



FirstEnergy Nuclear Operating Company

Perry Nuclear Power Station  
10 Center Road  
Perry, Ohio 44081

L. William Pearce  
Vice President

440-280-5382  
Fax: 440-280-8029

10 CFR 50.90

February 10, 2006  
PY-CEI/NRR-2930L

ATTN: Document Control Desk  
United States Nuclear Regulatory Commission  
Washington, DC 20555-0001

Perry Nuclear Power Plant  
Docket No. 50-440

**Subject: License Amendment Request To Revise Required Action B.1 In The  
Emergency Core Cooling System Instrumentation Technical Specification To Be  
Consistent With The Improved Standard Technical Specifications**

Pursuant to 10 CFR 50.90, a license amendment is requested for the Perry Nuclear Power Plant (PNPP). The requested change modifies Technical Specification 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation," to correct a PNPP-specific issue and to establish consistency with the improved Standard Technical Specifications (ISTS). Approval of the proposed license amendment is requested by March of 2007. The approval date is proposed to allow for Nuclear Regulatory Commission (NRC) review; the plant does not need this amendment by that date in order to continue safe full power operations. Once approved, the amendment will be implemented within 120 days.

The proposed changes have been reviewed by the Plant Operations Review Committee and Company Nuclear Review Board. The enclosure provides an evaluation of the proposed amendment. There are no regulatory commitments contained in this letter or its enclosure. If there are any questions or if additional information is required, please contact Mr. Gregory A. Dunn, Manager – FENOC Fleet Licensing, at (330) 315-7243.

I declare under penalty of perjury that the foregoing is true and correct. Executed on  
February 10, 2006

Enclosure: Evaluation of the Proposed Change

Attachments:

1. Proposed Technical Specification Changes (mark-up)
2. Changes to Technical Specification Bases pages, for information (mark-up)

cc: NRC Region III  
NRC Project Manager  
NRC Resident Inspector  
State of Ohio

A001

## **EVALUATION OF THE PROPOSED CHANGE**

**Subject:** License Amendment Request To Revise Required Action B.1 In The Emergency Core Cooling System Instrumentation Technical Specification To Be Consistent With The Improved Standard Technical Specifications

**Contents:** 1.0 DESCRIPTION  
2.0 PROPOSED CHANGE  
3.0 BACKGROUND  
4.0 TECHNICAL ANALYSIS  
5.0 REGULATORY SAFETY ANALYSIS  
5.1 Significant Hazards Consideration  
5.2 Applicable Regulatory Requirements/Criteria  
6.0 ENVIRONMENTAL CONSIDERATION  
7.0 REFERENCES

### **1.0 DESCRIPTION**

A license amendment is requested for the Perry Nuclear Power Plant (PNPP), in the form of a modification to Technical Specification (TS) 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation." The proposed change would revise Required Action B.1 to correct a PNPP-specific issue, by establishing consistency with the Boiling Water Reactor (BWR/6) improved Standard Technical Specification (Reference 1).

### **2.0 PROPOSED CHANGE**

Sub-actions B.1.2.1 and B.1.2.2, which were added into PNPP TS 3.3.5.1 during the improved Standard Technical Specification (ISTS) conversion process, are deleted. PNPP Required Action B.1 will then match the ISTS Required Action B.1. As a result, actions with a 1-hour Completion Time will only be required for the Annulus Exhaust Gas Treatment (AEGT) system if a loss of initiation capability in both divisions actually exists for an AEGT initiation Function, as originally intended.

### **3.0 BACKGROUND**

The purpose of Required Action B.1 in the ECCS Instrumentation Specification is to check if a "loss of initiation capability" for a "feature"<sup>(1)</sup> has occurred in both Divisions 1 and 2, whenever more than one instrumentation channel has become inoperable. This is explained in the Bases for Required Action B.1, and this concept is repeated in a number of places throughout the Instrumentation specifications. However, a portion of the current wording of Required Action B.1 is PNPP-specific, and that portion:

- Includes actions that must be taken even when only a single channel has become inoperable, and a "loss of initiation capability" has not occurred in both divisions,
- Conflicts with the Bases for the Required Action, and
- Could result in an operator misinterpretation.

