Duke Power®
A Duke Energy Company

GARY R. PETERSON
Vice President
Catawba Nuclear Station

Duke Power
CN01VP / 4800 Concord Rd
York, SC 29745

803 831 4251
803 831 3221 fax
grpeters@duke-energy com

November 20, 2002

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

ATTENTION: Document Control Desk

SUBJECT: Duke Energy Corporation

Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414

License Amendment Request Applicable to Catawba Nuclear Station Technical Specification 3.3.2 and Table 3.3.2-1, Engineered Safety Feature Actuation System Instrumentation; and Technical Specification 3.3.5, Loss of Power Diesel Generator Start Instrumentation

In Reference 1 identified below,[1] and pursuant to 10 CFR 50.90, Duke Energy Corporation (Duke) submitted a license amendment request (LAR) for the Catawba Nuclear Station Facility Operating Licenses and Technical Specifications (TS). This LAR proposed changes to Catawba TS 3.3.2, TS Table 3.3.2-1, and TS 3.3.5. In Reference 2 identified below,[2] and also in Reference 3 identified below,[3] Duke provided supplements to the LAR originally submitted by Reference 1. In a telephone conference call held between NRC officials and Duke representatives on October 24, 2002, an NRC request for additional information (RAI) on the

[1] M. S. Tuckman, Duke Energy Corporation, Letter to the NRC Dated December 20, 2001, SUBJECT: License Amendment Request for Catawba Nuclear Station Technical Specifications 3.3.2, Engineered Safety Feature Actuation System Instrumentation; and 3.3.5, Loss of Power Diesel Generator Start Instrumentation

[2] M. S. Tuckman, Duke Energy Corporation, Letter to the NRC Dated March 4, 2002, SUBJECT: Withdrawal of a Portion of a License Amendment Request Applicable to Technical Specification 3.3.2 and Technical Specification Table 3.3.2-1

[3] G. R. Peterson, Duke Energy Corporation, Letter to the NRC Dated September 12, 2002, Same Subject

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December 20, 2001 Duke LAR was discussed. The purpose of this letter is to provide the Duke response to this NRC RAI and to provide necessary revisions to the December 20, 2001 LAR that resulted from the conference call and Duke's response to the NRC RAI.

The contents of this submittal package are:

- Attachment 1 provides the Duke response to the NRC RAI. There are eight questions in the RAI. Each question is stated and the Duke response follows.

- Attachment 2 contains marked copies of the affected TS 3.3.2, TS Table 3.3.2-1, and Bases 3.3.2 pages, showing the proposed changes. This is a complete replacement of the marked pages for these TS contained in the original submittal described in Reference 1. Note, the changes to TS 3.3.5 proposed in Reference 1 are being withdrawn. Therefore, there are no marked pages for TS 3.3.5 included in this submittal.

- Attachment 3 contains reprinted pages for the affected TS 3.3.2, TS Table 3.3.2-1, and Bases 3.3.2 pages. This is a complete replacement of the reprinted pages for these TS contained in the original submittal described in Reference 1. Note, the changes to TS 3.3.5 proposed in Reference 1 are being withdrawn. Therefore, there are no reprinted pages for TS 3.3.5 included in this submittal.

- Pursuant to 10 CFR 50.92, Attachment 4 contains a revised No Significant Hazards Considerations (NSHC) determination. Duke's original determination of NSHC remains valid for the revised LAR contained within this current submittal package.

The original basis for excluding this LAR from the requirements to perform an environmental assessment/impact statement remains valid.

Duke continues to request review and approval of this LAR at the NRC's earliest opportunity, since this LAR addresses a non-conservative situation that currently exists with the Catawba TS. Pursuant to 10 CFR 50.91, a copy of this LAR is being sent to the appropriate official of the State of South Carolina.

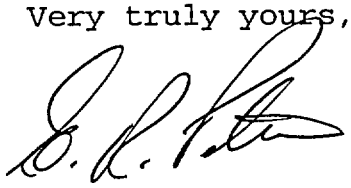
This submittal document contains these commitments:

1. Duke will implement this LAR within the NRC's standard 30-day grace period.

2. As a result of implementing this LAR, the Catawba Updated Final Safety Analysis Report (UFSAR) will require revision. Duke will make the necessary revisions to Chapters 7 and 16 of the UFSAR (as described in Attachment 1) in accordance with the applicable regulation.[4]

Inquiries on this matter should be directed to J. S. Warren at (704) 382-4986.

Very truly yours,



G. R. Peterson

Attachments

[4] 10 CFR 50.71(e), "Maintenance of records, making of reports."

xc w/Attachments:

L. A. Reyes, Regional Administrator
U. S. Nuclear Regulatory Commission, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

C. P. Patel (Addressee Only)
NRC Project Manager (CNS)
U. S. Nuclear Regulatory Commission
Mail Stop O-8 H12
Washington, DC 20555-0001

E. Guthrie
Senior Resident Inspector (CNS)
U. S. Nuclear Regulatory Commission
Catawba Nuclear Site - CN01RC

R. Wingard, Director
Division of Radioactive Waste Management
South Carolina Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

G. R. Peterson, affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

G. R. Peterson, Site Vice President

Subscribed and sworn to me: 11-20-2002
Date

Micky Standridge, Notary Public

My commission expires: 7-10-2012
Date

SEAL

Attachment 1

Duke Energy Corporation
Catawba Nuclear Station, Units 1 & 2

Docket Nos: 50-413 & 50-414
Operating License NPF-35 & NPF-52
Response to NRC Request for Additional Information
TAC Nos: MB3747 & MB3748

Background

This NRC Request for Additional Information (RAI) was discussed during a telephone conference call between NRC officials and Duke Energy Corporation representatives held on October 24, 2002. In the following paragraphs, each NRC RAI item is stated and the Duke Energy Corporation response follows.

