillance.

RCS pressure is used to verify closure of manually closed pressurizer spray line valves and pressurizer power operated relief valves (PORVs). In addition, RCS pressure is used to develop RCS subcooling. for determining whether to terminate actuated SI or to reinitiate stopped SI. RCS pressure can also be used:

- to determine when to reset SI and shut off low head SI;
- to manually restart low head SI;
- as reactor coolant pump (RCP) trip criteria; and
- to make a determination on the nature of the accident in progress and where to go next in the procedure.

RCS pressure is also related to three decisions about depressurization. They are:

- to determine whether to proceed with primary system depressurization;
- to verify termination of depressurization; and
- to determine whether to close accumulator isolation valves during a controlled cooldown/depressurization.

(continued)

BASES

LCO (continued)

RCS pressure and pressurizer level are also used to determine whether to operate the pressurizer heaters.

RCS pressure is a Type A variable because the operator uses this indication to monitor the depressurization of the RCS following a steam generator tube rupture (SGTR) or small break LOCA. Operator actions to maintain a controlled cooldown, such as adjusting steam generator (SG) pressure or level, would use this indication.

The LCO requirement for RCS Pressure (wide range) indication is satisfied by pressure transmitters designated PT-402 and PT-403. Normal control room indication or recorders or displays on the QSPDS in the Control Room will satisfy this requirement. Pressurizer pressure instrumentation (PT-455, PT-456, PT-457, and PT-474) is available as a diverse means of monitoring RCS pressure.

5. Reactor Vessel Water Level

Reactor Vessel Water Level is required for verification and long term surveillance of core cooling. It is also used for accident diagnosis and to determine reactor coolant inventory adequacy.

This requirement is satisfied by the two channels of the Reactor Vessel Level Indicating System (RVLIS-A and RVLIS-B). The RVLIS automatically compensates for variations in fluid density as well as for the effects of reactor coolant pump operation.

The level reading represents the amount of liquid mass that is in the reactor vessel. Measurement of the collapsed water level is selected because it is a direct indication of the water inventory. The level instrumentation is divided into the full range and the dynamic range in order to measure level under all conditions. The full range gives level indication from the bottom of the reactor vessel to the top of the reactor head during natural circulation conditions. The dynamic range gives indication of reactor vessel liquid level for any combination of running RCP's.

(continued)

BASES

LCO (continued)

6,7. Containment Water Level (Wide Range) and Recirculation Sump Level

Containment Water Level is required for verification and long term surveillance of RCS integrity.

Containment Water Level is used for accident diagnosis and provides a diverse indication for RWST level regarding when to begin the recirculation procedure.

The LCO requirement for Containment Recirculation sump water level indication is satisfied by transmitters designated LT-1251 and LT-1252. The LCO requirement for Containment water level (wide range) indication is satisfied by level transmitters designated LT-1253 and LT-1254. Normal control room recorders or QSPDS ddisplay will satisfy this requirement.

8. Containment Pressure (Wide Range)

Containment Pressure (Wide Range) is required for verification of need for and effectiveness of containment spray and fan cooler units.

The LCO requirement for Containment pressure indication is satisfied by pressure transmitters designated PT-1421 and PT-1422. Normal control room indication or QSPDS display will satisfy this requirement. Containment pressure narrow range instrumentation (PT-948A, B, C and PT-949A, B, C) is available to provide a diverse means of establishing containment pressure.

9. Automatic Containment Isolation Valve Position

CIV Position is provided for verification of Containment OPERABILITY and Phase A and Phase B isolation.

When used to verify Phase A and Phase B isolation, the important information is the isolation status of the containment penetrations.

(continued)

BASES

LCO (continued)

The LCO requires one channel of valve closed position indication in the control room (or at local control stations for valves without control room indication) to be OPERABLE for each active CIV in a containment penetration flow path, i.e., two total channels of CIV position indication for a penetration flow path with two active valves. For containment penetrations with only one active CIV having control room indication, Note (d) requires a single channel of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation of each isolable penetration either via indicated status of the active valve, as applicable, and prior knowledge of a passive valve, or via system boundary status. If a normally active CIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

Note (c) to the Required Channels states that the Function is not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve.

Note that non-automatic containment isolation valves are not provided with position indication. As described in the Bases for LCO 3.6.3, "Containment Isolation Valves, containment isolation valves classified as essential and non-automatic are maintained in the open position and are closed after the initial phases of an accident. Emergency procedures are utilized to control the closing of these valves. Non-essential containment isolation valves are maintained in the closed position and may be opened, if necessary, for plant operation and for only as long as necessary to perform the intended function, under administrative controls described in the Bases for LCO 3.6.3.

10. Containment Area Radiation (High Range)

Containment Area Radiation is provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans.

(continued)

BASES

LCO (continued)

The LCO requirement for Containment Area Radiation (high range) monitoring is satisfied by radiation monitors designated R-25 and R-26.

11. Containment Hydrogen Monitors

Hydrogen Monitors are provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. This variable is also important in verifying the adequacy of mitigating actions.

The LCO requirement for Containment Hydrogen monitoring is satisfied by containment hydrogen sampling monitors designated HCMC-A and HCMC-B. Hydrogen monitor OPERABILITY requires that at least one of the associated containment fan cooler units (FCU) is OPERABLE. HCMC-A is associated with FCU 32 or 35 and HCMC-B is associated with FCU 31 or 33 or 34.

12. Pressurizer Level

Pressurizer Level is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify that the unit is maintained in a safe shutdown condition.

The LCO requirement for 2 channels of pressurizer level indication is satisfied by any two of the level instruments designated LT-459, LT-460 and LT-461.

13. Steam Generator Water Level (Narrow Range)

SG Water Level is required to monitor operation of decay heat removal via the SGs.

Each Steam Generator (SG) has three narrow range transmitters which span a range from the top of the tube bundles up to the moisture separator.

(continued)

BASES

LCO (continued)

Requirements for steam generator water level indication assume that two of the four steam generators are required for heat removal.

Narrow range SG water level is a Category I, Type A variable used to determine if the SG's are being maintained as an adequate heat sink for decay heat removal and to maintain the SG level and prevent overfill. It is also used to determine whether SI should be terminated and may be used to diagnose an SG tube rupture event. The LCO requirement is satisfied by any two instruments for each SG in the following list:

SG 31	SG 32	SG 33	SG 34
LT-417A	LT-427A	LT-437A	LT-447A
LT-417B	LT-427B	LT-437B	LT-447B
LT-417C	LT-427C	LT-437C	LT-447C

14. Steam Generator Water Level (Wide Range)

Each steam generator has one level transmitter that spans a range from the tube sheet up to the moisture separator.

Wide range SG water level is a Category I, Type A variable used to determine if the SG's are being maintained as an adequate heat sink for decay heat removal. The LCO requirement for wide range water level is satisfied by instruments designated LT-417D, LT-427D, LT-437D, and LT-447D. Redundancy for wide range level in each SG is provided by the Auxiliary Feedwater Flow for that SG (Function 15).

15. Auxiliary Feedwater Flow

AFW Flow is provided to monitor the decay heat removal capability of each SG. Although not a category I or Type A variable for IP3, these instrument channels provide redundancy for SG wide range level in the event of the limiting single failure of a power supply. This LCO is satisfied by the OPERABILITY of the following instruments:

(continued)

BASES

LCO (continued)

SG 31	SG 32	SG 33	SG 34
F1200	F1201	F1202	F1203

16. Steam Generator Pressure

Each SG contains 3 transmitters that indicate SG pressure. Requirements for steam generator pressure indication assume that two of the four steam generators are required for heat removal.

SG pressure is a Category I, Type A variable used to determine if a high energy secondary line rupture occurred and which steam generator is faulted. SG pressure is also used as the redundant channel of RCS cold leg temperature for natural circulation determination.

The LCO requirements for steam generator pressure indication is satisfied by any two channels from the following list for each of the four SGs:

SG 31	SG 32	SG 33	SG 34
PT-419A	PT-429A	PT-439A	PT-449A
PT-419B	PT-429B	PT-439B	PT-449B
PT-419C	PT-429C	PT-439C	PT-449C

17. Condensate Storage Tank (CST) Level

CST Level is provided to ensure water supply for auxiliary feedwater (AFW). The CST provides the ensured safety grade water supply for the AFW System.

CST Level is a Type A variable because the control room indication is the primary indication used by the operator.

The DBAs that require AFW are the loss of electric power, steam line break (SLB), and small break LOCA.

(continued)

BASES

LCO (continued)

The CST is the initial source of water for the AFW System. However, as the CST is depleted, manual operator action is necessary to replenish the CST or align suction to the AFW pumps to city water.

The LCO requirement for CST level indication is satisfied by level transmitters designated LT-1128 and LT-1128A. Normal control room indication or displays on the QSPDS in the Control Room will satisfy this requirement.

18, 19, 20, 21. Core Exit Temperature

Core Exit Temperature is required for verification and long term surveillance of core cooling. Core Exit Temperature is used as input for developing RCS Subcooling (Function 24) and is also used for unit stabilization and cooldown control. Core exit thermocouples also serve as a redundant channel for the RCS Hot Leg Temperature (Function 3).

There are 10 qualified CETs in each of two trains distributed among the four core quadrants. Requiring 2 CETs per train in each of the four quadrants provides assurance that sufficient CETs are available to support evaluation of core radial decay power distribution.

22. Main Steam Line (MSL) Radiation

The MSL radiation monitors are a Type A variable provided to allow detection of a gross secondary side radioactivity release and to provide a means to identify the faulted steam generator. The LCO requirements for MSL radiation indication are satisfied by one channel in each of the 4 MSLs using instruments designated R62A, R62B, R62C, R62D. Steam generator narrow range leve (Function 13) serves as the redundant channel for the one MSL radiation monitor provided per loop.

(continued)

BASES

LCO (continued)

23. Gross Failed Fuel Detector

The gross failed fuel detector is a Type A variable provided to allow determination of reactor coolant system radioactivity concentration. The LCO requirement is satisfied by instrument loops R63A and R63B.

24. RCS Subcooling

RCS subcooling is a Type A variable provided to determine whether to terminate actuated SI or to reinitiate stopped SI, to determine when to terminate reactor coolant pump operation, and for unit stabilization and cooldown control. RCS subcooling is calculated and displayed in the plant Qualified Safety Parameter Display System using RCS Wide Range Pressure and Core Exit Temperature. Diverse indication is available using saturation pressure and steam tables.

APPLICABILITY

The PAM instrumentation LCO is applicable in MODES 1, 2, and 3. These variables are related to the diagnosis and pre-planned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1, 2, and 3. In MODES 4, 5, and 6, unit conditions are such that the likelihood of an event that would require PAM instrumentation is low; therefore, the PAM instrumentation is not required to be OPERABLE in these MODES.

ACTIONS

Note 1 has been added in the ACTIONS to exclude the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE while relying on the ACTIONS even though the ACTIONS may eventually require unit shutdown. This exception is acceptable due to the passive function of the instruments, the operator's ability to respond to an accident using alternate instruments and methods, and the low probability of an event requiring these instruments.

(continued)

BASES

ACTIONS (continued)

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.3-1. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies when one or more Functions have one required channel that is inoperable. Required Action A.1 requires restoring the inoperable channel to OPERABLE status within 30 days. The 30 day Completion Time is based on operating experience and takes into account any remaining OPERABLE channels, the passive nature of the instrument (no critical automatic action is assumed to occur from these instruments), and the low probability of an event requiring PAM instrumentation during this interval.

B.1

Condition B applies when the Required Action and associated Completion Time for Condition A are not met. This Required Action specifies initiation of actions in Specification 5.6.7. which requires a written report to be submitted to the NRC immediately. This report discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative actions. This action is appropriate in lieu of a shutdown requirement since alternative actions are identified before loss of functional capability, and given the likelihood of unit conditions that would require information provided by this instrumentation.

C.1

Condition C applies when one or more Functions have two inoperable required channels (i.e., two channels inoperable in the same Function). Required Action C.1 requires restoring one channel in the Function(s) to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event

(continued)

BASES

ACTIONS

C.1 (continued)

requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the PAM instrumentation.

Therefore, requiring restoration of one inperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur.

D.1

Condition D applies when the Required Action and associated Completion Time of Condition C is not met. Required Action D.1 requires entering the appropriate Condition referenced in Table 3.3.3-1 for the channel immediately. The applicable Condition referenced in the Table is Function dependent. Each time an inoperable channel has not met any Required Action of Condition C and the associated Completion Time has expired, Condition D is entered for that channel and provides for transfer to the appropriate subsequent Condition.

E.1 and E.2

If the Required Action and associated Completion Time of Condition D is not met and Table 3.3.3-1 directs entry into Condition E, the unit must be brought to a MODE where the requirements of this LCO do not apply. To achieve this status, the unit must be brought to at least 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 unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

BASES

ACTIONS (continued)

F.1

Alternative means of monitoring neutron flux, condensate storage tank level, main steam line radiation, gross failed fuel, containment isolation valve position indications and containment area radiation are available. These alternate means may be used if the normal PAM channel cannot be restored to OPERABLE status within the alloted time. If these alternate means can be used, the Required Action is not to shut down the unit but rather to follow the directions in Specification 5.6.7, in the Administrative Controls section of the TS.

The report provided to the NRC should discuss the alternate means available, describe the degree to which the alternate means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels.

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that SR 3.3.3.1 and SR 3.3.3.3 apply to each PAM instrumentation Function in Table 3.3.3-1.

SR 3.3.3.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure 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 two instrument channels could be an indication of excessive instrument drift in one of the channels or of 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. The high radiation instrumentation should be compared to similar unit instruments located throughout the unit.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.3.1 (continued)

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

As specified in the SR, a CHANNEL CHECK is only required for those channels that are normally energized.

The Frequency of 31 days is based on operating experience that demonstrates that 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 LCO required channels.

SR 3.3.3.2

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter with the necessary range and accuracy. This SR is modified by a Note that excludes neutron detectors. The calibration method for neutron detectors is described in the Bases of LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation." The Frequency is based on operating experience and consistency with the typical industry refueling cycle.

REFERENCES

1. Safety Evaluation: Conformance to Regulatory Guide 1.97, Revision 3, for Indian Point 3 (TAC No. 51099), dated April 3, 1991.

(continued)

BASES

REFERENCES (continued)

2. Regulatory Guide 1.97, Revision 3.

3. NUREG-0737, Supplement 1, "TMI Action Items."

4. FSAR, Section 7.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.3:
"Post Accident Monitoring (PAM) Instrumentation"

PART 3:

DISCUSSION OF CHANGES

Differences between CTS and ITS

DISCUSSION OF CHANGES
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING SYSTEM (PAM) INSTRUMENTATION

NOTE: General revision of DOCs for ITS 3.3.3, Rev 1. Rev bars not shown for changes to Rev 0, except that underlined DOC number means this is added in Rev 1.