---

<sup>(1)</sup> The "feature(s)" which must be examined to comply with the loss of initiation capability check in Required Action B.1 are those discussed in the Bases for Specification 3.3.5.1, including the Division 1 and 2 diesel generators; the low-pressure ECCS subsystems, and the AEGT subsystems (see Attachment 2).

The background of how this PNPP-specific wording was added into Required Action B.1 provides the foundation for Section 4.0 "Technical Analysis."

During the development of the BWR iSTS, the concept of checking for a "loss of initiation capability in both divisions" when more than one instrument channel became inoperable was added into several of the instrumentation specifications.

One of the specifications that adopted such a check was TS 3.3.5.1 "Emergency Core Cooling System (ECCS) Instrumentation." If a loss of initiation capability for feature(s) such as the low-pressure ECCS occurs in both divisions for a particular monitored Function such as Drywell Pressure-High, the supported feature(s) that would no longer initiate from that Drywell Pressure-High signal are required to be declared inoperable within 1 hour.

At PNPP, during the conversion to iSTS, additional requirements were added into TS 3.3.5.1 to address a PNPP-unique system called the Annulus Exhaust Gas Treatment (AEGT) system. The AEGT Division 1 and 2 subsystems are provided to reduce, by filtration, radioactive material that may be released due to a loss of coolant accident. The AEGT system function is very similar to the Standby Gas Treatment System (SGTS) used at most BWRs, except that at PNPP, one of the two subsystems of AEGT is in operation at all times, rather than both subsystems being in standby. More details on the AEGT system and its instrumentation are provided in Bases Sections 3.6.4.3 and 3.3.5.1, and in USAR Sections 6.5.3 and 7.3.1.1.9.

In NUREG-1434 "Standard Technical Specifications General Electric Plants, BWR/6," the loss of initiation capability check for the instrumentation that starts the Standby Gas Treatment System is folded into Specification 3.3.6.2, entitled "Secondary Containment Isolation Instrumentation." At PNPP, due to the passive secondary containment design, there was no need for a separate isolation specification, because there are no automatic valves that need to isolate. Therefore, PNPP did not incorporate iSTS 3.3.6.2.

Since that isolation specification also contained the requirements for the ventilation system initiation instruments, at PNPP the requirement to check for a loss of ventilation system initiation capability needed to be relocated into another Specification. The ECCS Instrumentation Specification (TS 3.3.5.1) was chosen, in Required Action B.1. This Required Action was chosen since the Required Action B.1 Functions 1.a, 2.a, 1.b, and 2.b (Low Water Level 1 and Drywell Pressure-High in Divisions 1 and 2, respectively) also actuate the AEGT subsystems.

Specifically, when the PNPP iSTS markups were prepared, a portion of the required actions from iSTS 3.3.6.2 relative to actuation of the ventilation system were copied into Required Action B.1 of TS 3.3.5.1. A copy of the iSTS 3.3.6.2 pages are included as pages 1 and 2 of Attachment 1, to show the source of the B.1.2.1 and B.1.2.2 words. In iSTS 3.3.6.2, those actions require the ventilation subsystems to either be placed in operation or declared inoperable when a loss of initiation capability has occurred. However, when those actions were transferred into TS 3.3.5.1, the loss of initiation capability requirements were not modified to conform to the format of TS 3.3.5.1. In TS 3.3.5.1, loss of initiation capability checks are self-contained in a single Condition, and there is a sentence in the Completion Time column that requires a check to determine if initiation capability has been lost in both divisions. However, in iSTS 3.3.6.2, the loss of initiation capability check is split into two Conditions (B and C), and the only portion of the requirements that were transferred into PNPP TS 3.3.5.1 were those from Condition C.

#### **4.0 TECHNICAL ANALYSIS**

Relocating the requirements from iSTS 3.3.6.2 without modifying them to conform to the TS 3.3.5.1 loss of initiation capability format resulted in unintended consequences. Even if only one AEGT system initiation channel has become inoperable, and even if the Function is still capable of initiating

the system (i.e., enough channels remain OPERABLE or are in trip that the Function has NOT been lost), operators are currently forced to take actions that should only be required if the Function has been lost. Specifically, they have to place the associated subsystem in operation or declare it inoperable. Requiring such actions within one hour when a loss of initiation capability has not occurred in both divisions is unnecessary, and conflicts with the Bases, which correctly state that Required Action B.1 is only applicable if redundant initiation capability has been lost.