Request for Additional Information

The TSS staff has completed the requested concurrence review for Catawba Nuclear Stations (CNS) Units 1 & 2. The following concerns need to be addressed regarding issuance of proposed technical specification (TS) changes to ESFAS LCO 3.3.2 and LOP-DG Start Instrumentation LCO 3.3.5.

I. The following requests for additional information (RAIs) refer to changes associated with Turbine Trip Instrumentation, proposed Table 3.3.2-1, Function 5.a.

RAI #1

Attachment 3, items 14 and 17 discuss deleting from Table 3.3.2-1 Function 5.e, Turbine Trip and Feedwater Isolation, Doghouse Water Level-High High; and Function 5.f, Turbine Trip and Feedwater Isolation, Trip of All Main Feedwater Pumps. The current TS requires these functions to be operable because, in the application to adopt the NUREG-1431 Standard Technical Specifications (STS), the licensee deemed these ESFAS functions meet 10 CFR 50.36(c)(2)(ii), criterion 3,

"A structure system or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier."

Existing limiting conditions for operation (LCOs) and related surveillances in the TS that satisfy any of the criteria stated in 50.36(c)(2)(ii) must be retained in the TS. The license amendment request does not provide a detailed discussion that shows why the conclusions from the previous analysis to include these variables in the TS are now, upon re-analysis, changed and, therefore, justify removal of these variables in accordance with 10 CFR 50.36 criterion. In this matter, a summary discussion of the 10 CFR 50.36 criterion is provided, which includes an overly succinct statement of the criterion. The staff, therefore, was not presented with a sufficient basis for the licensee's conclusion. In addition, for any proposed relocation of a TS to a licensee controlled document, such as Duke Energy's Selected Licensee Commitments Program, the Commission requires licensee assurance that future changes to the requirements will be adequately controlled. The licensee did not state the method of control that is proposed for making futures changes to the relocated TS requirements. Provide additional documentation to address these staff concerns.

Duke Energy Corporation Response:

Duke Energy Corporation submitted its application to convert the Catawba TS to the Improved TS on May 27, 1997. Volume 1 of the application contains what is commonly called the "Split Report". The Split Report applied the 10 CFR 50.36 selection criteria to the Catawba TS. Page 3 of 10 of the Summary Disposition Matrix addressed the EFSAS (old TS 3/4.3.2). The ESFAS was retained in the TS under Criterion 3. However, the application of the criteria of 10 CFR 50.36 was made at the overall LCO level (i.e., to the ESFAS as a whole), and not to individual ESFAS functions. Thus, the above specific ESFAS functions were never deemed to meet the 10 CFR 50.36 criteria for inclusion in the TS. This approach was consistent with the

approach used by other utilities in their TS conversion efforts.

If a structure, system, or component (SSC) is deemed to meet any of the 10 CFR 50.36 criteria, then that SSC should be included in the plant TS. The four criteria are as follows:

Criterion 1 - Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

Criterion 2 - A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 3 - A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 4 - A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

The Turbine Trip and Feedwater Isolation - Doghouse Water Level - High High function (Function 5e) terminates forward feedwater flow in the event of a postulated pipe break in the main feedwater piping in the doghouses to prevent flooding safety related equipment essential to the safe shutdown of the plant. With respect to the 10 CFR 50.36 criteria, this function: 1) is not used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary (i.e., it is not a reactor coolant leakage detection feature); 2) is not a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier (i.e., it is not an accident or

transient analysis assumption); 3) is not a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier (i.e., it is not a credited function of any design basis accident or transient analysis); and 4) is not a structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety (i.e., it is not significant enough to be credited or modeled in the Catawba Probabilistic Risk Assessment and is not significant from an operating experience point of view). This function accomplishes a flood protection feature in the event of a main feedwater line break in the doghouses. Flood protection features do not meet the threshold for inclusion in the TS. In Chapter 7 of the Catawba Updated Final Safety Analysis Report (UFSAR), the ESFAS instrumentation is discussed. This particular function is not listed as an ESFAS in Chapter 7 of the UFSAR. (It is listed in UFSAR Table 7-15, ESF Response Times; however, this table was formerly included in the TS and was moved to the UFSAR in its entirety during the Improved TS conversion for Catawba. The only reason that this function is listed in the table is because of the table's former inclusion in the TS, where this function is listed as an ESFAS function.) Deletion of this function from the TS is consistent with NUREG-1431, "Improved Standard Technical Specifications, Westinghouse Plants," as this function is not included in NUREG-1431.

The Turbine Trip and Feedwater Isolation - Trip of All Main Feedwater Pumps function (Function 5f) trips the main turbine to limit the loss of steam generator water level upon a loss of normal feedwater. With respect to the 10 CFR 50.36 criteria, this function: 1) is not used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary (i.e., it is not a reactor coolant leakage detection feature); 2) is not a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier (i.e., it is not an accident or transient analysis assumption); 3) is

not a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier (i.e., it is not a credited function of any design basis accident or transient analysis); and 4) is not a structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety (i.e., it is not significant enough to be credited or modeled in the Catawba Probabilistic Risk Assessment and is not significant from an operating experience point of view). This function is anticipatory in nature with respect to other TS Turbine Trip functions. In Chapter 7 of the Catawba UFSAR, the ESFAS instrumentation is discussed. This particular function is not listed as an ESFAS in Section 7.3 of the UFSAR. (It is listed in UFSAR Table 7-15, ESF Response Times; however, this table was formerly included in the TS and was moved to the UFSAR in its entirety during the Improved TS conversion for Catawba. The only reason that this function is listed in the table is because of the table's former inclusion in the TS, where this function is listed as an ESFAS function.) Deletion of this function from the TS is consistent with NUREG-1431, "Improved Standard Technical Specifications, Westinghouse Plants," as this function is not included in NUREG-1431. The instrumentation and controls testing description contained in Catawba UFSAR Chapter 7.6.22.3.9 will be revised to reflect this deletion and the doghouse listing in Table 7-15 will be removed as well. These UFSAR changes will be made in accordance with the applicable regulation.[1]