A.1 In the conversion of the Indian Point Unit 3 Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS) certain wording preferences or conventions are adopted which do not result in technical changes (either actual or interpretational). Additionally, editorial changes, reformatting, and revised numbering are adopted to make ITS consistent with the conventions in NUREG-1431, Standard Technical Specifications, Westinghouse Plants, Rev. 1, i.e., the improved Standard Technical Specifications.

The CTS Bases are deleted and replaced with comprehensive ITS Bases designed to support interpretation and implementation of the associated Technical Specifications. The Bases explain, clarify, and document the reasons (i.e., bases) for the associated Technical Specifications, and reflect the IP3 plant specific design, analyses, and licensing basis. In accordance with 10 CFR 50.36(a), the ITS Bases are included with the proposed ITS conversion application; however, deletion of the CTS Bases and the adoption of the ITS Bases is an administrative change with no impact on safety.

A.2 CTS Limiting Conditions for Operation (LCOs) and Surveillance Requirements (SRs) include statements of the objective and the applicability. The CTS statements of objective and applicability are deleted because these statements do not establish any requirements and do not provide any guidance for the application of CTS requirements. Therefore, deletion of these statements has no significant adverse impact on safety.

A.3 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 1, Neutron Flux**. Establishing a standard format for presenting this information is an administrative change with no impact on safety. CTS does not have an explicit requirement for neutron monitoring as a PAM function. Refer to DOC M.1 regarding the addition of specific requirements in ITS.

A.4 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Functions 2 and 3, RCS Hot Leg and Cold Leg Temperatures**, respectively. The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
Required channels: Increased from 1 to 1 per loop; DOC M.7
Actions and Time: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.
Surveillance Requirements: More Restrictive for this Function; DOC M.6

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.5 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 4, RCS Pressure (Wide Range)**. The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
Required channels: Increased from 1 to 2; DOC M.7
Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.
Surveillance Requirements: More Restrictive for this Function, see DOC M.6

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.6 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 5, Reactor Vessel Level (RVLIS)**. The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
Required channels: Increased from 1 to 2; DOC M.7
Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.

Surveillance Requirements: ITS maintains 24-month channel calibration, however the daily channel check is changed to monthly; DOC L.2.

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.7 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Functions 6 and 7, Containment Water Level (Wide Range) and Containment Water Level (Recirculation Sump)**, respectively. The information included is:
Applicability: More Restrictive for this Function; DOC M.9
Required channels: Increased from 1 to 2 for both functions; DOC M.7
Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOCs M.4 and M.5. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.
Surveillance Requirements: More Restrictive for this Function; DOC M.6

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.8 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 8, Containment Pressure**. The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
Required channels: Increased from 1 to 2; DOC M.7
Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.
Surveillance Requirements: ITS maintains CTS SRs.

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.9 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 9, Automatic Containment Isolation Valve Position Indication**. Establishing a standard format for presenting this information is an administrative change

with no impact on safety. CTS does not have an explicit requirement for neutron monitoring as a PAM function. Refer to DOC M.1 regarding the addition of specific requirements in ITS.

A.10 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 10, Containment Area Radiation** (High Range). The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
Required channels: Increased from 1 to 2; DOC M.7
Allowed Outage Times: ITS maintains CTS required action (special report) for loss of function. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the initiation of alternate monitoring are relocated; DOC LA.6.
Surveillance Requirements: ITS maintains 24-month channel calibration, however the daily channel check is changed to monthly; DOC L.2

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.11 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 11, Containment Hydrogen Monitors**. The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
- Required channels: Increased from 1 to 2; DOC M.7
- Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8.
- Surveillance Requirements: ITS maintains 24-month channel calibration, however the daily channel check is changed to monthly; DOC L.2.

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.12 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 12, Pressurizer Water Level**. The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
Required channels: Increased from 2 to 3; DOC M.7
Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion

time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.

Surveillance Requirements: ITS maintains 24-month channel calibration, however the daily channel check is changed to monthly; DOC L.2.

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.13 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Functions 13 and 14, Steam Generator (SG) Level, narrow range and wide range**, respectively. The information included is:

Applicability: Less Restrictive for this Function; DOC L.1

Required channels: Increased from one level channel per SG (with at least 2 channels being wide range) to 3 channels per SG for narrow range and 1 channel per SG for wide range; DOC M.7

Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.

Surveillance Requirements: ITS maintains CTS requirements for channel check and calibration

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.14 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 15, Steam Generator (SG) Pressure**. The information included is:

Applicability: Less Restrictive for this Function; DOC L.1

Required channels: Increased from 1 per SG to 3 per SG; DOC M.7

Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.

Surveillance Requirements: ITS maintains CTS requirements for channel check and calibration

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A.15 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 16, Condensate Storage Tank Level**. Establishing a standard format for presenting this information is an administrative change with no impact on safety. CTS does not have an explicit requirement for neutron monitoring as a PAM function. Refer to DOC M.3 regarding the addition of specific requirements in ITS.

A.16 DELETE A.16 for RWST Level .... this function is moved to 3.5.4

A.17 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Functions 18, 19, 20, and 21, Core Exit Thermocouples**. The information included is:

Applicability: Less Restrictive for this Function; DOC L.1

Required channels: Increased from 2 detectors per quadrant to 4 detectors per quadrant; DOC M.7

Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.

Surveillance Requirements: ITS maintains 24-month channel calibration, however the daily channel check is changed to monthly; DOC L.2.

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A18 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 22, Main Steam Line Radiation**. The information included is:

Applicability: Less Restrictive for this Function; DOC L.1

Required channels: ITS maintains CTS required channels of 1 per steam line.

Allowed Outage Times: ITS maintains CTS required action (special report) for loss of function. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the initiation of alternate monitoring are relocated; DOC LA.6.

Surveillance Requirements: ITS maintains 24-month channel calibration, however the daily channel check is changed to monthly; DOC L.2

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A19 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 23, Gross Failed Fuel Detector**. The information included is:
Applicability: ITS adopts a reasonable interpretation of CTS requirements.
Required channels: Increased from 1 channel, implicitly required in CTS to 2 channels; DOC M.7
Allowed Outage Times: ITS maintains CTS required action (special report) for loss of function. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8.
Surveillance Requirements: ITS maintains 24-month channel calibration, however the daily channel check is changed to monthly; DOC L.2

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A20 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Function 24, RCS Subcooling**. The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
- Required channels: Increased from 1 to 2; DOC M.7
- Allowed Outage Times: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8. Requirements regarding the recorder associated with this Function are relocated; DOC LA.7.
- Surveillance Requirements: ITS maintains 24-month channel calibration, however the daily channel check is changed to monthly; DOC L.2.

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

A21 ITS provides clarification that Separate Condition Entry is allowed for each channel, which is an unstated assumption in CTS. The allowance is not applicable to RWST Level. Providing this clarification is an administrative change with no impact on safety.

A22 ITS provides clarification that ITS LCO 3.0.4 is not applicable to Post Accident Monitoring Instrumentation (except for RWST Level). Since an equivalent of ITS LCO 3.0.4 is not in CTS, providing clarification that this provision is not applicable is an administrative change with no impact on safety.

A23 ITS LCO 3.3.3, including Table 3.3.3-1 is organized to provide information and requirements for Post Accident Monitoring (PAM) **Functions 25, Auxiliary Feedwater Flow Rate**. The information included is:
Applicability: Less Restrictive for this Function; DOC L.1
Required channels: ITS maintains the CTS required channels of 1 per pump. Wording is modified to state 1 per steam generator to be consistent with Function 14, SG wide range level.
Actions and Time: ITS maintains CTS required action (plant shutdown) for loss of function, however ITS establishes a more restrictive completion time; DOC M.4. Also ITS establishes new required actions and completion times for loss of redundancy; DOC M.8.
Surveillance Requirements: More Restrictive for this Function; DOC M.6

Establishing a standard format for presenting this information is an administrative change with no impact on safety.

M1 CTS does not identify Neutron Flux as a required instrument channel for PAM. This function is added to ITS because it was identified as a Reg Guide 1.97, Type A variable. Adding this Function to ITS 3.3.3 along with Required Actions, Completion Times, and Surveillance Requirements is a more restrictive change.

M2 CTS does not identify Containment Isolation Valve Position Indication as a required instrument channel for PAM. This function is added to ITS because it was identified as a Reg Guide 1.97, Type A variable. Adding this Function to ITS 3.3.3 along with Required Actions, Completion Times, and Surveillance Requirements is a more restrictive change.

M3 CTS does not identify Condensate Storage Tank Level as a required instrument channel for PAM. This function is added to ITS because it was identified as a Reg Guide 1.97, Type A variable. Adding this Function to ITS 3.3.3 along with Required Actions, Completion Times, and Surveillance Requirements is a more restrictive change.

M4 CTS provides for a 48-hour deferral of actions required in response to PAM instrument requirements not met, if the reactor is subcritical when the condition is discovered. ITS eliminates the 48-hour deferral and uniformly imposes Required Actions and Completion Times (Mode 3 in 6 hours and Mode 4 in 12 hours) regardless of reactor status at the time of discovery.

M5 CTS allows a 30 day AOT for loss of containment sump water level indication. ITS establishes a more restrictive AOT of 7 days to provide greater assurance that this function will be available to plant operators if needed to diagnose post accident conditions in containment.

M6 ITS adds surveillance requirements for the following PAM instrument channels;
channel check and channel calibration for RCS Pressure,
channel check and channel calibration for RCS hot leg and cold leg temperatures, and
channel check for containment water level (for wide range and for recirculation sump),
channel check for auxiliary feedwater flowrate

This is a more restrictive requirement because CTS does not specify equivalent surveillances for these channels

M7 CTS establishes number of channels required for PAM instrumentation based on loss of function only. ITS increases the required number of channels to account for loss of redundancy. This more restrictive change establishes requirements for single failure tolerance and channel diversity that are not specified in CTS.

M8 ITS establishes Required Actions and Completion Times for inoperable channels that result in loss of redundancy as discussed in DOC M.7. This more restrictive change ensures that appropriate and timely actions are taken to restore the required number of operable channels so that single failure tolerance is maintained.

M9 CTS requires that the reactor be placed in 'hot shutdown' (Mode 3) if Recirculation Sump Level instrumentation is not operable. This is implies an applicability of Modes 1 and 2. ITS establishes a more restrictive applicability of Modes 1,2, and 3.

L1 CTS specifies that PAM instrumentation is required whenever the reactor is not in cold shutdown (i.e., Modes 1, 2, 3, and 4). ITS establishes a less restrictive applicability of Modes 1, 2, and 3. This less restrictive change does not have an adverse impact on safety because IP3 safety analyses assume that plant conditions needed for initiation of a DBA exist only when the plant is in Modes 1, 2, or 3.

L2 CTS establishes requirements for periodic channel checks for various PAM instruments at a frequency of 12 hours. ITS will specify a frequency of 31 days. Certain PAM instruments are also part of RPS (ITS 3.3.1) and ESFAS (ITS 3.3.2). In these cases ITS will maintain the 12 hour frequency in the affected RPS or ESFAS surveillance

LA1 CTS contains requirements for indicators, recorders, and alarms under the heading of "Indicators and / or Recorders Available to the Operator." The information was originally in place prior to the establishment of Regulatory Guide 1.97 requirements, but was updated to include PAM instruments. ITS incorporates CTS Reg. Guide 1.97 requirements, however several instruments that are not Type A or Category I are relocated to the FSAR.

LA2 CTS contains design information regarding the availability of indicators and or recorders for various parameters including Reg Guide 1.97 instruments. This information is not needed to specify the requirements of ITS 3.3.3 and is relocated to the Bases.

LA3 CTS contains surveillance requirements for 'Indicators and Recorders Available to the Operator.' ITS maintains requirements for Channel Checks and Calibrations for Reg. Guide 1.97 Type A and Category I instruments. However, CTS requirements for Channel Operational Test of associated alarms that are not required for Reg Guide 1.97 function are relocated to the FSAR.

LA4 CTS requires RWST level alarm to be operable and set to alarm between 10.5 feet and 12.5 feet of water in the tank. ITS maintains surveillance requirements for channel calibration, however specific acceptance criteria are relocated to the FSAR.

LA5 not used

LA6 CTS establishes required actions, including alternate monitoring capability when Containment Area Radiation and Main Steam Line Radiation instrumentation is not fully operable. ITS maintains Required Actions for loss of redundancy and loss of function for these and other Reg Guide 1.97 variables. ITS LCO 3.3.3 addresses alternate monitoring via ITS 5.6.7, however specific time limits for implementing alternate monitoring are relocated to the FSAR.

LA7 CTS establishes a 7-day AOT for loss of a PAM instrument channel and a 14-day AOT for loss of the associated recorder. ITS maintains Required Actions for loss of redundancy and loss of function for PAM instrument channels. However AOTs for PAM instrument recorder capability are relocated to the FSAR.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.3:

"Post Accident Monitoring (PAM) Instrumentation"

PART 5:

NUREG-1431
Annotated to show differences between
NUREG-1431 and ITS

3.3 INSTRUMENTATION

3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

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

1. LCO 3.0.4 is not applicable.
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.~~8~~ 7.	Immediately
C. ~~----------NOTE---------- Not applicable to hydrogen monitor channels. ----------~~ One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days

CLB. 1

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~D. Two hydrogen monitor channels inoperable.~~	~~D.1 Restore one hydrogen monitor channel to OPERABLE status.~~	~~72 hours~~ CLD.1
D. ~~E.~~ Required Action and associated Completion Time of Condition C ~~or D~~ not met.	D ~~E~~.1 Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
E ~~F~~. As required by D Required Action ~~E~~.1 and referenced in Table 3.3.3-1.	E ~~F~~.1 Be in MODE 3. AND E ~~F~~.2 Be in MODE 4.	6 hours 12 hours
F ~~G~~. As required by D Required Action ~~E~~.1 and referenced in Table 3.3.3-1.	F ~~G~~.1 Initiate action in accordance with Specification 5.6.~~8~~ 7.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
SR 3.3.3.1 and SR 3.3.3.2 apply to each PAM instrumentation Function in Table 3.3.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.3.2	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. --- Perform CHANNEL CALIBRATION.	~~[18] months~~ As specified in Table 3.3.3-1

SR 3.3.3.2 FREQUENCY

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION E.1
1.	Power Range Neutron Flux	2	F
2.	Source Range Neutron Flux	2	F
3.	Reactor Coolant System (RCS) Hot Leg Temperature	2 per loop	F
4.	RCS Cold Leg Temperature	2 per loop	F
5.	RCS Pressure (Wide Range)	2	F
6.	Reactor Vessel Water Level	2	G
7.	Containment Sump Water Level (Wide Range)	2	F
8.	Containment Pressure (Wide Range)	2	F
9.	Containment Isolation Valve Position	2 per penetration flow path[a][b]	F
10.	Containment Area Radiation (High Range)	2	G
11.	Hydrogen Monitors	2	F
12.	Pressurizer Level	2	F
13.	Steam Generator Water Level (Wide Range)	2 per steam generator	F
14.	Condensate Storage Tank Level	2	F
15.	Core Exit Temperature – Quadrant [1]	2[c]	F
16.	Core Exit Temperature – Quadrant [2]	2[c]	F
17.	Core Exit Temperature – Quadrant [3]	2[c]	F
18.	Core Exit Temperature – Quadrant [4]	2[c]	F
19.	Auxiliary Feedwater Flow	2	F

D

INSERT 3.3-43-01

Insert 3.3-43-02

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

C

d (b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

(c) A channel consists of two core exit thermocouples (CETs).