The proposed change to delete Required Actions B.1.2.1 and B.1.2.2 and their Completion Times will resolve this issue by only requiring a 1-hour action for the AEGT feature if a loss of initiation capability actually exists in both divisions for an ECCS instrumentation Function that actuates AEGT. The change matches the ISTS wording of TS 3.3.5.1 Required Action B.1. Required Action B.1 will contain the requirements for all the "feature(s)", including the AEGT subsystems. If both divisions of AEGT should lose initiation capability from one of the applicable Functions, both subsystems will be declared inoperable. The Bases will be revised to provide a better explanation of this concept (see the example Bases markups provided in Attachment 2, for information). Bases changes are processed in accordance with the PNPP Bases Control Program.

The proposed revision to delete the sub-actions in B.1.2 will reduce the potential for operator misinterpretations. With the current format of Required Action B.1, it appears that all the AEGT actions are self-contained within Required Action B.1.2 (sub-actions B.1.2.1 and B.1.2.2), with no AEGT requirements in B.1.1. Also, sub-actions B.1.2.1 and B.1.2.2 appear to provide the operator with an option when a loss of initiation capability situation occurs, of either (1) placing the AEGT subsystems into operation, or (2) declaring the AEGT subsystems inoperable. However, Required Action B.1.1 is more restrictive than B.1.2 when a loss of initiation capability situation actually exists in both divisions. Required Action B.1.1 requires that if neither division of a feature addressed by this specification (such as AEGT) will initiate on a signal from one of the applicable Functions, then the "supported feature(s)" must be declared inoperable. In such a case, for AEGT, this would require both AEGT divisions to be declared inoperable. Therefore, the appearance of an option to instead place the subsystems into operation (in B.1.2) is misleading.

In a situation where a loss of initiation capability in both divisions has occurred for the AEGT feature, the deletion of sub-actions B.1.2.1 and B.1.2.2 actually has no impact on the currently required Technical Specification actions, because existing Required Action B.1.1 has already directed that both AEGT divisions must be declared inoperable. Deleting sub-actions B.1.2.1 and B.1.2.2 simply removes the requirements that were introduced for situations when channel inoperabilities do NOT result in a loss of initiation capability in both divisions. The wording that remains in Required Action B.1 ensures appropriate actions are taken when such a loss of initiation capability exists, by declaring the supported systems inoperable, which continues to place the same limit on continued plant operation as currently exists when the plant is in this condition.

As noted above, the proposed change deletes Required Action B.1.2. Instead of deleting B.1.2, rewording Required Action B.1 was considered, to allow the option of simply placing both AEGT subsystems into operation when a loss of initiation capability occurs in both divisions. However, this alternative approach was not chosen, since the PNPP AEGT design does not include automatic restart of the heaters for the charcoal beds following a loss of power, unless a Loss of Coolant Accident (LOCA) signal is provided to the system. Since the loss of initiation capability check required by Required Action B.1 is looking for a loss of a LOCA signal from one of the Functions such as Low Water Level 1 or Drywell Pressure-High, the check has to assume the LOCA signal would not work. Therefore, for the check, it is assumed the heaters would not restart. The heaters are currently considered to be necessary for AEGT system OPERABILITY.

## 5.0 REGULATORY SAFETY ANALYSIS

### 5.1 Significant Hazards Consideration

The proposed amendment is requesting Nuclear Regulatory Commission review and approval of changes to the Perry Nuclear Power Plant (PNPP) Technical Specifications (TS), addressing a PNPP-specific issue by revising the TS requirements to match the improved Standard Technical Specification (ISTS) requirements. The change revises TS Required Action B.1 for TS 3.3.5.1 "Emergency Core Cooling System (ECCS) Instrumentation." Required Action B.1 is a "loss of initiation capability" check. Therefore, sub-actions B.1.2.1 and B.1.2.2 are deleted so 1-hour actions are only required for the Annulus Exhaust Gas Treatment (AEGT) system if a "loss of initiation capability" actually exists for one or both of the Functions which actuate the AEGT subsystems.

An evaluation has been performed to determine whether or not a significant hazard is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

There are no physical modifications being made to any plant system or component. The only change is to a Required Action within the Technical Specifications. The revised Technical Specification requirements do not impact initiators of previously evaluated accidents or transients.