The justification for the deletion of these functions from the TS is similar to that contained in the Catawba Improved TS conversion submittal for the deletion of other functions which are not credited or required by the Catawba safety analyses (e.g., Turbine Trip - Manual Initiation, and Auxiliary Feedwater - Manual Initiation). In the December 20, 2001 application, Duke Energy Corporation proposed relocating the Turbine Trip and Feedwater Isolation, Doghouse Water Level - High High, and Turbine Trip and Feedwater Isolation, Trip of All Main Feedwater Pumps

[1] 10 CFR 50.71(e), "Maintenance of records, making of reports."

functions to the Selected Licensee Commitments (SLC) Manual. The SLC Manual is Chapter 16 of the Catawba UFSAR. Changes to the SLC Manual are controlled via the 10 CFR 50.59 process.

RAI #2

Attachment 3, item 16 discusses changes to the Catawba TS that require the Turbine Trip functions for Automatic Actuation Logic and Actuation Relays [Table 3.3.2-1, Function 5.A.(1)] and SG Water Level - High-High [Table 3.3.2-1, Function 5.A.(2)] to be operable in Mode 2 except when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve, and in MODE 1. The current TS footnote (e) applicability specifies allowances for securing MFIVs, MFCVs, and associated bypass valves using wording that provides a handshake to similar TS language in Section 3.6, Containment Systems, to ensure consistent interpretation of acceptable methods for containment isolation. The licensee proposes to revise footnote (f) to "Except when steam admission to the Main Turbine is prevented" and apply the revised footnote (f) to be applicable for both MODE 1 and MODE 2 operations.

Attachment 3, item 13, discusses changing the applicability for Turbine Trip on Safety Injection to include the revised footnote (f) from a cross reference to the Safety Injection (SI) function for the appropriate applicability.

An evaluation of the safety basis for the proposed TS changes was not provided in the license amendment application. Additionally, the proposed changes represent a generic change to the STS, which requires a Nuclear Energy Institute Technical Specification Task Force (NEI TSTF) citation to support the change. Provide additional justification for the above TS changes and an NEI TSTF citation for the proposed format changes.

Duke Energy Corporation Response:

Duke Energy Corporation has reviewed the proposed footnote (f) following an October 24, 2002 conference call with the NRC concerning this RAI. Proposed footnote (f) is being

withdrawn, such that the applicability of Functions 5a(1) and 5a(2) will be Modes 1 and 2. This applicability is consistent with the assumptions of the Catawba safety analyses.

RAI #3

Attachment 3, item 15, discusses adding Table 3.3.2-1, Function 5.a.(4), Turbine Trip, Reactor Trip (P-4). This change copies the Engineered Safety Features Actuation System (ESFAS) Interlock Function (Table 3.3.2-1, Function 8.a) into the Turbine Trip Instrumentation Function. One objective of the TS Improvement Program was to eliminate duplication of TS requirements. Thus, in developing the ESFAS STS, the P-4 interlock table function entry provides the bounding applicability, required channels, surveillance requirements and limiting conditions for operation. The proposed change represents a generic change to the STS format. Provide an NEI TSTF citation for the proposed format changes.

Duke Energy Corporation Response:

Following a conference call with the NRC concerning the subject RAI, Duke Energy Corporation has elected to withdraw this proposed change.

II. The following RAIs refer to changes associated with Feedwater Isolation Instrumentation, proposed Table 3.3.2-1, Function 5.b.

RAI #4

Attachment 3, item 13, discusses changing the applicability for Feedwater Isolation on Safety Injection [Table 3.3.2-1, Function 5.b.(3)] to include the revised footnote (f) from a cross reference to the SI function for the appropriate applicability. An evaluation of the safety basis for the proposed TS changes was not provided in the license amendment application. Additionally, the proposed changes represent a generic change to the STS, which requires an NEI TSTF citation to support the change. Provide additional justification for the above TS changes and an NEI TSTF citation for the proposed format changes.

Duke Energy Corporation Response:

The reference to footnote (f) in the above RAI should actually be a reference to footnote (e), as footnote (f) was not used in conjunction with the Feedwater Isolation Function 5b. Duke Energy Corporation discussed this proposed change with the NRC in a conference call. The purpose of adding the phrase, "See Item 5.a.(1) for Applicable MODES." to Function 5a(3) (Turbine Trip - Safety Injection) is to make the modes of applicability for this function consistent with the automatic actuation logic and actuation relays for this function. Function 1b (Safety Injection - Automatic Actuation Logic and Actuation Relays) has an applicability requirement of Modes 1, 2, 3, and 4. It is inconsistent to require Function 5a(3) to be applicable in Modes 3 and 4, when Function 5a(1) is not required in Modes 3 and 4. Similarly, the purpose of adding the phrase, "See Item 5.b.(1) for Applicable MODES." to Function 5b(3) (Feedwater Isolation - Safety Injection) is to make the modes of applicability for this function consistent with the automatic actuation logic and actuation relays for this function. Function 1b (Safety Injection - Automatic Actuation Logic and Actuation Relays) has an applicability requirement of Modes 1, 2, 3, and 4. It is inconsistent to require Function 5b(3) to be applicable in Modes 2 and 3 when feedwater is isolated in accordance with footnote (e), or in Mode 4, when Function 5b(1) is not required in Modes 2 and 3 when feedwater is isolated in accordance with footnote (e), or in Mode 4. During the conference call, the NRC indicated that the proposed changes to Functions 5a(3) and 5b(3) would be acceptable.