Reviewer's Note: Table 3.3.3-1 shall be amended for each unit as necessary to list:

(1) All Regulatory Guide 1.97, Type A instruments, and

(2) All Regulatory Guide 1.97, Category I, non-Type A instruments in accordance with the unit's Regulatory Guide 1.97, Safety Evaluation Report.

CLB.1

Insert 3.3-43-03

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: 3.3-43-01

<DOC A.3>	1.	Neutron Flux	2	F	24 months
< A.4>	2.	RCS Hot Leg Temperature (wide range)	1 per loop. ~~4 loops~~ (a)	E	24 months
	3.	RCS Cold Leg Temperature (wide range)	1 per loop. ~~4 loops~~ (b)	E	24 months
< A.5>	4.	RCS Pressure (wide Range)	2	E	24 months
<A.6>	5.	Reactor Vessel Water Level	2	E	24 months
<A.7>	6.	Containment Water Level (Wide Range)	2	E	24 months
	7.	Containment Water Level (Recirculation Sump)	2	E	24 months
<A.8>	8.	Containment Pressure	2	E	18 months
<A.9>	9.	Automatic Containment Isolation Valve Position	2 per penetration flow path(c)(d)	F	24 months
<A.10>	10.	Containment Area Radiation (High Range)	2	F	24 months
<A.11>	11.	Containment Hydrogen Monitors	2 (e)	E	92 days
<A.12>	12.	Pressurizer Level	2	E	24 months
<A.13>	13.	SG Water Level (Narrow Range)	2 per SG	E	24 months
	14.	SG Water Level (Wide Range)	1 per SG (f)	E	24 months
<A.20>	15	Auxiliary Feedwater Flow	1 per SG	E	18 months
<A.14>	16.	Steam Generator Pressure	2 per SG	E	24 months
<A.15>	17.	Condensate Storage Tank Level	2	F	24 months
<A.17>	18.	Core Exit Thermocouples-Quadrant 1	2 per train	E	24 months
	19.	Core Exit Thermocouples-Quadrant 2	2 per train	E	24 months
	20.	Core Exit Thermocouples-Quadrant 3	2 per train	E	24 months
	21.	Core Exit Thermocouples-Quadrant 4	2 per train	E	24 months
<A.18>	22.	Main Steam Line Radiation	1 per steam line (g)	F	24 months
<A.19>	23.	Gross Failed Fuel Detector	2	F	24 months
<A.20>	24.	RCS Subcooling ~~Margin~~	2	E	24 months

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: 3.3-43-02

(a) The redundant channel in each of four loops is any qualified CET in the quadrant associated with that loop.

(b) The redundant channel in each of four loops is any channel of steam generator pressure for that loop.

INSERT: 3.3-43-03:

(e) Hydrogen monitor OPERABILITY requires that at least one of the associated containment fan cooler units is OPERABLE.

(f) The redundant channel in each steam generator is the auxiliary feedwater flow rate channel for that steam generator.

(g) The redundant channel in each steam line is any one steam generator narrow range level indicator for that loop.

B 3.3 INSTRUMENTATION

B 3.3.3 Post Accident Monitoring (PAM) Instrumentation

BASES

BACKGROUND

The primary purpose of the PAM instrumentation is to display unit variables that provide information required by the control room operators during accident situations. This information provides the necessary support for the operator to take the manual actions for which no automatic control is provided and that are required for safety systems to accomplish their safety functions for Design Basis Accidents (DBAs).

The OPERABILITY of the accident monitoring instrumentation ensures that there is sufficient information available on selected unit parameters to monitor and to assess unit status and behavior following an accident.

The availability of accident monitoring instrumentation is important so that responses to corrective actions can be observed and the need for, and magnitude of, further actions can be determined. These ~~essential~~ instruments are identified by unit specific documents (Ref. 1) addressing the recommendations of Regulatory Guide 1.97 (Ref. 2) as required by Supplement 1 to NUREG-0737 (Ref. 3).

The instruments governed by this LCO are the

The instrument channels required to be OPERABLE by this LCO include two classes of parameters identified during unit specific implementation of Regulatory Guide 1.97. ~~as~~ Type A and Category I variables.

which are defined as follows:

Type A variables are included in this LCO because they provide the primary information required for the control room operator to take specific manually controlled actions for which no automatic control is provided, and that are required for safety systems to accomplish their safety functions for DBAs. ~~Because the list of Type A variables differs widely between units, Table 3.3.3-1 in the accompanying LCO contains no examples of Type A variables, except for those that may also be Category I variables.~~ PA.1

Category I variables are the key variables deemed risk significant because they are needed to:

(continued)

BASES

BACKGROUND (continued)

- Determine whether other systems important to safety are performing their intended functions;
- Provide information to the operators that will enable them to determine the likelihood of a gross breach of the barriers to radioactivity release; and
- Provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public, and to estimate the magnitude of any impending threat.

These key variables are identified by the unit specific Regulatory Guide 1.97 analyses (Ref. 1). These analyses identify the unit specific Type A and Category I variables and provide justification for deviating from the NRC proposed list of Category I variables.

~~Reviewer's Note: Table 3.3.3-1 provides a list of variables typical of those identified by the unit specific Regulatory Guide 1.97 analyses. Table 3.3.3-1 in unit specific Technical Specifications (TS) shall list all Type A and Category I variables identified by the unit specific Regulatory Guide 1.97 analyses, as amended by the NRC's Safety Evaluation Report (SER).~~

The specific instrument Functions listed in Table 3.3.3-1 are discussed in the LCO section.

APPLICABLE SAFETY ANALYSES

The PAM instrumentation ensures the operability of Regulatory Guide 1.97 Type A and Category I variables so that the control room operating staff can:

- Perform the diagnosis specified in the emergency operating procedures (these variables are restricted to preplanned actions for the primary success path of DBAs), e.g., loss of coolant accident (LOCA);
- Take the specified, pre-planned, manually controlled actions, for which no automatic control is provided, and that are required for safety systems to accomplish their safety function;

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

- Determine whether systems important to safety are performing their intended functions;
- Determine the likelihood of a gross breach of the barriers to radioactivity release;
- Determine if a gross breach of a barrier has occurred; and
- Initiate action necessary to protect the public and to estimate the magnitude of any impending threat.

PAM instrumentation that meets the definition of Type A in Regulatory Guide 1.97 satisfies Criterion 3 of ~~the NRC~~ ~~Policy Statement~~ 10 CFR 50.36. Category I, non-Type A, instrumentation must be retained in TS because it is intended to assist operators in minimizing the consequences of accidents. Therefore, Category I, non-Type A, variables are important for reducing public risk. And, therefore, meet Criterion 4 of 10 CFR 50.36 PA1

LCO

The PAM instrumentation LCO provides OPERABILITY requirements for Regulatory Guide 1.97 Type A monitors, which provide information required by the control room operators to perform certain manual actions specified in the unit Emergency Operating Procedures. These manual actions ensure that a system can accomplish its safety function, and are credited in the safety analyses. Additionally, this LCO addresses Regulatory Guide 1.97 instruments that have been designated Category I, non-Type A.

The OPERABILITY of the PAM instrumentation ~~ensures there is~~ provides ~~sufficient~~ information ~~available on~~ about selected unit parameters to monitor and assess unit status following an accident. This capability is consistent with the recommendations of Reference 1. LCO.1

Insert B 3.3-123-01

LCO 3.3.3 requires two OPERABLE channels for most Functions. Two OPERABLE channels ensure no single failure prevents operators from getting the information necessary for them to determine the safety status of the unit, and to bring the unit to and maintain it in a safe condition following an accident.

R.1

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-123-01

~~This LCO requires OPERABILITY of only one channel of each Type A and Category I variable. The additional channels of each Type A and Category I instrument described in Reference 1 and needed to meet Reference 2 requirements for single failure tolerance and channel diversity are controlled administratively.~~

R.1

BASES

LCO (continued)

Furthermore, OPERABILITY of two channels allows a CHANNEL CHECK during the post accident phase to confirm the validity of displayed information. More than two channels may be required at some units if the unit specific Regulatory Guide 1.97 analyses (Ref. 1) determined that failure of one accident monitoring channel results in information ambiguity (that is, the redundant displays disagree) that could lead operators to defeat or fail to accomplish a required safety function.

An ~~The~~ exception to the two channel requirement is Containment Isolation Valve (CIV) Position. In this case, the important information is the status of the containment penetrations. The LCO requires one position indicator for each active CIV. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve and prior knowledge of a passive valve, or via system boundary status. If a normally active CIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

Table 3.3.3-1 provides a list of variables typical of those identified by the unit specific Regulatory Guide 1.97 (Ref. 1) analyses. Table 3.3.3-1 in unit specific TS should list all Type A and Category I variables identified by the unit specific Regulatory Guide 1.97 analyses, as amended by the NRC's SER. IP3 R.1 R.1

(Ref. 1), with one exception. Requirements for PWST level, which is a Type A and Category I variable, are stated in LCO 3.5.4.

Type A and Category I variables are required to meet Regulatory Guide 1.97 Category I (Ref. 2) design and qualification requirements for seismic and environmental qualification, single failure criterion, utilization of emergency standby power, immediately accessible display, continuous readout, and recording of display.

Insert B 3.3-124-01

Listed below are discussions of the specified instrument Functions listed in Table 3.3.3-1. These discussions are intended as examples of what should be provided for each Function when the unit specific list is prepared. R.1

Insert B 3.3-124-02

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-124-01 DELETED ... Rev 1

~~Requirements for single failure tolerance and channel diversity are controlled administratively.~~

R.1

INSERT: B 3.3-124-02

The Safety Parameter Display System (SPDS) is provided to the Control Room to continuously display information from which plant status can be assessed. The SPDS consists of the Critical Functions Monitoring System (CFMS) and the Qualified Safety Parameters Display System (QSPDS). The CFMS displays and alarms critical safety functions (actions which preserve integrity of one or more physical barriers against radiation) in the Control Room and the emergency response facilities. The CFMS provides for historical data storage and retrieval capability. The CFMS is a redundant computer system not designed to seismic and electrical class 1E criteria. The QSPDS is a backup display system to the CFMS and is qualified to seismic and electrical class 1E standards (Ref. 4).

R.1

DB.1
CLB1

BASES

LCO (continued)

1

1/2. ~~Power Range and Source Range~~ Neutron Flux

Covering

~~Power Range and Source Range~~ Neutron Flux indication is provided to verify reactor shutdown. ~~The two ranges are necessary to cover the~~ full range of flux that may occur post accident.

no ¶

Neutron flux is used for accident diagnosis, verification of subcriticality, and diagnosis of positive reactivity insertion.

Insert: B3.3-125-01

2,3

3/4. Reactor Coolant System (RCS) Hot and Cold Leg Temperatures

(wide range)

RCS Hot and Cold Leg Temperatures are Category I variables provided for verification of core cooling and long term surveillance.

required

no ¶

~~RCS hot and cold leg temperatures are used to determine RCS subcooling margin. RCS subcooling margin will allow termination of safety injection (SI), if still in progress, or reinitiation of SI if it has been stopped. RCS subcooling margin is also used for unit stabilization and cooldown control.~~

no ¶

~~In addition~~, RCS cold leg temperature is used in conjunction with RCS hot leg temperature and steam generator pressure to verify the unit conditions necessary to establish natural circulation in the RCS.

Insert B3.3-125-02

~~Reactor outlet temperature inputs to the Reactor Protection System are provided by two fast response resistance elements and associated transmitters in each loop.~~ The channels provide indication over a range of 32°F to 700°F.

0

Insert B3.3-125-03

4

5. Reactor Coolant System Pressure (Wide Range)

RCS wide range pressure is a Category I variable provided for verification of core cooling and RCS integrity long term surveillance.

required

~~RCS pressure is used to verify delivery of SI flow to RCS from at least one train when the RCS pressure is~~

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-125-01

To satisfy these requirements, an Excore Neutron Flux Detection System consisting of two detectors (N38, N39) provides two channels of neutron flux indication capable of providing indication from the source range to 100% RTP. Either one of these channels is required to be OPERABLE to satisfy requirements of this LCO. The Excore Neutron Flux Detection System is an indication only system that displays on the QSPDS in the Control Room. Redundancy for this function is provided by the source range, intermediate range and power range instruments of the Nuclear Instrumentation System.

R.1

INSERT: B 3.3-125-02

This LCO is satisfied by the OPERABILITY of an one hot leg channel and any one cold leg channel from the following list: in each of the four RCS loops:

Hot Leg Loop No. 1 (T413A)	Cold Leg Loop No. 1 (T413B)
Hot Leg Loop No. 2 (T423A)	Cold Leg Loop No. 2 (T423B)
Hot Leg Loop No. 3 (T433A)	Cold Leg Loop No. 3 (T433B)
Hot Leg Loop No. 4 (T443A)	Cold Leg Loop No. 4 (T443B)

R.1

INSERT: B 3.3-125-03

Redundancy for the Hot Leg RCS Temperature is provided by the core exit thermocouples (Functions 18, 19, 20 and 21) which is considered a diverse variable for the RCS Hot Leg indication. Redundancy for the Cold Leg RCS Temperature is provided by Steam Generator Pressure (Function ~~15~~ 16).

R.1

BASES

LCO

4 ~~5~~. Reactor Coolant System Pressure (Wide Range) (continued)

~~below the pump shutoff head.~~ RCS pressure is ~~also~~ used to verify closure of manually closed spray line valves and pressurizer power operated relief valves (PORVs).

In addition ~~to these verifications,~~ RCS pressure is used ~~for determining~~ RCS subcooling ~~margin. RCS subcooling margin will allow termination of SI, if still in progress, or reinitiation of SI if it has been stopped.~~ RCS pressure can also be used:

- ~~to~~ determining whether to terminate actuated SI or to reinitiate stopped SI;
- to determine when to reset SI and shut off low head SI;
- to manually restart low head SI;
- as reactor coolant pump (RCP) trip criteria; and
- to make a determination on the nature of the accident in progress and where to go next in the procedure.

~~RCS subcooling margin is also used for unit stabilization and cooldown control.~~

RCS pressure is also related to three decisions about depressurization. They are:

- to determine whether to proceed with primary system depressurization;
- to verify termination of depressurization; and
- to determine whether to close accumulator isolation valves during a controlled cooldown/depressurization.

~~A final use of~~ RCS pressure is to determine whether to operate the pressurizer heaters.

(continued)

DB1
CLB1

BASES

LCO

4 → 5. Reactor Coolant System Pressure (Wide Range) (continued)

depressurization

~~In some units,~~ RCS pressure is a Type A variable because the operator uses this indication to monitor the ~~cooldown~~ of the RCS following a steam generator tube rupture (SGTR) or small break LOCA. Operator actions to maintain a controlled cooldown, such as adjusting steam generator (SG) pressure or level, would use this indication. Furthermore, RCS pressure is one factor that may be used in decisions to terminate RCP operation.