The specification being revised is associated with a system used to mitigate the consequences of accidents. The change does not affect how the AEGT system is controlled, operated, or tested. The intent of Required Action B.1 for the ECCS Instrumentation, specifically, a loss of initiation capability check, is maintained by the changes being proposed. The wording of Required Action B.1 ensures appropriate actions are taken when a loss of initiation capability exists, by declaring the supported systems inoperable. This action is consistent with the current requirements.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

There are no physical modifications being made to any plant system or component, and the proposed change introduces no new method of operation of the plant, or its systems or components. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed change does not involve a significant reduction in a margin of safety.

The change to the ECCS Instrumentation Required Action continues to ensure that a check is performed to determine if one or more of the ECCS Instrumentation Functions has lost its capability to actuate the Division 1 and 2 low-pressure ECCS, the AEGT subsystems, and the associated diesel generators. It continues to direct appropriate actions if such a loss of initiation capability is found. Therefore, the necessary function

of the Technical Specification requirements is maintained, and the proposed changes do not involve a significant reduction in a margin of safety.

Based upon the above, it is concluded that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

## **5.2 Applicable Regulatory Requirements/Criteria**

These changes are consistent with the BWR/6 ISTS format and intent. There are no regulations or Regulatory Guides directly applicable to the wording of these Required Actions. There are no known industry precedents, since the need for correction of the PNPP Technical Specifications is due to the PNPP-specific nature of the existing requirements. Proposed Bases markups are provided in Attachment 2, for information.

In conclusion, based on the considerations discussed in 5.1 and 5.2 above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

## **6.0 ENVIRONMENTAL CONSIDERATION**

The proposed Technical Specification change was evaluated against the criteria of 10CFR51.22 for environmental considerations. The proposed change does not significantly increase individual or cumulative occupational radiation exposures, does not significantly change the types or significantly increase the amounts of effluents that may be released off-site and, as discussed above, does not involve a significant hazards consideration. Based on the foregoing, it has been concluded that the proposed Technical Specification change meets the criteria given in 10CFR51.22(c)(9) for categorical exclusion from the requirement for an Environmental Impact Statement.

## **7.0 REFERENCES**

1. NUREG-1434 "Standard Technical Specifications General Electric Plants, BWR/6, Revisions 0 and 3.0
2. USAR Section 6.5.3 "Fission Product Control Systems"
3. USAR Section 7.3.1.1.9 "Annulus Exhaust Gas Treatment System (AEGTS)"
4. Letter to NRC dated December 16, 1993 (PY-CEI/NRR-1732L) "License Amendment Request: Conversion to Technical Specifications Based on NUREG-1434 "Improved BWR-6 Technical Specifications" Revision 0"

### 3.3 INSTRUMENTATION

#### 3.3.6.2 Secondary Containment Isolation Instrumentation

LCO 3.3.6.2

The secondary containment isolation instrumentation for each Function in Table 3.3.6.2-1 shall be OPERABLE.

*No changes to this page. This BWR-6 ISTS Spec 3.3.6.2 page is provided to show that Spec 3.3.6.2 uses a different format than Spec 3.3.5.1 uses to accomplish the "loss-of-function" check.*

APPLICABILITY: According to Table 3.3.6.2-1.

ACTIONS

NOTE

Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Place channel in trip.	12 hours for Function 2
B. One or more automatic Functions with secondary containment isolation capability not maintained.	B.1 Restore secondary containment isolation capability.	AND 24 hours for Functions other than Function 2
		1 hour
C. Required Action and associated Completion Time of Condition A or B not met.	C.1.1 Isolate the associated penetration flow path(s).	1 hour
	OR	
	C.1.2 Declare associated secondary containment isolation valves inoperable.	1 hour
	AND	

*Here in Spec 3.3.6.2, the "loss-of-function" check is broken out separately in Condition B, and the resultant Required Actions (if the one-hour Completion Time is not met) are specified (separately) in Condition C.*

*Because of this difference in format, when the resultant Required Actions for a "loss-of-function" of the secondary containment ventilation system (Actions C.2.1 and C.2.2 - see the next page) were cut and pasted into Spec 3.3.5.1, the intended result was not achieved... (see next page)*

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>This "portion" of the Required Actions addressing a "loss-of-function" of the ventilation system actuation instrumentation were cut and pasted into the PNPP TS 3.3.5.1</p>	C.2.1 Place the associated standby gas treatment (SGT) subsystem(s) in operation.	1 hour
	<p>OR</p> <p>C.2.2 Declare associated SGT subsystem inoperable.</p>	1 hour

"loss-of-function" Action (B.1).