RAI #5

Attachment #3, item 12, discusses changing the applicability for Feedwater Isolation on SG Water Level - High-High (P-14) [Table 3.3.2-1, Function 5.b.(2)] to MODES 1, 2 and 3, from MODE 1, and from MODE 2 except when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve. The TS markup pages submitted with the amendment do not reflect the attachment 3 discussion. Revise the final typed TS.

Duke Energy Corporation Response:

Duke Energy Corporation discussed this RAI in a conference call with the NRC. It was noted that the TS markups and reprinted pages are indeed correct with respect to this proposed change. The NRC withdrew this RAI.

III. The following RAIs refer to changes for Auxiliary Feedwater, Table 3.3.2-1, Function 6 and to LCO 3.3.5, Loss of Power Diesel Generator Start Instrumentation

RAI #6

Attachment #3, item 18, discusses changing the Conditions and Required Actions for the Auxiliary Feedwater, Loss of Offsite Power Function (Table 3.3.2-1, Function 6.d) from Condition D (trip an inoperable channel in 6 hours) to proposed Condition T (immediately enter the LCO 3.3.5 TS Required Actions) in order to provide Conditions and Required Actions like those that govern TS 3.3.5, Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation. The licensee stated that this change is justified because the sensing relays for Function 6.d are the same relays used for LOP DG Start instrumentation. These proposed changes represent a generic change to the STS format by altering the requirements of TS LCO 3.0.6, since the loss of offsite power Function 6.d supports operability of the Auxiliary Feedwater System (TS 3.7.5), and the loss of offsite power DG instrumentation support operability of the AC Sources - Operating (TS 3.8.1). An evaluation of the safety basis for the proposed TS changes was not provided in the license amendment application. Additionally, the proposed changes represent a generic change to the STS, which requires an NEI TSTF citation to support the change. Provide additional justification for the above TS changes and an NEI TSTF citation for the proposed format changes.

The licensee states that the note in LCO 3.3.2, Condition D for bypassing an inoperable channel for up to 4 hours for surveillance testing of other channels, should be incorporated into Condition A of LCO 3.3.5 since the same

relays are used to detect an undervoltage conditions whether they are referenced in TS 3.3.2 or TS 3.3.5. In STS (NUREG-1431) the 4 hour bypass allowance for surveillance testing is granted based on plant-specific approval of WCAP-10271-P-A, Supplement 2, Revision 1, June 1990. An evaluation of the safety basis for the proposed TS changes was not provided in the license amendment application.

Duke Energy Corporation Response:

As indicated in a conference call between Duke Energy Corporation and the NRC concerning this RAI, this proposed change is being withdrawn in its entirety.

RAI #7

Attachment #3, item 19, discusses modifying TS 3.3.2, Condition K to provide an action requirement for more than one inoperable channel on a per pump basis for Table 3.3.2-1, Function 6.e, Trip of All Main Feedwater Pumps, which specifies 3 operable channels per pump. The discussion appears to state that AFW pump start logic occurs for 2 of 3 channels per pump in trip for both pumps. Thus, the proposed change is to trip inoperable channels on a pump with one or more inoperable channels or both pumps with one inoperable channel. The pump trip logic discussion disagrees with the current TS Bases.

The proposed revision to Condition K to enter the action for one inoperable channel on each pump is not necessary since the Actions Bases state entry into the conditions on a per pump basis is permitted. This proposed change represents a generic change to the STS format and content. Generic changes to the STS require an NEI TSTF citation to support the change. Provide an NEI TSTF citation for the proposed format changes.

The proposed revision to Condition K to permit all ("one or more trip channels inoperable" is the proposed condition language) channels in one pump inoperable represents a loss of functional capability for Trip of All Main Feedwater Pumps." The correct required action for this condition is to enter LCO 3.0.3. This proposed change also represents a

generic change to the STS format and content. An evaluation of the safety basis for the proposed TS changes was not provided in the license amendment application. Additionally, the proposed changes represent a generic change to the STS, which requires an NEI TSTF citation to support the change. Provide additional justification for the above TS changes and an NEI TSTF citation for the proposed format changes.

Duke Energy Corporation Response:

As indicated in a conference call between Duke Energy Corporation and the NRC concerning this RAI, this proposed change is being withdrawn in its entirety.

RAI #8

Attachment #3, item 20, discusses modifying TS 3.3.2, Condition M and adding Condition U for the Auxiliary Pump Train A and Train B Suction Transfer on Suction Pressure - Low Function, Table 3.3.2-1, Function 6.f. The licensee proposed modifying Condition M to provide an action requirement for one inoperable channel on both trains of suction pressure low. The proposed revision to Condition M to enter the action for one inoperable channel on each train is not necessary since the Actions Bases state entry into the conditions on a per pump basis is permitted. This proposed change represents a generic change to the STS format and content. Provide an NEI TSTF citation for the proposed format and content changes.