Insert: B3.3-127-01

5 → 6. Reactor Vessel Water Level

required

Reactor Vessel Water Level is ~~provided~~ for verification and long term surveillance of core cooling. It is also used for accident diagnosis and to determine reactor coolant inventory adequacy.

Insert: B3.3-127-02

~~The Reactor Vessel Water Level Monitoring System provides a direct measurement of the collapsed liquid level above the fuel alignment plate.~~ The ~~co~~ Nlapsed level reading represents the amount of liquid mass that is in the reactor vessel ~~above the core~~. Measurement of the collapsed water level is selected because it is a direct indication of the water inventory. R.1

Insert: B3.3-127-03

6,7 → 7. Containment ~~Sump~~ Water Level (Wide Range)

and Recirculation Sump Level

required

Containment ~~Sump~~ Water Level is ~~provided~~ for verification and long term surveillance of RCS integrity.

Containment ~~Sump~~ Water Level is used ~~to determine:~~

for accident diagnosis and provides a diverse indication for RWST level regarding

- ~~containment sump level accident diagnosis;~~
- when to begin the recirculation procedure; ~~and~~
- ~~whether to terminate SI, if still in progress.~~ •

R.1

Insert: B3.3-127-04

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-127-01

The LCO requirement for ~~1 channel of~~ RCS Pressure (wide range) indication is satisfied by ~~either the~~ pressure transmitters designated PT-402 ~~or~~ and PT-403. Normal control room indication or recorders or displays on the QSPDS in the Control Room will satisfy this requirement.

~~Redundancy for RCS Pressure (wide range) indication is provided by the RCS 0-3000 psig pressure gauge which is located in an area accessible to plant operators. Additionally, pressure transmitters used to monitor pressurizer pressure (PT-455, PT-456, PT-457 and PT-474) for the range of 1700-2500 psig are available.~~

R. 1

INSERT: B 3.3-127-02

This requirement is satisfied by ~~either of the~~ two channels of the Reactor Vessel Level Indicating System ~~(RVLIS)~~ (RVLIS-A and RVLIS-B). The RVLIS automatically compensates for variations in fluid density as well as for the effects of reactor coolant pump operation.

R. 1

INSERT: B 3.3-127-03

The level instrumentation is divided into the full range and the dynamic range in order to measure level under all conditions. The full range gives level indication from the bottom of the reactor vessel to the top of the reactor head during natural circulation conditions. The dynamic range gives indication of reactor vessel liquid level for any combination of running RCP's.

INSERT: B 3.3-127-04

The LCO requirement for ~~1 channel of~~ Containment Recirculation sump water level indication is satisfied by ~~either level~~ the transmitters designated LT-1251 ~~or~~ and LT-1252. The LCO requirement for ~~1 channel of~~ Containment water level (wide range) indication is satisfied by ~~either the~~ level transmitters designated LT-1253 ~~or~~ and LT-1254. Normal control room ~~indication~~ recorders or QSPDS display will satisfy this requirement.

~~The refueling water storage tank level (Function 17) provides the diverse variable for measurement for the containment water level. Additionally, 2 channels of containment sump water level indication are available.~~

R. 1

BASES

LCO (continued)

8. Containment Pressure (Wide Range)

Insert: B3.3-128-01

Containment Pressure (Wide Range) is ~~provided~~ required for verification of ~~RCS and containment OPERABILITY~~.

~~Containment pressure is used to verify closure of main steam isolation valves (MSIVs), and containment spray Phase B isolation when High-3 containment pressure is reached.~~

Automatic

9. Containment Isolation Valve Position

CIV Position is provided for verification of Containment OPERABILITY, and Phase A and Phase B isolation.

Closed

(or at local control stations for valves without control room indication)

When used to verify Phase A and Phase B isolation, the important information is the isolation status of the containment penetrations. The LCO requires one channel of valve position indication in the control room to be OPERABLE for each active CIV in a containment penetration flow path, i.e., two total channels of CIV position indication for a penetration flow path with two active valves. For containment penetrations with only one active CIV having control room indication, Note (b) requires a single channel of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve, as applicable, and prior knowledge of a passive valve, or via system boundary status. If a normally active CIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE. Note (a) to the Required Channels states that the Function is not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve ~~with flow through the valve secured~~.

(d) (c) DBI R.1

Insert: B3.3-128-02

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-128-01

need for and effectiveness of containment spray and fan cooler units.

The LCO requirement for 1 channel of Containment pressure indication is satisfied by either the pressure transmitters designated PT-1421 or PT-1422. Normal control room indication will satisfy this requirement. Additional containment pressure instrumentation, PT-948A, B & C and PT-949A, B & C, provide a diverse means of establishing containment pressure.

or ASPDS display

and

R. 1

INSERT: B 3.3-128-02

Note that non-automatic containment isolation valves are not provided with position indication. As described in the Bases for LCO 3.6.3, "Containment Isolation Valves, containment isolation valves classified as essential and non-automatic are maintained in the open position and are closed after the initial phases of an accident. Emergency procedures are utilized to control the closing of these valves. Non-essential containment isolation valves are maintained in the closed position and may be opened, if necessary, for plant operation and for only as long as necessary to perform the intended function, under administrative controls described in the Bases for LCO 3.6.3.

Containment pressure narrow range instrumentation (PT-948A, C, C and PT-949A, B, C) is available to provide a diverse means of establishing containment pressure.

R. 1

DB.1
CLB.1

BASES

LCO (continued)

10. Containment Area Radiation (High Range)

Containment Area Radiation is provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans. ~~Containment radiation level is used to determine if a high energy line break (HELB) has occurred, and whether the event is inside or outside of containment.~~

Insert: B 3.3 129-01

11. Hydrogen Monitors Containment

Hydrogen Monitors are provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. This variable is also important in verifying the adequacy of mitigating actions.

Insert B 3.3-129-02

12. Pressurizer Level

Pressurizer Level is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify the unit conditions necessary to establish natural circulation in the RCS and to verify that the unit is maintained in a safe shutdown condition.

Insert B 3.3-129-03

Separate 13 and 14; Sp. ITI clear pages R.1

13, 14 → 13.

Steam Generator Water Level (Wide Range) and Narrow Range

SG Water Level is provided Required to monitor operation of decay heat removal via the SGs. ~~The Category I indication of SG level is the extended startup range level instrumentation. The extended startup range level covers a span of ≥ 6 inches to ≤ 394 inches above the lower tubesheet. The measured differential pressure is displayed in inches of water at 68°F.~~

Insert: B 3.3 129-04

~~Temperature compensation of this indication is performed manually by the operator. Redundant monitoring capability is provided by two trains of instrumentation. The uncompensated level signal is~~

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-129-01

The LCO requirement for ~~1 channel of~~ Containment Area Radiation (high range) monitoring is satisfied by ~~either~~ the radiation monitors designated R-25 ~~or~~ and R-26.

R.1

INSERT: B 3.3-129-02

The LCO requirement for ~~1 channel of~~ Containment Hydrogen monitoring is satisfied by ~~either~~ the containment hydrogen sampling monitors designated HCMC-A and HCMC-B. Hydrogen monitor OPERABILITY requires that at least one of the associated containment fan cooler units (FCU) is OPERABLE. HCMC-A is associated with FCU 32 or 35 and HCMC-B is associated with FCU 31 or 33 or 34.

R.1

INSERT: B 3.3-129-03

The LCO requirement for 2 channels of pressurizer level indication is satisfied by any 2 of the level instruments designated LT-459, LT-460 and LT-461.

NUREG-1431 Markup Inserts

ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

SEE ITS clean pages for info reorganized in separate sections for Function 13 & 14.

INSERT: B 3.3-129-04

R.1

Each Steam Generator (SG) contains 4 transmitters that indicate SG water level. Three transmitters per SG indicate narrow range level which is a span that begins at the top of the tube bundles up to the moisture separator. The remaining level transmitter, the wide range instrument, covers the span from the bottom tube sheet up to the moisture separator.

Requirements for steam generator water level indication assume that two of the four steam generators are required for heat removal.

Wide range SG water level is a Category I, Type A variable used to determine if the SG's are being maintained as an adequate heat sink for decay heat removal. The LCO requirement for ~~2 channels of~~ wide range water level is satisfied by ~~any two of~~ the instruments designated LT-417D, T-L427D, LT-437D, and LT-447D.

Narrow range SG water level is a Category I, Type A variable used to determine if the SG's are being maintained as an adequate heat sink for decay heat removal and to maintain the SG level and prevent overfill. It is also used to determine whether SI should be terminated and may be used to diagnose an SG tube rupture event. The LCO requirement for 2 channels of narrow range SG water level is satisfied by any 2 instruments from any two different SGs such that all SGs have at least one wide range oe one narrow range instrument:

SG 31	SG 32	SG 33	SG 34
L417A	L427A	L437A	L447A
L417B	L427B	L437B	L447B
L417C	L427C	L437C	L447C

is satisfied by any two instruments for each SG in the following list

Redundancy for wide range level in each SG is provided by the Auxiliary Feedwater Flow for that SG (Function 15)

R.1

SG Narrow Range level provides a redundant channel for Main Steam Line radiation (Function 22).

DB.1
CLB.1

BASES

LCO

13. Steam Generator Water Level (Wide Range) (continued)

input to the unit computer, a control room indicator, and the Emergency Feedwater Control System.

SG Water Level (Wide Range) is used to:

- identify the faulted SG following a tube rupture;
- verify that the intact SGs are an adequate heat sink for the reactor;
- determine the nature of the accident in progress (e.g., verify an SGTR); and
- verify unit conditions for termination of SI during secondary unit HELBs outside containment.

Insert B 3.3-130-01

At some units, operator action is based on the control room indication of SG level. The RCS response during a design basis small break LOCA depends on the break size. For a certain range of break sizes, the boiler condenser mode of heat transfer is necessary to remove decay heat. Extended startup range level is a Type A variable because the operator must manually raise and control SG level to establish boiler condenser heat transfer. Operator action is initiated on a loss of subcooled margin. Feedwater flow is increased until the indicated extended startup range level reaches the boiler condenser setpoint.

R.1

Insert: B 3.3-130-02

17. Condensate Storage Tank (CST) Level

CST Level is provided to ensure water supply for auxiliary feedwater (AFW). The CST provides the ensured safety grade water supply for the AFW System. The CST consists of two identical tanks connected by a common outlet header. Inventory is monitored by a 0 inch to 144 inch level indication for each tank. CST Level is displayed on a control room indicator, strip chart recorder, and unit computer. In addition, a control room annunciator alarms on low level.

R.1

At some units, CST Level is considered a Type A variable because the control room meter and indication

(continued)

INSERT: B 3.3-130-01

15. Auxiliary Feedwater Flow

AFW Flow is provided to monitor the decay heat removal capability of each SG. Although not a Category I or Type A variable for IP3, these instrument channels provide redundancy for SG wide range level ~~for E~~ in the event of the limiting single failure of a power supply. This LCO is satisfied by the OPERABILITY of the following instruments.

SG 31	SG 32	SG 33	SG 34
F1200	F1201	F1202	F1203

R.1

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-130-~~01~~ 02

~~15~~. 16 Steam Generator Pressure

Each SG contains 3 transmitters that indicate SG pressure. Requirements for steam generator pressure indication assume that two of the four steam generators are required for heat removal. Requiring 1 channel per steam generator of SG pressure provides indication for all SGs.

SG pressure is a Category I, Type A variable used to determine if a high energy secondary line rupture occurred and which steam generator is faulted. SG pressure is also used as diverse indication of RCS cold leg temperature for natural circulation determination. the redundant channel of

The LCO requirement for 1 channel per steam generator of pressure indication is satisfied by any 1 channel from the following for each of the four SGs: 2 s list

R. 1

SG 31	SG 32	SG 33	SG 34
P419A	P429A	P439A	P449A
P419B	P429B	P439B	P449B
P419C	P429C	P439C	P449C

BASES

LCO

14. Condensate Storage Tank (CST) Level (continued)

~~annunciator are considered~~ the primary indication used by the operator.

The DBAs that require AFW are the loss of electric power, steam line break (SLB), and small break LOCA.

The CST is the initial source of water for the AFW System. However, as the CST is depleted, manual operator action is necessary to replenish the CST or align suction to the AFW pumps ~~from the hotwell~~.

Core Exit Temperature

Core Exit Temperature is ~~provided~~ for verification and long term surveillance of core cooling.

~~An evaluation was made of the minimum number of valid core exit thermocouples (CET) necessary for measuring core cooling. The evaluation determined the reduced complement of CETs necessary to detect initial core recovery and trend the ensuing core heatup. The evaluations account for core nonuniformities, including incore effects of the radial decay power distribution, excore effects of condensate runback in the hot legs, and nonuniform inlet temperatures. Based on these evaluations, adequate core cooling is ensured with two valid Core Exit Temperature channels per quadrant with two CETs per required channel. The CET pair are oriented radially to permit evaluation of core radial decay power distribution. Core Exit Temperature is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Core Exit Temperature is also used for unit stabilization and cooldown control.~~

~~Two OPERABLE channels of Core Exit Temperature are required in each quadrant to provide indication of radial distribution of the coolant temperature rise across representative regions of the core. Power distribution symmetry was considered in determining the specific number and locations provided for diagnosis of local core problems. Therefore, two randomly selected thermocouples are not sufficient to~~

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-131-01

The LCO requirement for ~~1 channel of~~ CST level indication is satisfied by ~~either~~ the level transmitters designated LT-1128 ~~or~~ and LT-1128A. Normal control room indication or displays on the QSPDS in the Control Room ~~will satisfy this requirement.~~ Diverse indication of CST level can be ~~derived from auxiliary feedwater suction pressure indication.~~

R1

INSERT: B 3.3-131-02

17. Refueling Water Storage Tank (RWST) Level Alarm

Following a LOCA, switchover from the injection phase to the recirculation phase must occur before the RWST empties to prevent damage to the pumps and a loss of cooling capability. For similar reasons, switchover must not occur before there is sufficient water in the containment to support recirculation pump suction. Furthermore, early switchover must not occur to ensure that sufficient borated water is injected from the RWST. The IP3 ESFAS design does not include automatic switchover from the safety injection mode to the recirculation mode of operation based on low level in the RWST coincident with a safety injection signal. This function is performed manually by the operator with the RWST level alarm (in conjunction with containment level) as the primary indicator for determining the time for the switchover. Therefore, RWST level alarms are Type A, Category 1 variable. Note that RWST level indication is a Category 2 instrument as recommended in Regulatory Guide 1.97.

The RWST low low level alarm setpoint has both upper and lower limits. The lower limit is selected to ensure switchover occurs before the RWST empties, to prevent ECCS pump damage. The high limit also ensures adequate water inventory in the containment to provide ECCS pump suction.

Requiring 2 channels of RWST level alarm ensures that the alarm function will be available assuming a single failure of one channel. Diverse indication of RWST level can be derived the post LOCA containment water level.