SURVEILLANCE REQUIREMENTS

NOTES

1. Refer to Table 3.3.6.2-1 to determine which SRs apply for each Secondary Containment Isolation Function.
2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours, provided the associated Function maintains secondary containment isolation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.6.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.2.2	Perform CHANNEL FUNCTIONAL TEST.	[92] days
SR 3.3.6.2.3	[ Calibrate the trip unit.	[92] days ]
SR 3.3.6.2.4	Perform CHANNEL CALIBRATION.	[18] months
SR 3.3.6.2.5	Perform LOGIC SYSTEM FUNCTIONAL TEST.	[18] months



### 3.3 INSTRUMENTATION

#### 3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

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

APPLICABILITY: According to Table 3.3.5.1-1.

#### ACTIONS

#### NOTE

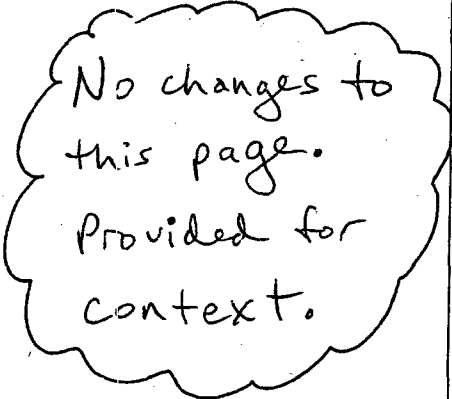
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.1-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	B.1 <div style="border: 1px solid black; border-radius: 50%; padding: 10px; margin-top: 10px;"> <p style="text-align: center;">NOTES</p> <ol style="list-style-type: none"> <li>Only applicable in MODES 1, 2, and 3.</li> <li>Only applicable for Functions 1.a, 1.b, 2.a and 2.b.</li> </ol> <hr/> <p>Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.</p> </div> <p style="margin-top: 10px;"><u>AND</u></p>	1 hour from discovery of loss of initiation capability for feature(s) in both divisions

No changes to this page. The PNPP Spec 3.3.5.1 is being revised to match this

BWR/6 Standard Required Action.

ACTIONS (continued)

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

### 3.3 INSTRUMENTATION

#### 3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

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

APPLICABILITY: According to Table 3.3.5.1-1.

#### ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.1-1 for the channel.	Immediately

(continued)

No changes to this page.  
Provided for context.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	<p>B.1.1 <del>1</del> -----NOTES-----</p> <p>1. Only applicable in MODES 1, 2, and 3.</p> <p>2. Only applicable for Functions 1.a, 1.b, 2.a and 2.b.</p> <p>-----</p> <p>Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.</p>	1 hour from discovery of loss of initiation capability for feature(s) in both divisions
	<p><u>AND</u></p> <p>B.1.2.1 Place the associated annulus exhaust gas treatment (AEGT) subsystem in operation.</p>	1 hour
	<p><u>OR</u></p> <p>B.1.2.2 Declare associated AEGT subsystem inoperable.</p>	1 hour
	<p><u>AND</u></p>	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)  <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: 10px auto;">             No changes to              this page.              Provided for              context.           </div>	B.2  -----NOTES----- 1. Only applicable in MODES 1, 2, and 3.  2. Only applicable for Functions 3.a and 3.b.  -----  Declare High Pressure Core Spray (HPCS) System inoperable.	1 hour from discovery of loss of HPCS initiation capability
	<u>AND</u>  B.3  Place channel in trip.	24 hours
C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	C.1  -----NOTES----- 1. Only applicable in MODES 1, 2, and 3.  2. Only applicable for Functions 1.c, 1.d, 1.e, 2.c, and 2.d.  -----  Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for feature(s) in both divisions   (continued)

**ACTIONS (continued)**

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	G.1 -----NOTE----- Only applicable for Functions 4.b, 4.d, 4.e, 5.b, and 5.d. ----- Declare ADS valves inoperable.	1 hour from discovery of loss of ADS initiation capability in both trip systems
	AND G.2 Restore channel to OPERABLE status.	96 hours from discovery of inoperable channel concurrent with HPCS or RCIC inoperable AND 8 days
H. Required Action and associated Completion Time of Condition B, C, D, E, F, or G not met.	H.1 Declare associated supported feature(s) inoperable.	Immediately

No changes to this page. Provided for context.