New Condition U proposes an action for two or more inoperable channels. This condition represents a complete loss of capability for the suction pressure low function to perform its intended safety function. Condition U also proposes to declare the associated Auxiliary Feedwater Train inoperable if the actuation instrumentation channels are inoperable. Entering the Auxiliary Feedwater System TS actions for channels in one train of AFW suction pressure low inoperable is an unacceptable remedial action for failure of the instrumentation to perform its intended safety function. The AFW System is not inoperable, as such entry into the AFW system specification would be for operational convenience. The TS requirement that is not

met is the capability to transfer the AFW suction source on suction pressure low. This proposed change also represents a generic change to the STS format and content. An evaluation of the safety basis for the proposed TS changes was provided in the license amendment application. However, the proposed changes represent a generic change to the STS, which requires an NEI TSTF citation to support the change. Provide an NEI TSTF citation for the proposed format changes.

Duke Energy Corporation Response:

As indicated in a conference call between Duke Energy Corporation and the NRC concerning this RAI, this proposed change is being withdrawn in its entirety.

Additional discussion regarding proposed change to Function 8c (Tavg - Low Low, P-12):

Duke Energy Corporation had proposed to change the REQUIRED CHANNELS entry for this function from "1 per loop" to "4". As indicated in the conference call between Duke Energy Corporation and the NRC concerning these RAIs, this proposed change is being withdrawn.

Attachment 2

Catawba Units 1 and 2 Technical Specifications

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. One channel inoperable.	J.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
	OR	
	J.2 Be in MODE 3.	12 hours
K. One Main Feedwater Pumps trip channel inoperable.	K.1 Place channel in trip.	1 hour
	OR	
	K.2 Be in MODE 3.	7 hours
L. ~~One channel inoperable.~~ Not used.	L.1 ~~----------NOTE---------- One channel may be bypassed for up to 2 hours for surveillance testing provided the other channel is OPERABLE. ----------~~ Be in MODE 3.	~~6 hours~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.2.8	----------NOTE---------- Verification of setpoint not required for manual initiation functions. ---------- Perform TADOT.	18 months
SR 3.3.2.9	----------NOTE---------- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	18 months
SR 3.3.2.10	----------NOTE---------- Not required to be performed for the turbine driven AFW pump until 24 hours after SG pressure is $\geq$ 600 psig. ---------- Verify ESFAS RESPONSE TIMES are within limit.	18 months on a STAGGERED TEST BASIS
SR 3.3.2.11	Perform COT.	18 months
SR 3.3.2.12	Perform ACTUATION LOGIC TEST	18 months

Table 3.3.2-1 (page 3 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
4. Steam Line Isolation (continued)						
(2) Negative Rate - High	3[b][c]	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	≤ 122.8[d] psi	100[d] psi
5. Turbine Trip and Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1,2[e]	2 trains	I	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[e]	4 per SG	J	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.9 SR 3.3.2.10	≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2)	83.9% (Unit 1) 77.1% (Unit 2)
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
d. T_{avg}-Low	1,2[e]	4	J	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≥ 561°F	564°F
coincident with Reactor Trip, P-4	Refer to Function 8.a (Reactor Trip, P-4) for all initiation functions and requirements.					
e. Doghouse Water Level - High High	1,2[e]	2 per doghouse	L	SR 3.3.2.8	≤ 12 inches above 577 ft floor level	11 inches above 577 ft floor level
f. Trip of all main feedwater pumps	1,2[a]	3 per MFW pump	K	SR 3.3.2.8	NA	NA

Replace With INSERT C1

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Except when all MSIVs are closed and de-activated.

(c) Trip function automatically blocked above P-11 (Pressurizer Pressure) interlock and may be blocked below P-11 when Steam Line Isolation Steam Line Pressure - Low is not blocked.

(d) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(e) Except when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

INSERT C1

5.	Turbine Trip and Feedwater Isolation						
a	Turbine Trip						
	(1) Automatic Actuation Logic and Actuation Relays	1,2	2 trains	I	SR 3 3.2.2 SR 3.3 2.4 SR 3.3 2 6	NA	NA
	(2) SG Water Level-High-High (P-14)	1,2	4 per SG	J	SR 3 3 2.1 SR 3 3.2.2 SR 3 3.2.4 SR 3 3 2 5 SR 3.3 2 6 SR 3.3 2.9 SR 3 3 2.10	≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2)	83 9% (Unit 1) 77.1% (Unit 2)
	(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements. See Item 5 a (1) for Applicable MODES.					
b.	Feedwater Isolation						
	(1) Automatic Actuation Logic and Actuation Relays	$1,2^{(e)},3^{(e)}$	2 trains	H	SR 3 3 2.2 SR 3.3.2.4 SR 3 3.2 6	NA	NA
	(2) SG Water Level- High High (P-14)	$1,2^{(e)},3^{(e)}$	4 per SG	D	SR 3.3 2.1 SR 3 3 2 2 SR 3 3 2.4 SR 3 3 2.5 SR 3 3.2.6 SR 3 3.2.9 SR 3 3 2.10	≤ 85 6% (Unit 1) ≤ 78.9% (Unit 2)	83 9% (Unit 1) 77.1% (Unit 2)
	(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements. See Item 5 b.(1) for Applicable MODES.					
	(4) Tavg-Low	$1,2^{(e)}$	4	J	SR 3 3 2.1 SR 3 3 2.5 SR 3 3.2.9	≥ 561°F	564°F
	coincident with Reactor Trip, P-4	Refer to Function 8 a (Reactor Trip, P-4) for all initiation functions and requirements.					