(RWST level to be controlled under ITS 3.5.4)
Applicability & Required Actions are more strict in 3.5.4 than 3.3.3

R.1

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-131-03

Core exit thermocouples also serve as a redundant channel ~~provide diverse indication~~ for the RCS Hot Leg Temperature. (Function 3)

~~Four individual channels qualified to satisfy LCO requirements are provided in each quadrant of core. The LCO requirements for core exit thermocouple temperature indication are satisfied by any two channels in each of the 4 core quadrants (i.e., 2 channels per quadrant). Thermocouple readings are obtainable via the plant computer and at a manually selected display unit in the control room.~~

~~Requiring 2 channels per core quadrant provides sufficient channels in each of the 4 quadrants to determine the core radial temperature gradient.~~

The are 10 qualified CETs in each of two Trains distributed among the four core quadrants. Requiring 2 CETs per Train in each of the four quadrants provides assurance that sufficient CETs are available to support evaluation of core radial decay power distribution.

R. 1

BASES

LCO 15, 16, 17, 18 18, 19, 20, 21

Core Exit Temperature (continued)

meet the two thermocouples per channel requirement in any quadrant. The two thermocouples in each channel must meet the additional requirement that one is located near the center of the core and the other near the core perimeter, such that the pair of Core Exit Temperatures indicate the radial temperature gradient across their core quadrant. Unit specific evaluations in response to Item II.F.2 of NUREG-0737 (Ref. 3) should have identified the thermocouple pairings that satisfy these requirements. Two sets of two thermocouples ensure a single failure will not disable the ability to determine the radial temperature gradient.

Insert: B 3.3-132-01

19. Auxiliary Feedwater Flow

AFW Flow is provided to monitor operation of decay heat removal via the SGs.

The AFW Flow to each SG is determined from a differential pressure measurement calibrated for a range of 0 gpm to 1200 gpm. Redundant monitoring capability is provided by two independent trains of instrumentation for each SG. Each differential pressure transmitter provides an input to a control room indicator and the unit computer. Since the primary indication used by the operator during an accident is the control room indicator, the PAM specification deals specifically with this portion of the instrument channel.

AFW flow is used three ways:

- to verify delivery of AFW flow to the SGs;
- to determine whether to terminate SI if still in progress, in conjunction with SG water level (narrow range); and
- to regulate AFW flow so that the SG tubes remain covered.

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-132-01

22. Main Steam Line (MSL) Radiation

The MSL radiation monitors are a Type A variable provided to allow detection of a gross secondary side radioactivity release and to provide a means to identify the faulted steam generator. The LCO requirements for MSL radiation indication are satisfied by one channel in each of the 4 MSLs using instruments designated R62A, R62B, R62C, R62D. Steam generator narrow range level serves as diverse indication for the one MSL radiation monitor per loop provided. (Function 13) the redundant channel

R.1

23. Gross Failed Fuel Detector

The gross failed fuel detector (instrument loops R63A, R63B) is a Type A variable provided to allow determination of reactor coolant system radioactivity concentration. The LCO requires 1 OPERABLE channel and can be satisfied by either R-63A or R-63B.

The LCO requirement is satisfied by instrument loops R63A and R63B.

R.1

24. RCS Subcooling

RCS subcooling margin is a Type A variable provided to determine whether to terminate actuated SI or to reinitiate stopped SI, to determine when to terminate reactor coolant pump operation, and for unit stabilization and cooldown control. RCS subcooling margin is calculated and displayed in the plant Safety Parameter Display System. Diverse indication is available using saturation pressure and steam tables.

using RCS wide Range Pressure and Core Exit Temperature

R.1

BASES

LCO

19. Auxiliary Feedwater Flow (continued)

At some units, AFW flow is a Type A variable because operator action is required to throttle flow during an SLB accident to prevent the AFW pumps from operating in runout conditions. AFW flow is also used by the operator to verify that the AFW System is delivering the correct flow to each SG. However, the primary indication used by the operator to ensure an adequate inventory is SG level.

APPLICABILITY

The PAM instrumentation LCO is applicable in MODES 1, 2, and 3. These variables are related to the diagnosis and pre-planned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1, 2, and 3. In MODES 4, 5, and 6, unit conditions are such that the likelihood of an event that would require PAM instrumentation is low; therefore, the PAM instrumentation is not required to be OPERABLE in these MODES.

ACTIONS

Note 1 has been added in the ACTIONS to exclude the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE while relying on the ACTIONS even though the ACTIONS may eventually require unit shutdown. This exception is acceptable due to the passive function of the instruments, the operator's ability to respond to an accident using alternate instruments and methods, and the low probability of an event requiring these instruments.

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.3-1. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

(continued)

BASES

ACTIONS (continued)

A.1

Condition A applies when one or more Functions have one required channel that is inoperable. Required Action A.1 requires restoring the inoperable channel to OPERABLE status within 30 days. The 30 day Completion Time is based on operating experience and takes into account the remaining OPERABLE channel(s) (or in the case of a Function that has only one required channel, other non-Regulatory Guide 1.97 instrument channels to monitor the Function), the passive nature of the instrument (no critical automatic action is assumed to occur from these instruments), and the low probability of an event requiring PAM instrumentation during this interval.

B.1

Condition B applies when the Required Action and associated Completion Time for Condition A are not met. This Required Action specifies initiation of actions in Specification 5.6.8, which requires a written report to be submitted to the NRC immediately. This report discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative actions. This action is appropriate in lieu of a shutdown requirement since alternative actions are identified before loss of functional capability, and given the likelihood of unit conditions that would require information provided by this instrumentation.

C.1

Condition C applies when one or more Functions have two inoperable required channels (i.e., two channels inoperable in the same Function). Required Action C.1 requires restoring one channel in the Function(s) to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the PAM instrumentation. Therefore, requiring restoration

(continued)

BASES

ACTIONS

C.1 (continued)

of one inoperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur. Condition C is modified by a Note that excludes hydrogen monitor channels. CLB1

R.1 Insert B 3.3.135.01

D.1

Condition D applies when two hydrogen monitor channels are inoperable. Required Action D.1 requires restoring one hydrogen monitor channel to OPERABLE status within 72 hours. The 72 hour Completion Time is reasonable based on the backup capability of the Post Accident Sampling System to monitor the hydrogen concentration for evaluation of core damage and to provide information for operator decisions. Also, it is unlikely that a LOCA (which would cause core damage) would occur during this time. CLB.1

D E.1 D A C is

Condition B applies when the Required Action and associated Completion Time of Condition C or D are not met. Required Action B.1 requires entering the appropriate Condition referenced in Table 3.3.3-1 for the channel immediately. The applicable Condition referenced in the Table is Function dependent. Each time an inoperable channel has not met any Required Action of Condition C or D, and the associated Completion Time has expired, Condition B is entered for that channel and provides for transfer to the appropriate subsequent Condition.

D A C A D

E C F.1 and F.2

A is D C E

If the Required Action and associated Completion Time of Conditions C or D are not met and Table 3.3.3-1 directs entry into Condition E, the unit must be brought to a MODE where the requirements of this LCO do not apply. To achieve this status, the unit must be brought to at least 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 unit conditions R.1

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-135-01

~~Condition A also applies when one channel of RWST low level alarm (Table 3.3.31-1. Function 17) is inoperable. Required Action A.1 requires restoring the inoperable channel to OPERABLE status within 7 days. The 7 day Completion Time for restoration redundancy of the alarm function is needed because the IP3 ESFAS design does not include automatic switchover from the safety injection mode to the recirculation mode of operation based on low level in the RWST coincident with a safety injection signal. This function is performed manually by the operator with the RWST level alarm (in conjunction with containment sump level) as the primary indicator for determining the time for the switchover.~~

R.1

(RWST level will be addressed by 3.5.4)

BASES

ACTIONS

E ~~G~~ E ~~G~~

~~F.1 and F.2~~ (continued)

from full power conditions in an orderly manner and without challenging unit systems.

Insert: B 3.3-136-01

~~G.1~~ ~~D~~ F

~~At this unit,~~ alternate means of monitoring ~~Reactor Vessel Water Level and~~ Containment Area Radiation ~~have been developed and tested~~ are available. These alternate means may be ~~temporarily installed~~ if the normal PAM channel cannot be restored to OPERABLE status within the allotted time. If these alternate means ~~are~~ used, the Required Action is not to shut down the unit but rather to follow the directions of Specification 5.6 ~~B~~ 7, in the Administrative Controls section of the TS. The report provided to the NRC should discuss the alternate means ~~used~~ can be available, describe the degree to which the alternate means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels.

R. 1

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that SR 3.3.3.1 and SR 3.3.3.3 apply to each PAM instrumentation Function in Table 3.3.3-1.

SR 3.3.3.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure 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 two instrument channels could be an indication of excessive instrument drift in one of the channels or of 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. The high radiation instrumentation

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-136-01

neutron flux, condensate storage tank level, main steam line radiation, gross failed fuel, some containment isolation valves and

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.3.1 (continued)

should be compared to similar unit instruments located throughout the unit.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

As specified in the SR, a CHANNEL CHECK is only required for those channels that are normally energized.

The Frequency of 31 days is based on operating experience that demonstrates that 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 LCO required channels.

SR 3.3.3.2

A CHANNEL CALIBRATION is performed every [18] 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter with the necessary range and accuracy. This SR is modified by a Note that excludes neutron detectors. The calibration method for neutron detectors is ~~specified~~ described in the Bases of LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation." The Frequency is based on operating experience and consistency with the typical industry refueling cycle.

REFERENCES

1. ~~[Unit specific document (e.g., FSAR, NRC Regulatory Guide 1.97 SER letter).]~~ Insert: B3.3-137-01
2. Regulatory Guide 1.97, ~~[date]~~. Revision 3
3. NUREG-0737, Supplement 1, "TMI Action Items."
4. FSAR, Section 7.

NUREG-1431 Markup Inserts
ITS SECTION 3.3.3 - POST ACCIDENT MONITORING (PAM) INSTRUMENTATION

INSERT: B 3.3-137-01

Safety Evaluation: Conformance to Regulatory Guide 1.97, Revision 3, for Indian Point 3 (TAC No. 51099), dated April 3, 1991.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.5:

"Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"

PART 1:

Indian Point 3
Improved Technical Specifications and Bases

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time not met. OR Two channels of Degraded Voltage Function inoperable in one or more buses.	C.1 Enter applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.1	Perform TADOT.	31 days
SR 3.3.5.2	Perform CHANNEL CALIBRATION with Allowable Value as follows:	
	a. Undervoltage (480 V bus) Relay Allowable Value ≥ 200 V.	24 months
	b. Degraded Voltage (480 V bus) Relay (Non-SI) Allowable Value ≥ 414 V with a time delay ≤ 45 seconds.	18 months NYPA
	c. Degraded Voltage (480 V bus) Relay (Coincident SI) Allowable Value ≥ 414 V with a time delay ≤ 10 seconds.	18 months NYPA

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.5:
"LOP DIESEL GENERATOR START INSTRUMENTATION"

PART 2:

CURRENT TECHNICAL SPECIFICATION PAGES

Annotated to show differences between CTS and ITS

CTS PAGE	AMENDMENT FOR REV O SUBMITTAL	AMENDMENT FOR REV 1 SUBMITTAL	COMMENT
3.5-1	26	26	
T3.5-1(1)	154	154	
T3.5-1(2)	106	106	
T3.5-3(3)	151	151	
4.1-1	97	97	
4.1-2	97	97	
4.1-3	148	148	
4.1-4	107	107	
4.1-5	107;97-156	182	SR Frequency for Turbine Stop and Control Valves
T4.1-1(4)	169;98-043	200	Deleted SR for VCT and Boric Acid Makeup Flow Channel

No impact
on ITS 3.3.5

TABLE 3.5-1 (Sheet 1 of 2)

ENGINEERED SAFETY FEATURES INITIATION INSTRUMENT ALLOWABLE VALUES			
	No.	FUNCTIONAL UNIT	CHANNEL	ALLOWABLE VALUE
SEE CTS MASTER MARKUP	1.	High Containment Pressure (Hi Level)	Safety Injection	≤ 4.5 psig
	2.	High Containment Pressure (Hi-Hi Level)	a. Containment Spray b. Steam Line Isolation	≤ 24 psig
	3.	Pressurizer Low Pressure	Safety Injection	≥ 1700 psig
	4.	High Differential Pressure Between Steam Lines	Safety Injection	≤ 150 psi
	5.	High Steam Flow in 2/4 Steam Lines Coincident with Low T_{avg} or Low Steam Line Pressure	a. Safety Injection b. Steam Line Isolation	≤ 6 sec. time delay for SI actuation ≤ 49% of full steam flow at zero load ≤ 49% of full steam flow at 20% load ≤ 110% of full steam flow at full load ≥ 540°F T_{avg} ≥ 600 psig steam line pressure
	6.	Steam Generator Water Level (low-low)	Auxiliary Feedwater	≥ 5% of narrow range instrument span each steam generator
SR 3.3.5.3.a	7.*a.	480v Bus Undervoltage Relay		≥ 200v**
SR 3.3.5.3.b	b.	480v Bus Degraded Voltage Relay (Non-~~SI~~)		≥ 414v with a ≤45 sec time delay
SR 3.3.5.3.c	c.	480v Bus Degraded Voltage Relay (Coincident SI)		≥ 414v with a ≤10 sec time delay

R.1

Amendment No. ~~70~~, ~~78~~, ~~94~~, ~~100~~, 154

LA.1

A.4

TABLE 3.5-3 (Sheet 3 of 3)

INSTRUMENTATION OPERATING CONDITION FOR ENGINEERED SAFETY FEATURES

No.	FUNCTIONAL UNIT	1 NO. OF CHANNELS	2 NO. OF CHANNELS TO TRIP	3 MIN. NUMBER OF OPERABLE CHANNELS	4 MIN. DEGREE OF REDUNDANCY	5 OPERATOR ACTION IF CONDITIONS OF COL. 3 OR 4 CANNOT BE MET (Note 6)
4.	LOSS OF POWER					
LCO 3.3.5	a. 480v Bus Undervoltage Relay	2/bus	1/bus	1/bus (1/bus)	0	See Note 1 Req. Act A.1 Req Act C.1
LCO 3.3.5	b. 480v Bus Degraded Voltage Relay	2/bus	2/bus	2/bus (See Note 2) Req Act B.1	0	See Note 1 Req Act B.1 Req Act C.1
SEE ITS 3.4.12	5. OVERPRESSURE PROTECTION SYSTEM (OPS)	3	2	2	1	See Note 7

L2 R.1

Req Act C.1 ~~Note 1.~~ If the 138KV and 13.8KV sources of offsite power are available and the conditions of column 3 or 4 cannot be met within 72 hours, then the requirements of 3.7.C.1 or 2 shall be met. (Declare DG inoperable) M.1

Req Act B.1 Note 2. If one channel becomes inoperable, it is placed in the trip position and the minimum number of operable channels is reduced by one. L2 R.1 A1

Note 3. Permissible to bypass if reactor coolant pressure is less than 2000 psig.