This shows the "default" Required Action H, which applies if:

- 1) No loss of initiation capability exists in both divisions (so Required Action B.1 is N/A); and
- 2) the operators choose not to implement Required Action B.3 (i.e., they choose to not place the inoperable channel(s) in trip after 24 hours).

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
<b>1. Low Pressure Coolant Injection-A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems</b>					
a. Reactor Vessel Water Level - Low Low Low, Level 1	1,2,3, 4(a),5(a)	2(b)	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 14.3 inches
b. Drywell Pressure - High	1,2,3	2(b)	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 1.88 psig
c. LPCI Pump A Start - Time Delay Relay	1,2,3, 4(a),5(a)	1	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 5.25 seconds
d. Reactor Vessel Pressure - Low (LPCS Injection Valve Permissive)	1,2,3	1	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 482.7 psig and ≤ 607.7 psig
	4(a),5(a)	1	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 482.7 psig and ≤ 607.7 psig
e. Reactor Vessel Pressure-Low (LPCI Injection Valve Permissive)	1,2,3	1	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 490.0 psig and ≤ 537.1 psig
	4(a), 5(a)	1	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 490.0 psig and ≤ 537.1 psig
f. LPCS Pump Discharge Flow - Low (Bypass)	1,2,3, 4(a),5(a)	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1200 gpm

(continued)

(a) When associated subsystem(s) are required to be OPERABLE.

(b) Also required to initiate the associated diesel generator and AEGT subsystem.

No changes to this page. Provided for context.  
This shows the Division 1 Functions 1a and 1b.

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Low Pressure Coolant Injection-A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems (continued)					
g. LPCI Pump A Discharge Flow - Low (Bypass)	1,2,3, 4(a),5(a)	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1450 gpm
h. Manual Initiation	1,2,3, 4(a),5(a)	1	C	SR 3.3.5.1.6	NA
2. LPCI B and LPCI C Subsystems					
a. Reactor Vessel Water Level - Low Low Low, Level 1	1,2,3, 4(a),5(a)	2(b)	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 14.3 inches
b. Drywell Pressure - High	1,2,3	2(b)	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 1.88 psig
c. LPCI Pump B Start - Time Delay Relay	1,2,3, 4(a),5(a)	1	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 5.25 seconds
d. Reactor Vessel Pressure - Low (LPCI Injection Valve Permissive)	1,2,3	1 per subsystem	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 490.0 psig and ≤ 537.1 psig for LPCI B; and ≥ 490.0 psig and ≤ 537.1 psig for LPCI C
	4(a),5(a)	1 per subsystem	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 490.0 psig and ≤ 537.1 psig for LPCI B; and ≥ 490.0 psig and ≤ 537.1 psig for LPCI C

(continued)

(a) When associated subsystem(s) are required to be OPERABLE.

(b) Also required to initiate the associated diesel generator and AEGT subsystem.

No changes to this page.  
Provided for context.  
This shows the  
Division 2 Functions 2.a. and 2.b.



BASES

INFORMATION ONLY

BACKGROUND

Diesel Generators (continued)

standby conditions (rated voltage and speed, with the DG output breaker open). The DGs will only energize their respective Engineered Safety Feature (ESF) buses if a loss of offsite power occurs. (Refer to Bases for LCO 3.3.8.1.)

AEGTs

The AEGT subsystems may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level-Low Low Low, Level 1 or Drywell Pressure-High. Each of these diverse variables is monitored by two redundant transmitters per AEGT subsystem which are, in turn, connected to two trip units. The outputs of the four divisionalized trip units (two trip units from each of the two variables) are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic. The AEGT subsystems receive their initiation signals from the associated Divisions' ECCS logic (i.e., Division 1 AEGT subsystem receives an initiation signal from Division 1 ECCS (LPCS and LPCI A), and Division 2 AEGT subsystem receives an initiation signal from Division 2 ECCS (LPCI B and LPCI C)). The AEGT subsystems can also be started manually from the control room. The AEGT initiation logic is reset by resetting the associated ECCS initiation logic.