Table 3 3 2-1 (page 4 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
6. Auxiliary Feedwater						
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	H	SR 3.3.2 2 SR 3.3 2.4 SR 3 3.2.6	NA	NA
b SG Water Level - Low Low	1,2,3	4 per SG	D	SR 3 3.2.1 SR 3.3.2.5 SR 3 3.2.9 SR 3 3.2.10	≥ 9% (Unit 1) ≥ 35.1% (Unit 2)	10.7% (Unit 1) 36.8% (Unit 2)
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements					
d. Loss of Offsite Power	1,2,3	3 per bus	D	SR 3.3 2.3 SR 3.3 2.9 SR 3.3 2.10	≥ 3242 V	3500 V
e Trip of all Main Feedwater Pumps	1,2(a)	3 per pump	K	SR 3 3 2.8 SR 3 3.2.10	NA	NA
f Auxiliary Feedwater Pump Train A and Train B Suction Transfer on Suction Pressure - Low	1,2,3	3 per train	M	SR 3.3.2.8 SR 3 3.2.10	A) ≥ 9.5 psig B) ≥ 5.2 psig (Unit 1) ≥ 5.0 psig (Unit 2)	A) 10 5 psig B) 6 2 psig (Unit 1) 6.0 psig (Unit 2)
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	1,2,3,4	4	N	SR 3 3 2.1 SR 3.3 2.7 SR 3 3 2.9 SR 3 3 2.10	≥ 162 4 inches	177.15 inches
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements					

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.
*If more than one channel of Auxiliary Feedwater Suction Pressure – Low for one train becomes inoperable, immediately enter the applicable Condition(s) and Required Action(s) for the associated AFW train made inoperable by the inoperable channels. This is a one time only change for Unit 1 in support of the activities associated with the replacement of pressure switch 1CAPS5232.

Table 3.3 2-1 (page 5 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
8. ESFAS Interlocks						
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	F	SR 3.3 2.8	NA	NA
b. Pressunzer Pressure, P-11	1,2,3	3	O	SR 3.3.2.5 SR 3 3.2.9	≥ 1944 and ≤ 1966 psig	1955 psig
c T_{avg} - Low Low, P-12	1,2,3	1 per loop	O	SR 3 3.2.5 SR 3 3.2.9	≥ 550°F	553°F
9. Containment Pressure Control System						
a. Start Permissive	1,2,3,4	4 per train	P	SR 3 3.2.1 SR 3 3.2.7 SR 3 3.2.9	≤ 0 45 psid	0.4 psid
b. Termination	1,2,3,4	4 per train	P	SR 3 3.2.1 SR 3 3.2.7 SR 3.3.2.9	≥ 0 25 psid	0.3 psid
10. Nuclear Service Water Suction Transfer - Low Pit Level	1,2,3,4	3 per pit	Q,R	SR 3.3.2.1 SR 3.3.2.9 SR 3.3.2.11 SR 3.3.2.12	≥ El. 555.4 ft	El. 557.5 ft

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

(2) Steam Line Pressure-Negative Rate-High

Steam Line Pressure-Negative Rate-High provides closure of the MSIVs for an SLB when less than the P-11 setpoint, to maintain at least one unfaulted SG as a heat sink for the reactor, and to limit the mass and energy release to containment. When the operator manually blocks the Steam Line Pressure-Low main steam isolation signal when less than the P-11 setpoint, the Steam Line Pressure-Negative Rate-High signal is automatically enabled. Steam Line Pressure-Negative Rate-High provides no input to any control functions. Thus, three OPERABLE channels are sufficient to satisfy requirements with a two-out-of-three logic on each steam line.

Replace With INSERT C2

Steam Line Pressure-Negative Rate-High must be OPERABLE in MODE 3 when less than the P-11 setpoint, when a secondary side break or stuck open valve could result in the rapid depressurization of the steam line(s). In MODES 1 and 2, and in MODE 3, when above the P-11 setpoint, this signal is automatically disabled and the Steam Line Pressure-Low signal is automatically enabled. The Steam Line Isolation Function is required to be OPERABLE 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 primary and secondary sides to have an SLB or other accident that would result in a release of significant enough quantities of energy to cause a cooldown of the RCS.

5. Turbine Trip and Feedwater Isolation

~~The primary functions of the Turbine Trip and Feedwater Isolation signals 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.~~

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

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.

Replace With INSERT C2

Turbine Trip and Feedwater Isolation signals are both 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. Feedwater Isolation signals are also generated by a reactor trip (P-4) coincident with T_{avg}-Low and on a high water level in the reactor building doghouse. 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 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

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

OPERABLE channels are required to satisfy the requirements with a two-out-of-four logic. The setpoints are based on percent of narrow range instrument span.

c. Turbine Trip and Feedwater Isolation-Safety Injection

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.

d. Turbine Trip and Feedwater Isolation - RCS T_{avg}- Low coincident with Reactor Trip (P-4)

Replace With INSERT C2

This signal only initiates a Feedwater Isolation. The signal provides protection against excessive cooldown, which could subsequently introduce a positive reactivity excursion after a plant trip. There are four channels of RCS T_{avg} - Low (one per loop), with a two-out-of-four logic required coincident with a reactor trip signal (P-4) to initiate a feedwater isolation. The P-4 interlock is discussed in Function 8.a.

e. Turbine Trip and Feedwater Isolation - Doghouse Water Level - High High

This signal initiates a Feedwater Isolation. The signal terminates forward feedwater flow in the event of a postulated pipe break in the main feedwater piping in the doghouses to prevent flooding safety related equipment essential to the safe shutdown of the plant. The level instrumentation consists of two level switches (one per train) in each of the two reactor building doghouses. A high-high level detected by one-out-of-two switches, in either the inboard or outboard doghouse, will initiate a doghouse isolation. This signal initiates Feedwater Isolation for the

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

specific doghouse where the High-High level is detected and trips both main feedwater pumps thus causing a main turbine trip.

f. Turbine Trip and Feedwater Isolation - Trip of all Main Feedwater Pumps

This signal only initiates a Turbine Trip. The signal trips the main turbine to limit the loss of steam generator water level upon a loss of normal feedwater. Three oil pressure switches are provided on each main feedwater pump trip oil system. A low pressure in two-out-of-three switches on both main feedwater pumps will initiate a turbine trip.