Note 4. Must actuate 2 switches simultaneously.

Note 5. The Minimum Number of Operable Channels and the Minimum Degree of Redundancy may be reduced to zero if the SI bypass is in the unblocked position.

SEE CTS MASTER MARKUP

Note 6. If the condition of Column 3 or 4 cannot be met, the reactor shall be placed in the hot shutdown condition, utilizing normal operating procedures, within 4 hours of the occurrence. If the conditions are not met within 24 hours of the occurrence, the reactor shall be placed in the cold shutdown condition, or the alternate condition, if applicable, within an additional 24 hours.

Note 7. Refer to Specification 3.1.A.8.

Note 8. Main steam isolation valves may be closed in lieu of going to cold shutdown if the circuitry associated with closing the valves is the only portion inoperable.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.5:

"Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"

PART 3:

DISCUSSION OF CHANGES

Differences between CTS and ITS

an inoperable channel. This is an administrative change with no adverse impact on safety because there is no change to the existing requirements.

A.5 CTS Table 3.5-1, Note *, modifying item 7, states that the requirements are to be effective after completion of all required modifications. ITS LCO 3.3.5 does not retain this note because the modifications are completed. Deletion of the note is an administrative change.

MORE RESTRICTIVE

M.1 CTS Applicability requirements for the LOP DG start instrumentation are implied by CTS 3.5.1 which requires that instrument setpoints must meet requirements only when not in the cold shutdown condition and CTS Table 3.5-3, Note 1, which requires that actions for inoperable DG when above cold shutdown are taken if the LOP DG start instrumentation is not Operable. CTS Table 3.5-3, Note 1 does not include required actions for the shutdown or refueling modes, where CTS 3.7.F.3 and 3.7.F.4 require, as a minimum, two of the four 480 V buses to be energized, and two diesel generators to be operable because autstart of the EDGs is not required in these Modes.

ITS LCO 3.3.5 maintains the requirement that LOP DG start instrumentation is Operable above cold shutdown (i.e., Modes 1, 2, 3 and 4); however, ITS LCO 3.3.5 requires that LOP DG start instrumentation is Operable whenever a DG is required to be Operable (i.e., Modes 5 and 6 (if fuel is being moved) and during movement of irradiated fuel assemblies.

This change is needed because it ensures that the LOP DG start instrumentation is Operable whenever a DG is Operable. This more restrictive change is acceptable because if does not introduce any operation that is un-analyzed while ensuring that DG autostart instrumentation is Operable whenever a DG is required to be Operable. Therefore, this change has no significant adverse impact on safety.

DISCUSSION OF CHANGES
ITS SECTION 3.3.5 - LOSS OF POWER (LOP) DIESEL
GENERATOR (DG) START INSTRUMENTATION

LESS RESTRICTIVE

L.1 Not used

L.2 CTS Table 3.5-3, Note 1, specifies the following actions whenever the requirements for Undervoltage or Degraded Voltage are not met: "If the 138KV and 13.8KV sources of offsite power are available and the conditions of column 3 or 4 cannot be met within 72 hours, then the requirements of 3.7.C.1 or 2 shall be met. CTS 3.7.C.1 and CTS 3.7.C.2 are the actions taken after the AOT for an inoperable DG has expired. Therefore, these CTS statements are equivalent to requiring a plant shutdown in 72 hours. In ITS 3.3.5 Conditions A and B, a one hour completion time is provided for Required Actions that can be taken prior to declaring the associated DG inoperable, which then requires a plant shutdown in 72 hours. This results in a less restrictive change because the ITS allows for a total of 73 hours to reach the same plant condition that must be reached in 72 hours under CTS. The 6-hour AOT in condition A of the NUREG does not apply because the IP3 design is not covered by WCAP 10271. The less restrictive change has no significant adverse impact on safety because there is only a slight increase in time from 72 hours to 73 hours.

REMOVED DETAIL

LA.1 CTS Section 3.5, Tables 3.5-2, 3.5-3 and 3.5-4, Columns 1 and 2, identify the number of channels and the channels required to trip for each RPS and ESFAS Function. ITS LCO 3.3.1, LCO 3.3.2, LCO 3.3.3, LCO 3.3.5 and LCO 3.3.6 require that these Functions be Operable but do not provide system design details. This is acceptable because this design information is incorporated into the minimum requirements and ITS specifies the minimum requirements for Operability.

This change is acceptable because ITS LCO 3.3.1, LCO 3.3.2, LCO 3.3.3, LCO 3.3.5 and LCO 3.3.6 maintain the existing requirements for the Operability of these instruments (except as identified and justified in this discussion of change); therefore, there is no change to the existing requirements and no change to the level of safety of facility operation.

DISCUSSION OF CHANGES
ITS SECTION 3.3.5 - LOSS OF POWER (LOP) DIESEL GENERATOR (DG) START INSTRUMENTATION

This change, which allows the description of the design of instrument functions to be maintained in the FSAR and the detailed description of the requirements for Operability of these functions to be maintained in the ITS Bases, is consistent with the approach used in NUREG-1431 for all Limiting Conditions for Operation (LCOs). This approach is acceptable because the requirements of 10 CFR 50.59, Changes, Tests and Experiments, and ITS 5.5.13, Technical Specifications (TS) Bases Control Program, are designed to assure that changes to the FSAR and ITS Bases do not result in changes to the Technical Specification requirements and do not result in significant increases in the probability or consequences of accidents previously evaluated, do not create the possibility of a new or different kind of accident, and do not result in a significant reduction in a margin of safety. Additionally, IP3 programs that implement FSAR changes in accordance with 10 CFR 50.59 and ITS Bases changes in accordance with ITS 5.5.13 require periodic submittal of FSAR and Bases changes to the NRC for review.

This change is a less restrictive administrative change with no impact on safety because no requirements are being deleted from Technical Specifications and an appropriate change control process and an appropriate level of regulatory oversight are maintained for the information being relocated out of the Technical Specifications.

LA.2 CTS Table 3.5-1, Note **, explains why there are no explicit time delay requirements for the 480 V Bus undervoltage relay. This note states that the undervoltage protection devices used for diesel generator starting are induction type disc relays; therefore, the time to actual trip will decrease as a function of voltage decrease below the setpoint. This detail is not included in ITS 3.3.5, and is relocated to the LCO 3.3.5 Bases.

This change is acceptable because ITS LCO 3.3.5 maintain the existing requirement for the Operability of the 480 V Bus undervoltage relay (except as identified and justified in this discussion of change); therefore, there is no change to the existing requirements and no change to the level of safety of facility operation.

This change, which allows the description of the design of instrument

functions and the detailed description of the requirements for Operability of these functions to be maintained in the ITS Bases, is consistent with the approach used in NUREG-1431 for all Limiting Conditions for Operation (LCOs). This approach is acceptable because the requirements of ITS 5.5.13, Technical Specifications (TS) Bases Control Program, are designed to assure that changes to the ITS Bases do not result in changes to the Technical Specification requirements. Additionally, IP3 programs that implement ITS Bases changes in accordance with ITS 5.5.13 require periodic submittal of Bases changes to the NRC for review.

This change is a less restrictive administrative change with no impact on safety because no requirements are being deleted from Technical Specifications and an appropriate change control process and an appropriate level of regulatory oversight are maintained for the information being relocated out of the Technical Specifications.

LA.3 CTS Table 4.1-1 includes requirements for the testing of the 480 V safeguards bus undervoltage alarm. This requirement is not included in ITS 3.3.5 and is relocated to the FSAR and plant procedures.

This change, which allows testing of the 480 V safeguards bus undervoltage alarm to be maintained in the FSAR and implemented by procedures, is acceptable because the requirements of 10 CFR 50.59, Changes, Tests and Experiments, are designed to assure that changes to the FSAR do not result in changes to the Technical Specification requirements and do not result in significant increases in the probability or consequences of accidents previously evaluated, do not create the possibility of a new or different kind of accident, and do not result in a significant reduction in a margin of safety. Additionally, IP3 programs that implement FSAR changes in accordance with 10 CFR 50.59 require periodic submittal of FSAR and Bases changes to the NRC for review.

This change is a less restrictive administrative change with no impact on safety because an appropriate change control process and an appropriate level of regulatory oversight are maintained for the information being relocated out of the Technical Specifications.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.5:

"Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"

PART 4:

No Significant Hazards Considerations for Changes between CTS and ITS that are Less Restrictive

No Significant Hazard Considerations for Changes that are Administrative, More Restrictive, and Removed Details are the same for all Packages. A Copy is included at the end of the Package.

NO SIGNIFICANT HAZARDS EVALUATION
ITS SECTION 3.3.5 - LOSS OF POWER (LOP)
DIESEL GENERATOR (DG) START INSTRUMENTATION

LESS RESTRICTIVE
("L.1" Labeled Comments/Discussions)

Not used

LESS RESTRICTIVE
("L.2" Labeled Comments/Discussions)

New York Power Authority has evaluated the proposed Technical Specification change identified as "Less Restrictive" in accordance with the criteria set forth in 10 CFR 50.92, and has determined that the proposed change does not involve a significant hazards consideration. The bases for the determination that the proposed change does not involve a significant hazards consideration are discussed below.

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Allowed outage times are provided for unit operating personnel to respond to plant conditions in a safe and controlled manner commensurate with the safety significance of that condition. Adjustments to AOT do not involve accident precursors or accident mitigating actions. Therefore, this change has no effect on accident probability or consequences.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

   The proposed change will not involve any physical changes to systems, structures, or components or involve a change in normal plant operation. Therefore, it will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

   Increasing the overall allowed outage time from 72 hours to 73 hours to

initiate a plant shutdown following the discovery of an inoperable undervoltage or degraded voltage channel in one or more buses represents a small increase in time. This change does not involve a significant reduction in a margin of safety because there is not a significant change in the likelihood of a loss of offsite power event during this incremental increase in time. In addition, the ability of the equipment and personnel to respond to a loss of offsite power during this incremental period is not changed.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.5:

"Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"

PART 5:

NUREG-1431
Annotated to show differences between NUREG-1431 and ITS

Status of NUREG 1431 Generic Changes for ITS 3.3.5

This ITS Specification is based on NUREG-1431 Specification No. **3.3.5**
as modified by the following Generic Changes:

3.3 INSTRUMENTATION

(CTS) 3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

(3.5.2) LCO 3.3.5 ~~Three~~ One channel~~s~~ per bus of the ~~loss of voltage~~ Insert: 3.3-47-01 Function and ~~Three~~ Two channels per bus of the ~~degraded voltage~~ Insert 3.3.47-02 Function shall be OPERABLE.

(3.5.1) (DOC L.2) APPLICABILITY: MODES 1, 2, 3, and 4,
When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources—Shutdown." R.1

ACTIONS

(DOC A3)

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel per bus inoperable.	A.1 --------NOTE--------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- Place channel in trip.	6 hours
B. One or more Functions with two or more channels per bus inoperable.	B.1 Restore all but one channel to OPERABLE status.	1 hour

Insert: 3.3-47-03

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.5 - LOSS OF POWER (LOP) DIESEL GENERATOR (DG) START INSTRUMENTATION

INSERT: 3.3-47-01

Undervoltage (480 V bus)

INSERT: 3.3-47-02

Degraded Voltage (480 V bus)

INSERT: 3.3-47-03

<T 3.5-3, #4a> <DOC L.2>	A. One required channel of Undervoltage Function inoperable in one or more buses.	A.1 Restore channel to OPERABLE status.	1 hour	R.1
<T 3.5-3 4b> <DOC L.2>	B. One channel of Degraded Voltage Function inoperable in one or more buses.	B.1 Place channel in trip.	1 hour	R.1

NUREG-1431 Markup Inserts
ITS SECTION 3.3.5 - LOSS OF POWER (LOP) DIESEL GENERATOR (DG) START INSTRUMENTATION

INSERT: 3.3-49-01

<T.4.1-1, #35.a> <T3.5-1, #7.a> <DOC LA.2>	a.	Undervoltage (480 V bus) Relay Allowable Value ≥ 200 V.	24 months
<T3.5-1, #7.b> <T4.1-1, #35.b>	b.	Degraded Voltage (480 V bus) Relay (Non-SI) Allowable Value ≥ 414 V with a time delay ≤ 45 seconds.	18 months
<T3.5-1, #7.c> <T4.1-1, #35.b>	c.	Degraded Voltage (480 V bus) Relay (Coincident SI) Allowable Value ≥ 414 V with a time delay ≤ 10 seconds.	18 months

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.7:

"Control Room Emergency Ventilation (CRVS) Actuation Instrumentation"

PART 1:

Indian Point 3
Improved Technical Specifications and Bases

SURVEILLANCE REQUIREMENTS

----------NOTE----------

Refer to Table 3.3.7-1 to determine which SRs apply for each CRVS Actuation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.7.1	Perform actuation logic test	31 days staggered test basis
SR 3.3.7.2	----------NOTE---------- Verification of setpoint is not required. ----------	
	Perform TADOT.	24 months

RAI-01

BASES (continued)

APPLICABLE SAFETY ANALYSES

The control room must be kept habitable for the operators stationed there during accident recovery and post accident operations.

The CRVS acts to limit the supply of unfiltered outside air to the control room, initiate filtration, and pressurize the control room. These actions are necessary to ensure the control room is kept habitable for the operators stationed there during accident recovery and post accident operations by minimizing the radiation exposure of control room personnel.

In MODES 1, 2, 3, and 4, SI signal actuation ensures initiation of the CRVS during a loss of coolant accident or steam generator tube rupture.

Radiation monitor R-1 is not required for the Operability of the Control Room Ventilation System because control room isolation is initiated by the safety injection signal in MODES 1, 2, 3 and 4 and control room isolation is not required for maintaining radiation exposure within General Design Criteria 19 limits following a fuel handling accident or gas-decay-tank rupture (Ref. 2).

The CRVS does not actuate automatically in response to toxic gases. Separate chlorine, ammonia and oxygen probes are provided to detect the presence of these gases in the outside air intake. Additionally, monitors in the Control Room will detect low oxygen levels and high levels of chlorine and ammonia. The CRVS may be placed in the incident mode with no outside air makeup (i.e. 100% incident mode) to respond to these conditions. Instrumentation for toxic gas monitoring is governed by the IP3 Technical Requirements Manual (TRM) (Ref. 1).

Note that the original CRVS design was not required to meet single failure criteria and, although upgraded from the original design, CRVS does not satisfy all requirements in IEEE-279 for single failure tolerance.

The CRVS actuation instrumentation satisfies Criterion 3 of 10 CFR 50.36.

(continued)

BASES

ACTIONS (continued)

B.1

Condition B applies to the failure of two CRVS actuation trains, or two manual channels. The Required Action is to place CRVS in the 10% incident mode of operation within 72 hours. This starts both trains of CRVS because a single switch controls both trains. This accomplishes the actuation instrumentation Function that may have been lost and places the unit in a conservative mode of operation. The 72 hour Completion Time for placing the CRVS in the 10% incident mode is consistent with the 72 hour Completion Time in ITS 3.7.11. The Completion Time is acceptable because of the low probability of a DBA occurring during this time period. This ensures appropriate limits are placed upon train inoperability as discussed in the Bases for LCO 3.7.11. RAI-03

C.1 and C.2

Condition C applies when the Required Action and associated Completion Time for Condition A or B have not been met. The unit must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. RAI-05

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.7-1 determines which SRs apply to which CRVS Actuation Functions.