No changes  
to this page.  
Provided for  
information.

APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY

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

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

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

(continued)

BASES

INFORMATION ONLY

APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY  
(continued)

Low Pressure Core Spray and Low Pressure Coolant Injection Systems

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

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

Reactor Vessel Water Level-Low Low Low, Level 1 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. The Reactor Vessel Water Level-Low Low Low, Level 1 Allowable Value is chosen to allow time for the low pressure core flooding systems to activate and provide adequate cooling.

Two channels of Reactor Vessel Water Level-Low Low Low, Level 1 Function per associated Division are only required to be OPERABLE when the associated ECCS, DG, or AEGT subsystem is required to be OPERABLE, to ensure that no single instrument failure can preclude ECCS initiation. (Two channels input to LPCS and LPCI A, while the other two channels input to LPCI B and LPCI C.) Refer to LCO 3.5.1 and LCO 3.5.2, "ECCS-Shutdown," for Applicability Bases for the low pressure ECCS subsystems; LCO 3.8.1, "AC Sources-Operating" and LCO 3.8.2, "AC Sources-Shutdown," for Applicability Bases for the DGs; and LCO 3.6.4.3, "Annulus Exhaust Gas Treatment (AEGT) System," for Applicability Bases for AEGT System.

The AEGT System is also initiated at Level 1 to reduce, by filtration, radioactive material which may be released due to a loss of coolant accident.

FYI:

Features  
addressed  
by Functions  
1.a and 2.a

are the  
ECCS  
subsystems,  
the Div. 1  
and 2 DG's,  
and the  
AEGT  
subsystems.

(continued)

BASES

INFORMATION ONLY

APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY  
(continued)

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

High pressure in the drywell could indicate a break in the reactor coolant pressure boundary (RCPB). The low pressure ECCS and associated DGs are initiated upon receipt of the Drywell Pressure-High Function in order to minimize the possibility of fuel damage. The Drywell Pressure-High Function is assumed in the analysis of the DBA LOCA (Ref. 2). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

The AEGT System is also initiated by the Drywell Pressure-High Function to reduce, by filtration, radioactive material which may be released due to a loss of coolant accident.

The Drywell Pressure-High Function is required to be OPERABLE when the associated ECCS, DGs or AEGT subsystems are required to be OPERABLE in conjunction with times when the primary containment is required to be OPERABLE. Thus, four channels of the LPCS and LPCI Drywell Pressure-High Function are required to be OPERABLE in MODES 1, 2, and 3 to ensure that no single instrument failure can preclude ECCS initiation. (Two channels input to LPCS and LPCI A, while the other two channels input to LPCI B and LPCI C.) In MODES 4 and 5, the Drywell Pressure-High Function is not required since there is insufficient energy in the reactor to pressurize the primary containment to Drywell Pressure-High setpoint.

Refer to LCO 3.5.1 for Applicability Bases for the low pressure ECCS subsystems; LCO 3.8.1 for Applicability Bases for the DGs; and LCO 3.6.4.3 for Applicability Bases for the AEGT subsystems.

FYI:

Features  
addressed  
by Functions

1.b and 2.b  
are the  
ECCS  
Subsystems,  
the Div. 1  
and 2 DG's,  
and the  
AEGT  
subsystems

1.c, 2.c. Low Pressure Coolant Injection Pump A and Pump B Start-Time Delay Relay

The purpose of this time delay is to stagger the start of the two ECCS pumps that are in each of Divisions 1 and 2, thus limiting the starting transients on the 4.16 kV emergency buses. This Function is only necessary when power is being supplied from the standby power sources (DG).

(continued)

## INFORMATION ONLY

### BASES

APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY

#### 4.f. 5.e. Manual Initiation (continued)

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

### ACTIONS

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

#### A.1

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

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

Required Actions B.1 and B.2 are intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function (or in some cases, within the same monitored parameter) result in redundant automatic initiation capability being lost for the feature(s). Required Action B.1 features would be those that are initiated by Functions 1.a, 1.b, 2.a, and 2.b (e.g., low pressure ECCS). The Required Action B.2 feature

(continued)

PERRY - UNIT 1

B 3.3-110

Division 1 and 2  
diesel generators,

, or the AEGT  
subsystems

; B.1 features do not include those separately addressed with their own Instrumentation Specification (e.g., RHR Containment Spray Instrumentation)

Revision No. 1

BASES

INFORMATION ONLY

ACTIONS

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

would be HPCS. <sup>for a feature</sup> <sup>of its</sup> Required Action B.1, redundant automatic initiation capability is lost if either (a) one or more Function 1.a channels and one or more Function 2.a channels are inoperable and untripped, or (b) one or more Function 1.b channels and one or more Function 2.b channels are inoperable and untripped.