Turbine Trip and Feedwater Isolation Functions must be OPERABLE in MODES 1 and 2 except when all MFIVs, MFCVs, 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 generator are not in service and this Function is not required to be OPERABLE.

Replace with INSERT C2

6. Auxiliary Feedwater

The AFW System is designed to provide a secondary side heat sink for the reactor in the event that the MFW System is not available. The system has two motor driven pumps and a turbine driven pump, making it available during normal and accident operation. The normal source of water for the AFW System is the condensate storage system (not safety related). A low suction pressure to the AFW pumps will automatically realign the pump suctions to the Nuclear Service Water System (NSWS)(safety related). The AFW System is aligned so that upon a pump start, flow is initiated to the respective SGs immediately.

5. Turbine Trip and Feedwater Isolation

The primary functions of the Turbine Trip and Feedwater Isolation signals are to prevent damage to the turbine due to water in the steam lines, stop the excessive flow of feedwater into the SGs, and to limit the energy released into containment. 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. Feedwater Isolation serves to limit the energy released into containment upon a feedwater line or steam line break inside containment.

The Functions are 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.

Turbine Trip and Feedwater Isolation signals are both 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. A Feedwater Isolation signal is also generated by a reactor trip (P-4) coincident with T_{avg}-Low. 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

(1) Turbine Trip-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.

INSERT C2 – Page 2 of 3

(2) Turbine Trip-Steam Generator Water Level-High High (P-14)

This signal prevents damage to the turbine due to water in the steam lines. The ESFAS SG water level 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. The setpoints are based on percent of narrow range instrument span.

(3). Turbine Trip-Safety Injection

Turbine Trip is also initiated by all Functions that initiate SI. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements. Item 5.a.(1) is referenced for the applicable MODES.

The Turbine Trip Function must be OPERABLE in MODES 1 and 2. In lower MODES, the turbine generator is not in service and this Function is not required to be OPERABLE.

b. Feedwater Isolation

(1) 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.

(2) Feedwater Isolation-Steam Generator Water Level-High High (P-14)

This signal provides protection against excessive feedwater flow. The ESFAS SG water level 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. The setpoints are based on percent of narrow range instrument span.

(3) Feedwater Isolation-Safety Injection

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. Item 5.b.(1) is referenced for the applicable MODES.

(4) Feedwater Isolation - RCS T_{avg}- Low coincident with Reactor Trip (P-4)

This signal provides protection against excessive cooldown, which could subsequently introduce a positive reactivity excursion after a plant trip. There are four channels of RCS T_{avg} - Low (one per loop), with a two-out-of-four logic required coincident with a reactor trip signal (P-4) to initiate a feedwater isolation. The P-4 interlock is discussed in Function 8.a.

The Feedwater Isolation Function must be OPERABLE in MODES 1 and 2 and also in MODE 3 (except for the functions listed in Table 3.3.2-1). Feedwater Isolation is not required OPERABLE when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve. In lower MODES, the MFW System is not in service and this Function is not required to be OPERABLE.

SES

ABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

d. Auxiliary Feedwater-Loss of Offsite Power

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 essential service bus. Loss of power to either essential service bus will start the turbine driven and motor driven AFW pumps 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.

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. 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.

e. Auxiliary Feedwater-Trip of All Main Feedwater Pumps

A Trip of all MFW pumps is an 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 three pressure switches on the trip oil system. A low pressure signal from two-out-of-three of these pressure switches indicates a trip of that pump. Three OPERABLE channels per pump satisfy redundancy requirements with two-out-of-three logic. A trip of all MFW pumps starts the motor driven AFW pumps to ensure that at least one SG is available with water to act as the heat sink for the reactor. This function 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 an

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

accident. In MODES 3, 4, and 5, the MFW pumps may be normally shut down, and thus neither pump trip is indicative of a condition requiring automatic AFW initiation.

f. Auxiliary Feedwater-Pump Suction Transfer on Suction Pressure-Low

A low pressure signal in the AFW pump suction line protects the AFW pumps against a loss of the normal supply of water for the pumps, the condensate storage system. Three pressure switches per train are located on the AFW pump suction line from the condensate storage system. A low pressure signal sensed by two-out-of-three switches will align their train related motor driven AFW pump and the turbine driven AFW pump to the assured water supply (NSWS). The NSWS (safety grade) is then lined up to supply the AFW pumps to ensure an adequate supply of water for the AFW System to maintain at least one of the SGs as the heat sink for reactor decay heat and sensible heat removal.

two

This Function must be OPERABLE in MODES 1, 2, and 3 to ensure a safety grade supply of water for the AFW System to maintain the SGs as the heat sink for the reactor. This Function does 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 automatic suction transfer does not need to be OPERABLE because RHR will already be in operation, or sufficient time is available to place RHR in operation, to remove decay heat.