SR 3.3.7.1

An actuation logic test is performed at a frequency of 31 days on a Staggered Test Basis. RAI-01

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.1 (continued)

This test verifies the capability of the instrumentation to provide the CRVS actuation. The Frequency is based on the known reliability of the system and has been shown to be acceptable through operating experience.

SR 3.3.7.2

SR 3.3.7.2 is the performance of a TADOT. This test is a check of the Manual Actuation Functions and is performed every 24 months. Each Manual Actuation Function is tested up to, and including, the end device (i.e., fan starts, damper cycles, etc.).

The Frequency is based on the known reliability of the Function and has been shown to be acceptable through operating experience. The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Functions tested have no setpoints associated with them.

REFERENCES

1. IP3 Technical Requirements Manual.

2. SER for Amendment No. 137 to Facility Operating License DPR-64 for IP3.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.7:

"Control Room Emergency Ventilation (CRVS) Actuation Instrumentation"

PART 3:

DISCUSSION OF CHANGES

Differences between CTS and ITS

with this change. Conditions and Required Actions are added to address when one or more required channels are inoperable.

Required Action A.1 specifies that 7 days are permitted to restore Operability if one channel or train is inoperable. The basis for this Completion Time is the same as provided in LCO 3.7.11 for an inoperable CRVS train. If the channel/train cannot be restored to OPERABLE status within the completion Time, CRVS must be placed in the 10% incident mode because this action accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation. Note that both trains of CRVS are placed in the 10% incident mode because both trains are controlled by one switch.

Required Action B.1 specifies that if two channels or trains of the same initiation function are inoperable (i.e., loss of an initiation function), then CRVS must be placed in the 10% incident mode immediately because this action accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation. Note that both trains of CRVS are placed in the 10% incident mode because both trains are controlled by one switch. The 72 hour Completion Time for placing CRVS in the 10% incident mode is consistent with the 72 hour AOT in ITS 3.7.11 when both trains of CRVS are inoperable.

These more restrictive change are acceptable because they do not introduce any operation that is un-analyzed while establishing an explicit and conservative requirements when one or more CRVS actuation functions is not Operable. Therefore, this change has no significant adverse impact on safety.

M.2 CTS 3.3.H.1 requires that the control room ventilation system be operable in Mode 1, 2, 3 and 4. ITS LCO 3.3.7, CRVS Actuation Instrumentation, is added to establish explicit requirements for the associated actuation instrumentation (i.e., manual actuation, Automatic Actuation Logic and Actuation Relays, and SI actuation). However, there is no explicit requirement for periodic verification that channel logic and channel end devices (e.g., fan start capability, damper cycling, etc) are Operable. ITS SR 3.3.7.1 is added to require an Actuation

Logic Test of the CRVS automatic actuation logic and actuation relays. ITS SR 3.3.7.2 is added to require a Trip Actuating Device Operational Test (TADOT) of the CRVS end devices using the manual actuation channel. These changes are needed because they ensure that CRVS actuation instrumentation and associated end devices function as required. These more restrictive changes are acceptable because they do not introduce any operation that is un-analyzed while establishing an explicit requirement for periodic verification that channel end devices (e.g., fan start capability, damper cycling, etc) are Operable. Therefore, this change has no significant adverse impact on safety.

LESS RESTRICTIVE

None

REMOVED DETAIL

None

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.7:

"Control Room Emergency Ventilation (CRVS) Actuation Instrumentation"

PART 5:

NUREG-1431
Annotated to show differences between NUREG-1431 and ITS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more Functions with two channels or two trains inoperable.	~~----------NOTE---------- Place in the toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable. ----------~~	
	B.1 Place ~~one~~ CREFS ~~train~~ in ~~emergency~~ [radiation protection] mode.	~~Immediately~~ 72 hours
	~~AND~~	
	~~B.1.2 Enter applicable Conditions and Required Actions for one CREFS train made inoperable by inoperable CREFS actuation instrumentation.~~	~~Immediately~~
	~~OR~~	
	~~B.2 Place both trains in emergency [radiation protection] mode.~~	~~Immediately~~
C. Required Action and associated Completion Time for Condition A or B not met ~~in MODE 1, 2, 3, or 4~~.	C.1 Be in MODE 3.	6 hours
	AND	
	C.2 Be in MODE 5.	36 hours

~~(continued)~~

(DOC M.1) (3.3.H.2.a) 10% incident CRVS R.1 CLB.1 CLB.1 DB.1 (DOC M.1)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time for Condition A or B not met during movement of irradiated fuel assemblies [or during CORE ALTERATIONS].	D.1 Suspend CORE ALTERATIONS. AND D.[2] Suspend movement of irradiated fuel assemblies.	Immediately Immediately
E. Required Action and associated Completion Time for Condition A or B not met in MODE 5 or 6.	E.1 Initiate action to restore one CREFS train to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Refer to Table 3.3.7-1 to determine which SRs apply for each CREFS Actuation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.7.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.7.2	Perform COT.	92 days

R.1
RAI-

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
<DOC M.2> SR 3.3.7.~~3~~ 1	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.7.4	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.7.5	Perform SLAVE RELAY TEST.	[92] days
<DOC M.2> SR 3.3.7.~~6~~ 2	----------NOTE---------- Verification of setpoint is not required. ---------- Perform TADOT.	[~~18~~] 24 months
SR ~~3.3.7.7~~	~~Perform CHANNEL CALIBRATION.~~	~~[18] months~~

R.1

Table 3.3.7-1 (page 1 of 1)
CREFS Actuation Instrumentation

FUNCTION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	~~2 trains~~ two	SR 3.3.7.6 2	NA
2. Automatic Actuation Logic and Actuation Relays	2 trains	SR 3.3.7.3 1 ~~SR 3.3.7.4~~ ~~SR 3.3.7.5~~	NA
~~3. Control Room Radiation~~			
~~a. Control Room Atmosphere~~	~~[2]~~	~~SR 3.3.7.1~~ ~~SR 3.3.7.2~~ ~~SR 3.3.7.7~~	~~≤ [2] mR/hr~~
~~b. Control Room Air Intakes~~	~~[2]~~	~~SR 3.3.7.1~~ ~~SR 3.3.7.2~~ ~~SR 3.3.7.7~~	~~≤ [2] mR/hr~~
3 ~~4.~~ Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.		

R.1

NUREG-1431 Markup Inserts
ITS SECTION ITS SECTION 3.3.7 - CONTROL ROOM VENTILATION SYSTEM (CREVS) ACTUATION INSTRUMENTATION

INSERT: B 3.3-159-01

On a Safety Injection signal or high radiation in the Control Room (Radiation Monitor R-1), the CRVS will actuate to the incident mode with outside air makeup (i.e. 10% incident mode). This will cause one of the two filters booster fans to start, the locker room exhaust fan to stop, and CRVS dampers to open or close as necessary to filter incoming outside air and direct approximately 10% of the recirculated air through the filter unit. In the event that the first booster fan fails to start, the second booster fan will start after a predetermined time delay.

If for any reason it is required or desired to operate with 100% recirculated air (e.g., toxic gas condition is identified), the CRVS can be placed in the incident mode with no outside air makeup (i.e. 100% incident mode) by remote manually operated switches. The Firestat detector will also initiate 100% incident mode in the CRVS.

INSERT: B 3.3-159-02

Radiation monitor R-1 is not required for the Operability of the Control Room Ventilation System because control room isolation is initiated by the safety injection signal in MODES 1, 2, 3 and 4 and control room isolation is not required for maintaining radiation exposure within General Design Criteria 19 limits following a fuel handling accident or gas-decay-tank rupture (Ref 2).

The CRVS does not actuate automatically in response to toxic gases. Separate chlorine, ammonia and oxygen probes are provided to detect the presence of these gases in the outside air intake. Additionally, monitors in the Control Room will detect low oxygen levels and high levels of chlorine and ammonia. The CRVS may be placed in the incident mode with no outside air makeup (i.e. 100% incident mode) to respond to these conditions. Instrumentation for toxic gas monitoring is governed by the IP3 Technical Requirements Manual (TRM) (Ref. 1).

Note that the original CRVS design was not required to meet single failure criteria and, although upgraded from the original design, CRVS does not satisfy all requirements in IEEE-279 for single failure tolerance.

NUREG-1431 Markup Inserts
ITS SECTION ITS SECTION 3.3.7 - CONTROL ROOM VENTILATION SYSTEM (CREVS) ACTUATION INSTRUMENTATION

INSERT: B 3.3-160-01

Automatic Actuation Logic and Actuation Relays are required to be Operable to support the Operability of the function that starts CRVS (i.e., an ESFAS SI initiation signals). The term automatic actuation logic and actuation relays applies to those portions of the circuit that are: 1) common to more than one channel in one train of a single function (i.e., the automatic actuation logic); or, 2) the initiating relay contacts in one train responsible for actuating the equipment and which are common to both more than one channel of a single function and more than one function (i.e., the actuation relays). There are two trains of automatic actuation logic and actuation relays.

BASES

ACTIONS (continued)

B.1 ~~1, B.1.2, and B.2~~

Condition B applies to the failure of two ~~CREFS~~ CRVS actuation trains, ~~two radiation monitor channels,~~ or two manual channels. The ~~first~~ Required Action is to place ~~one~~ CREFS ~~train~~ in the ~~emergency [radiation protection]~~ mode of operation ~~immediately~~. This accomplishes the actuation instrumentation Function that may have been lost and places the unit in a conservative mode of operation. ~~The applicable Conditions and Required Actions of LCO 3.7.10 must also be entered for the CREFS train made inoperable by the inoperable actuation instrumentation.~~ This ensures appropriate limits are placed upon train inoperability as discussed in the Bases for LCO 3.7.11. R.1

10% incident

within 72 hours

insert: B3.3-163-01

insert: B3.3-163-02

R.1

~~Alternatively, both trains may be placed in the emergency [radiation protection] mode. This ensures the CREFS function is performed even in the presence of a single failure.~~

~~The Required Action for Condition B is modified by a Note that requires placing one CREFS train in the toxic gas protection mode instead of the [radiation protection] mode of operation if the automatic transfer to toxic gas protection mode is inoperable. This ensures the CREFS train is placed in the most conservative mode of operation relative to the OPERABILITY of the associated actuation instrumentation.~~

C.1 and C.2

Condition C applies when the Required Action and associated Completion Time for Condition A or B have not been met. ~~and the unit is in MODE 1, 2, 3, or 4.~~ The unit must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. R.1

(continued)

NUREG-1431 Markup Inserts
ITS SECTION ITS SECTION 3.3.7 - CONTROL ROOM VENTILATION SYSTEM (CREVS) ACTUATION INSTRUMENTATION

INSERT: B 3.3-163-01

This starts both trains of CRVS because a single switch controls both trains.

INSERT: B 3.3-163-02

The 72 hour Completion Time for placing the CRVS in the 10% incident mode is consistent with the 72 hour Completion Time in ITS 3.7.11. This Completion Time is acceptable because of the low probability of a DBA occuring during this time period.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.1 (continued)

including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

The Frequency is based on 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 LCO required channels.

An actuation logic test is performed at a frequency of 31 days on a staggered Test Basis

SR 3.3.7.2 (1)

~~A COT is performed once every 92 days on each required channel to ensure the entire channel will perform the intended function~~. This test verifies the capability of the instrumentation to provide the CREFS (CRVS) actuation. ~~The setpoints shall be left consistent with the unit specific calibration procedure tolerance.~~ The Frequency is based on the known reliability of the ~~monitoring equipment~~ (system) and has been shown to be acceptable through operating experience. R1

SR 3.3.7.3

SR 3.3.7.3 is the performance of an ACTUATION LOGIC TEST. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and there is an intact voltage signal path to the master relay coils. This test is performed every 31 days on a STAGGERED TEST BASIS. The Frequency is justified in WCAP-10271-P-A, Supplement 2, Rev. 1 (Ref. 1).

SR 3.3.7.4

SR 3.3.7.4 is the performance of a MASTER RELAY TEST. The MASTER RELAY TEST is the energizing of the master relay, verifying contact operation and a low voltage continuity

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.6 (continued)

TADOT. The Functions tested have no setpoints associated with them.

~~SR 3.3.7.7~~

~~A CHANNEL CALIBRATION is performed every [18] months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.~~

~~The Frequency is based on operating experience and is consistent with the typical industry refueling cycle.~~

REFERENCES

Nope.

1. IP3 Technical Requirement Manual

2. Safety Evaluation Report for Amendment No. 137 to Facility Operating License DPR-64 for IP3. R.1

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.8:

"Fuel Storage Building Emergency Ventilation System (FSBEVS) Instrumentation"

PART 1:

Indian Point 3
Improved Technical Specifications and Bases

3.3 INSTRUMENTATION

3.3.8 Fuel Storage Building Emergency Ventilation System (FSBEVS) Actuation Instrumentation

LCO 3.3.8 FSBEVS manual and automatic actuation instrumentation shall be OPERABLE. RAI-03

APPLICABILITY: During movement of irradiated fuel in the fuel storage building.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Manual or automatic FSBEVS actuation instrumentation inoperable.	A.1	Place FSBEVS in operation.	Immediately RAI-03
	OR		
	A.2	Suspend movement of irradiated fuel in the fuel storage building.	Immediately

B 3.3 INSTRUMENTATION

B 3.3.8 Fuel Storage Building Emergency Ventilation System (FSBEVS) Actuation Instrumentation

BASES

BACKGROUND

The FSBEVS ensures that radioactive materials in the fuel building atmosphere following a fuel handling accident are filtered and adsorbed prior to exhausting to the environment. The system is described in the Bases for LCO 3.7.13, Fuel Storage Building Emergency Ventilation System (FSBEVS). The system initiates filtered ventilation of the fuel storage building automatically following receipt of a high radiation signal from fuel storage building area radiation monitor, R-5.

High radiation levels detected by the fuel storage building area radiation monitor, R-5, initiates fuel storage building isolation and starts the FSBEVS. These actions function to prevent exfiltration of contaminated air by initiating filtered ventilation, which imposes a negative pressure on the fuel storage building. Following an Area Radiation Monitor (R-5) signal or local manual actuation to the emergency mode of operation, the FSBEVS ventilation supply fans stop automatically and the associated ventilation supply dampers close automatically. The charcoal filter face dampers (inlet and outlet dampers) open automatically, if not already open. Additionally, the rolling door closes, if open, and the inflatable seals on the man doors and rolling door are actuated. The FSB exhaust fan continues to operate. NYPA

APPLICABLE SAFETY ANALYSES

The FSBEVS ensures that radioactive materials in the fuel storage building atmosphere following a fuel handling accident are filtered and adsorbed prior to being exhausted to the environment when the FSBEVS is aligned and operates as described in the Bases for LCO 3.7.13, Fuel Storage Building Emergency Ventilation

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

System (FSBEVS). This action reduces the radioactive content in the fuel building exhaust following a LOCA or fuel handling accident so that offsite doses remain within the limits specified in 10 CFR 100 (Ref. 1).