~~For Divisions 1 and 2, since each inoperable channel would have Required Action B.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected portion of the associated Division of low-pressure ECCS, DG and AEGT System to be declared inoperable. However, since channels in both Divisions are~~

Since Required Action B.1 is only applicable if

~~inoperable and untripped, and the Completion Times started concurrently for the channels in both Divisions, this results in the affected portions in both Divisions of ECCS, DG and AEGT system being concurrently declared inoperable~~

For Required Action B.2, redundant automatic initiation capability is lost if two Function 3.a or two Function 3.b channels are inoperable and untripped in the same trip system. In this situation (loss of redundant automatic initiation capability), the 24 hour allowance of Required Action B.3 is not appropriate and the feature(s) associated with the inoperable, untripped channels must be declared inoperable within 1 hour. As noted (Note 1 to Required Action B.1 and Required Action B.2), the two Required Actions are only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the ECCS is not assumed and the probability of a LOCA is lower. Although a total loss of initiation capability for 24 hours is allowed by Required Action B.3 during MODES 4 and 5, additional controls are imposed in ORM 6.2.9. Notes are also provided (Note 2 to Required Action B.1 and Required Action B.2) to delineate which Required Action is applicable for each Function that requires entry into Condition B if an associated channel is inoperable. This ensures that the proper loss of initiation capability check is performed.

A clean re-type of the Bases discussions for ACTIONS B.1, B.2, and B.3 are provided on the next page of this package

(continued)

02  
075

pg. B 3.3-110

B.1, B.2, and B.3 **INFORMATION ONLY**

Required Actions B.1 and B.2 are intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function (or in some cases, within the same monitored parameter) result in redundant automatic initiation capability being lost for the feature(s). Required Action B.1 "features" would be those that are initiated by Functions 1.a, 1.b, 2.a, and 2.b (e.g., Division 1 and 2 diesel generators, low pressure ECCS, or the AEGT subsystems); B.1 features do not include those separately addressed with their own Instrumentation Specification (e.g., RHR Containment Spray Instrumentation). The Required Action B.2 feature

-----  
pg. B 3.3-111

would be HPCS.

For Required Action B.1, redundant automatic initiation capability is lost for a feature if either (a) one or more of its Function 1.a channels and one or more of its Function 2.a channels are inoperable and untripped, or (b) one or more of its Function 1.b channels and one or more of its Function 2.b channels are inoperable and untripped. Since Required Action B.1 is only applicable if channels supporting both Divisions of a feature are inoperable and untripped, the affected portions of both Divisions of ECCS, DG and AEGT are declared inoperable concurrently (within 1 hour of discovery).

For Required Action B.2, redundant automatic initiation capability is lost if two Function 3.a or two Function 3.b channels are inoperable and untripped in the same trip system.

In this situation (loss of redundant automatic initiation capability), the 24 hour allowance of Required Action B.3 is not appropriate and the feature(s) associated with the inoperable, untripped channels must be declared inoperable within 1 hour.

As noted (Note 1 to Required Action B.1 and Required Action B.2), the two Required Actions are only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the ECCS is not assumed and the probability of a LOCA is lower. Although a total loss of initiation capability for 24 hours is allowed by Required Action B.3 during MODES 4 and 5, additional controls are imposed in ORM 6.2.9. Notes are also provided (Note 2 to Required Action B.1 and Required Action B.2) to delineate which Required Action is applicable for each Function that requires entry into Condition B if an associated channel is inoperable. This ensures that the proper loss of initiation capability check is performed.

BASES

INFORMATION ONLY

ACTIONS

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

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

; the Division 1  
and 2 DGs; the  
Division 1 and  
2 AEGT  
subsystems

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 4) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action B.3. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an initiation), Condition H must be entered and its Required Action taken.

(continued)