The FSBEVS actuation instrumentation satisfies Criterion 3 of 10 CFR 50.36.

LCO

The LCO requirements ensure that instrumentation necessary for local manual and automatic actuation of the FSBEVS is OPERABLE.

Manual and automatic FSBEVS actuation instrumentation consists of one channel of Fuel Storage Building Area Radiation Monitor (R-5) and one channel of manual actuation. Manual actuation from the fan house and automatic FSBEVS actuation instrumentation are Operable when both the Fuel Strorage Building Area Radiation Monitor (R-5) signal and manual initiation will cause the realignment of the FSBEVS to the accident mode of operation as described in the Bases for LCO 3.7.13, Fuel Storage Building Emergency Ventilation System (FSBEVS). RAI-03

The setpoint for Fuel Storage Building Area Radiation Monitor (R-5) is established in accordance with the FSAR (Ref. 2). NYPA

APPLICABILITY

The manual FSBEVS initiation must be OPERABLE when moving irradiated fuel assemblies in the fuel storage building, to ensure the FSBEVS operates to remove fission products associated with leakage after a fuel handling accident.

High radiation initiation of the FSBEVS must be OPERABLE in any MODE during movement of irradiated fuel assemblies in the fuel storage building to ensure automatic initiation of the FSBEVS when the potential for a fuel handling accident exists.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.8.1 (continued)

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal checks of a channel during normal operational use of the displays associated with the LCO required channel.

SR 3.3.8.2

A COT is performed for both the manual and automatic function once every 92 days to ensure the entire channel will perform the intended function. This test verifies the capability of the instrumentation to provide the FSBEVS actuation. The setpoints shall be left consistent with requirements of Reference 2. The Frequency of 92 days is based on the known reliability of the monitoring equipment and has been shown to be acceptable through operating experience. This test is typically performed in conjunction with SR 3.7.13.4 which verifies OPERABILITY of the activated devices.

SR 3.3.8.3

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. The Frequency is based on operating experience and is consistent with the refueling cycle.

REFERENCES

1. 10 CFR 100.11.

2. FSAR, Section 1.3.

NYPA

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.8:
"FSBEVS INSTRUMENTATION"

PART 2:

CURRENT TECHNICAL SPECIFICATION PAGES

Annotated to show differences between CTS and ITS

CTS PAGE	AMENDMENT FOR REV O SUBMITTAL	AMENDMENT FOR REV 1 SUBMITTAL	COMMENT
3.8-2	175	189	* Deleted Requirement of 267 Hours for Discharge of > 76 Assemblies
3.8-3	114	114	
3.8-4	173	173	
3.8-5	173	173	
3.8-6	175	189	* Deleted Requirement of 267 Hours for Discharge of > 76 Assemblies
T4.1-1(2)	169	200	* Deleted Boric Acid Tank Level Surveillance

* No impact on ITS 3.3.8

Add Req Action A.2 (L.1)

R.1

SEE CTS MASTER MARKUP

a. No. 31 residual heat removal pump and heat exchanger, together with their associated piping and valves are operable.

b. No. 32 residual heat removal pump and heat exchanger, together with their associated piping and valves are operable.

c. The water level in the refueling cavity above the top of the reactor vessel flange is equal to or greater than 23 feet.

Req Act A.2

B. If any of the specified limiting conditions for refueling are not met, refueling shall cease until the specified limits are met, and no operations which may increase the reactivity of the core shall be made. (A.4)

R.1

SEE CTS MASTER MARKUP

C. During fuel handling and storage operations, the following conditions shall be met:

1. Radiation levels in the spent fuel storage area shall be monitored continuously whenever there is irradiated fuel stored therein. If the monitor is inoperable, a portable monitor may be used.

2. The spent fuel cask shall not be moved over any region of the spent fuel pit which contains irradiated fuel. Additionally, if the spent fuel pit contains irradiated fuel, no loads in excess of 2,000 pounds shall be moved over any region of the spent fuel pit.

3. During periods of spent fuel cask or fuel storage building cask crane movement over the spent fuel pit, or during periods of spent fuel movement in the spent fuel pit when the pit contains irradiated fuel, the pit shall be filled with borated water at a concentration of >1000 ppm.

4. Whenever movement of irradiated fuel in the spent fuel pit is being made, the minimum water level in the area of movement shall be maintained 23 feet over the top of irradiated fuel assemblies seated in the storage rack.

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.8:

"Fuel Storage Building Emergency Ventilation System (FSBEVS) Instrumentation"

PART 3:

DISCUSSION OF CHANGES

Differences between CTS and ITS

emergency ventilation system. LCO 3.7.13, Fuel Storage Building Emergency Ventilation System (FSBEVS), maintains the requirement for FSBEVS Operability and LCO 3.3.8, Fuel Storage Building Emergency Ventilation System (FSBEVS) Actuation Instrumentation, is added to establish an explicit requirement for the Operability of the manual and automatic actuation instrumentation for the FSBEVS. This is an administrative change with no adverse impact of safety because it is an explicit statement of a reasonable interpretation of the existing requirement.

A.4 CTS 3.8.A establishes requirements for fuel handling operations both in the containment and in the fuel storage building. CTS 3.8.B specifies that if any of these requirements are not met, then refueling shall cease until the specified limits are met, and no operations which may increase the reactivity of the core shall be made. ITS LCO 3.3.8, Required Action A.1.2, which applies to the FSBEVS only, maintains the requirement to stop handling of irradiated fuel in the FSB. However, the requirement to halt operations which may increase the reactivity of the core is applied in the appropriate specifications of section 3.9, Refueling Operations. This change is acceptable because FSBEVS Operability is not assumed in the analysis of a fuel handling accident in containment. This is an administrative change with no adverse impact of safety because it is an explicit statement of a reasonable interpretation of the existing requirement.

MORE RESTRICTIVE

None

LESS RESTRICTIVE

L.1 CTS 3.8.B requires that refueling (i.e., fuel handling in the FSB) cease if the fuel storage building emergency ventilation system (and implicitly the actuation instrumentation) is inoperable. ITS 3.3.8, Required Action A.2 maintains this requirement; however, ITS 3.3.8, Required Action A.1 adds the option of placing the FSBEVS in operation

immediately upon discovery that either the manual initiation function or automatic initiation function is inoperable. This option will allow fuel handling in the FSB to continue. This change is acceptable because this action places the FSBEVS in accident mode of operation (as described in the Bases of LCO 3.7.13). Therefore, this action accomplishes LCO safety function and ensures the FSBEVS is in a conservative mode of operation if a fuel handling accident occurs. Therefore, this change does not have a significant adverse impact on safety.

REMOVED DETAIL

None

Indian Point 3
Improved Technical Specifications (ITS)
Conversion Package

Technical Specification 3.3.8:

"Fuel Storage Building Emergency Ventilation System (FSBEVS) Instrumentation"

PART 5:

NUREG-1431
Annotated to show differences between NUREG-1431 and ITS

Insert 3.3-60-01

3.3 INSTRUMENTATION

3.3.8 ~~Fuel Building Air Cleanup System (FBACS)~~ Actuation Instrumentation

LCO 3.3.8 ~~The FBACS actuation instrumentation for each Function in Table 3.3.8-1 shall be OPERABLE.~~ CLB.1

Insert: 3.3-60-02

APPLICABILITY: According to Table 3.3.8-1.

Insert: 3.3-60-03

ACTIONS

~~NOTE~~
~~Separate Condition entry is allowed for each Function.~~ DB.1

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A. One or more Functions with one channel or train inoperable.~~	~~A.1 Place one FBACS train in operation.~~	~~7 days~~
A. ~~B.~~ One or more Functions with two channels or two trains inoperable.	A. ~~B.1.1~~ Place FSBEVS ~~one FBACS train~~ in operation.	Immediately CLB.1 DB.1
	~~AND~~	
	~~B.1.2 Enter applicable Conditions and Required Actions of LCO 3.7.13, "Fuel Building Air Cleanup System (FBACS)," for one train made inoperable by inoperable actuation instrumentation.~~	Immediately
	~~OR~~	

Insert: 3.3-60-04

Insert 3.3-60-05

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.8 - Fuel Storage Building Emergency Ventilation System (FSBEVS) Instrumentation

INSERT: 3.3-60-01

Fuel Storage Building Emergency Ventilation System (FSBEVS)

INSERT: 3.3-60-02

FSBEVS manual and automatic actuation instrumentation shall be OPERABLE. |

INSERT: 3.3-60-03

During movement of irradiated fuel in the fuel storage building.

INSERT: 3.3-60-04

Manual or Automatic FSBEVS actuation instrumentation inoperable. |

INSERT: 3.3-60-05

OR

A.2 Suspend movement of irradiated fuel in the fuel storage building.

Insert: B 3.3-168-01

B 3.3 INSTRUMENTATION

B 3.3.8 ~~Fuel Building Air Cleanup System (FBACS)~~ Actuation Instrumentation

BASES

BACKGROUND

The FBACS ensures that radioactive materials in the fuel building atmosphere following a fuel handling accident ~~or a loss of coolant accident (LOCA)~~ are filtered and adsorbed prior to exhausting to the environment. The system is described in the Bases for LCO 3.7.13, ~~"Fuel Building Air Cleanup System."~~ The system initiates filtered ventilation of the fuel building automatically following receipt of a high radiation signal ~~(gaseous or particulate) or a safety injection (SI) signal. Initiation may also be performed manually as needed from the main control room.~~

Insert B 3.3-168-01

Insert B 3.3-168-02

Storage

~~High gaseous and particulate radiation, each monitored by either of two monitors, provides FBACS initiation. Each FBACS train is initiated by high radiation detected by a channel dedicated to that train. There are a total of two channels, one for each train. Each channel contains a gaseous and particulate monitor. High radiation detected by any monitor or an SI signal from the Engineered Safety Features Actuation System (ESFAS) initiates fuel building isolation and starts the FBACS. These actions function to prevent exfiltration of contaminated air by initiating filtered ventilation, which imposes a negative pressure on the fuel building. Since the radiation monitors include an air sampling system, various components such as sample line valves, sample line heaters, sample pumps, and filter motors are required to support monitor OPERABILITY.~~

Insert: B 3.3-168-04

Storage

FSBEVS

Storage

Insert: B 3.3-168-05

APPLICABLE SAFETY ANALYSES

The FBACS ensures that radioactive materials in the fuel building atmosphere following a fuel handling accident ~~or a LOCA~~ are filtered and adsorbed prior to being exhausted to the environment. This action reduces the radioactive content in the fuel building exhaust following a ~~LOCA or~~ fuel handling accident so that offsite doses remain within the limits specified in 10 CFR 100 (Ref. 1).

Storage

Storage

Insert: B 3.3-168-03

The FBACS actuation instrumentation satisfies Criterion 3 of ~~the NRC Policy Statement.~~ 10 CFR 50.36

FSBEVS

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.8 - Fuel Storage Building Emergency Ventilation System (FSBEVS) Instrumentation

INSERT: B 3.3-168-01

Fuel Storage Building Emergency Ventilation System (FSBEVS)

INSERT: 3.3-168-02

from fuel storage building area radiation monitor, R-5.

INSERT: 3.3-168-03

when the FSBEVS is aligned and operates as described in the Bases for LCO 3.7.13, Fuel Storage Building Emergency Ventilation System (FSBEVS).

INSERT: 3.3-168-04

High radiation levels detected by the fuel storage building area radiation monitor, R-5,

INSERT: 3.3-168-05

Following an Area Radiation Monitor (R-5) signal or manual actuation to the emergency mode of operation, the FSBEVS ventilation supply fans stop automatically and the associated ventilation supply dampers close automatically. The charcoal filter face dampers (inlet and outlet dampers) open automatically, if not already open. Additionally, the rolling door closes, if open, and the inflatable seals on the man doors and rolling door are actuated. The FSB exhaust fan continues to operate.

BASES (continued)

LCO

The LCO requirements ensure that instrumentation necessary to initiate the FBACS is OPERABLE.

for manual and automatic actuation of the FSBEVS

1. Manual Initiation

The LCO requires two channels OPERABLE. The operator can initiate the FBACS at any time by using either of two switches in the control room. This action will cause actuation of all components in the same manner as any of the automatic actuation signals.

The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

Each channel consists of one push button and the interconnecting wiring to the actuation logic cabinet.

2. Automatic Actuation Logic and Actuation Relays

Insert: B 3.3-169-01

The LCO requires two trains of Actuation Logic and Relays OPERABLE to ensure that no single random failure can prevent automatic actuation.

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b., SI, in LCO 3.3.2. The applicable MODES and specified conditions for the FBACS portion of these functions are different and less restrictive than those specified for their SI roles. If one or more of the SI functions becomes inoperable in such a manner that only the FBACS function is affected, the Conditions applicable to their SI function need not be entered. The less restrictive Actions specified for inoperability of the FBACS functions specify sufficient compensatory measures for this case.

3. Fuel Building Radiation

The LCO specifies two required Gaseous Radiation Monitor channels and two required Particulate Radiation Monitor channels to ensure that the radiation monitoring instrumentation necessary to initiate the FBACS remains OPERABLE.

(continued)

NUREG-1431 Markup Inserts
ITS SECTION 3.3.8 - Fuel Storage Building Emergency Ventilation System (FSBEVS) Instrumentation

INSERT: B 3.3-169-01

Manual and automatic FSBEVS actuation instrumentation consists of one channel of Fuel Storage Building Area Radiation Monitor (R-5) and one channel of manual actuation. Manual actuation from the fan house and automatic FSBEVS actuation instrumentation are OPERABLE when both the Fuel Storage Building Area Radiation Monitor (R-5) signal and manual initiation will cause the realignment of the FSBEVS to the accident mode of operation as described in the Bases for LCO 3.7.13, Fuel Storage Building Emergency Ventilation System (FSBEVS).

The setpoint for Fuel Storage Building Area Radiation Monitor (R-5) are established in accordance with the FSAR (Ref. 2).

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.8.3 (continued)

reliability of the relays and controls and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

SR 3.3.8.4

SEE SR 3.7.13.4

SR 3.3.8.4 is the performance of a TADOT. This test is a check of the manual actuation functions and is performed every [18] months. Each manual actuation function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (e.g., pump starts, valve cycles, etc.). The Frequency is based on operating experience and is consistent with the typical industry refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Functions tested have no setpoints associated with them.

SR 3.3.8.~~5~~ 3

A CHANNEL CALIBRATION is performed every ~~18~~ 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy. The Frequency is based on operating experience and is consistent with the ~~typical industry~~ refueling cycle.

REFERENCES

1. 10 CFR 100.11.
2. ~~Unit Specific Setpoint Calibration Procedure~~ FSAR, Section 1.3

R.1