7. Automatic Switchover to Containment Sump

At the end of the injection phase of a LOCA, the RWST will be nearly empty. Continued cooling must be provided by the ECCS to remove decay heat. The source of water for the ECCS pumps is automatically switched to the containment recirculation sump. The low head residual heat removal (RHR) pumps and containment spray pumps draw the water from the containment recirculation sump, the RHR pumps pump the water through the RHR heat exchanger, inject the water back into the RCS, and supply the cooled water to the other ECCS pumps. Switchover from the

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

RWST to the containment sump must occur before the RWST empties to prevent damage to the RHR pumps and a loss of core cooling capability.

a. Automatic Switchover to Containment Sump-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. Automatic Switchover to Containment Sump-Refueling Water Storage Tank (RWST) Level-Low Coincident With Safety Injection

During the injection phase of a LOCA, the RWST is the source of water for all ECCS pumps. A low level in the RWST coincident with an SI signal provides protection against a loss of water for the ECCS pumps and indicates the end of the injection phase of the LOCA. The RWST is equipped with four level transmitters. These transmitters provide no control functions. Therefore, a two-out-of-four logic is adequate to initiate the protection function actuation. Although only three channels would be sufficient, a fourth channel has been added for increased reliability.

Replace With INSERT C3

Automatic switchover occurs only if the RWST low level signal is coincident with SI. This prevents accidental switchover during normal operation. Accidental switchover could damage ECCS pumps if they are attempting to take suction from an empty sump. The automatic switchover Function requirements for the SI 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.

INSERT C3

Since an inadvertent switchover to the containment sump could have a significant safety impact, this instrumentation is placed in a bypass condition for testing. Therefore, four channels are supplied such that, during testing, the remaining three channels could perform the intended function, and no single failure could result in either a failure to accomplish the intended function, or in an inadvertent switchover to the containment sump.

ACTIONS (continued)

- Phase B Isolation; and
- Automatic Switchover to Containment Sump.

This action addresses the train orientation of the SSPS and the master and slave relays. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (12 hours total time) and in MODE 5 within an additional 30 hours (42 hours total time). The 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.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. The Required Actions are not required to be met during this time, unless the train is discovered inoperable during the testing. This allowance is based on the reliability analysis assumption of WCAP-10271-P-A (Ref. 7) that 4 hours is the average time required to perform channel surveillance.

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

Condition D applies to:

- Containment Pressure-High;
- Pressurizer Pressure-Low;
- Steam Line Pressure-Low;
- Steam Line Pressure-Negative Rate-High;
- Loss of offsite power; ~~and~~
- SG Water level—Low Low; and
- SG Water level - High High (P-14) for the Feedwater Isolation Function.

ACTIONS (continued)

Functions, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. In MODE 4, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

G.1 and G.2

Condition G applies to manual initiation of Steam Line Isolation.

This action addresses the operability of the manual steam line isolation function for each individual main steam isolation valve. If a channel is inoperable, 48 hours is allowed to return it to an OPERABLE status. If the train cannot be restored to OPERABLE status, the Conditions and Required Actions of LCO 3.7.2, "Main Steam Isolation Valves," must be entered for the associated inoperable valve. The specified Completion Time is reasonable considering that there is a system level manual initiation train for this Function and the low probability of an event occurring during this interval.

, Feedwater Isolation,

H.1, H.2.1 and H.2.2

Condition H applies to the automatic actuation logic and actuation relays for the Steam Line Isolation and AFW actuation Functions.

The action addresses the train orientation of the SSPS and the master and slave relays for these functions. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly

ACTIONS (continued)

manner and without challenging unit systems. Placing the unit in MODE 4 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 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

I.1 and I.2

Condition I applies to the automatic actuation logic and actuation relays for the Turbine Trip and Feedwater Isolation Function.

This action addresses the train orientation of the SSPS and the master and slave relays for this Function. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the following 6 hours. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit 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 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

ACTIONS (continued) for the Turbine Trip Function

J.1 and J.2

Condition J applies to:

- SG Water Level—High High (P-14); and
- T_{avg}-Low.

If one channel is inoperable, 6 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition where one-out-of-three logic will result in actuation. The 6 hour Completion Time is justified in Reference 7. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to place the inoperable channel in the tripped condition, and the 4 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 7.

K.1 and K.2

Condition K applies to the Turbine Trip and AFW pump start on trip of all MFW pumps.

This action addresses the auto start function of the AFW System and Turbine Trip function on loss of all MFW pumps. The OPERABILITY of the AFW System must be assured by allowing automatic start of the AFW System pumps. If a channel is inoperable, 1 hour is allowed to return it to an OPERABLE status or to place the channel in trip. If the function cannot be returned to an OPERABLE status or placed in a trip condition, 6 hours are allowed to place the unit in MODE 3. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above.

ACTIONS (continued)

L.1

Condition L applies to the Doghouse Water Level - High High.

The failure of one channel in either reactor building doghouse results in a loss of redundancy for the function and possible feedwater isolation (depending on the failed status of the channel). This requires the unit be placed in MODE 3 within 6 hours.

The allowed Completion Time is reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, this Function is no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 2 hours for surveillance testing of other channels.

M.1, M.2.1 and M.2.2

Condition M applies to the Auxiliary Feedwater Pumps Suction Transfer on Suction Pressure Low.

If one channel is inoperable, 1 hour is allowed to restore the channel to OPERABLE status or to place it in the tripped condition. The failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-three configuration that satisfies redundancy requirements.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 1 hour requires the unit to be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 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. In MODE 4, this Function is no longer required OPERABLE.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.3

SR 3.3.2.3 is the performance of a TADOT every 31 days. This test is a check of the Loss of Offsite Power Function. Each Function is tested up to, and including, the master transfer relay coils.

This test also includes trip devices that provide actuation signals directly to the SSPS. The SR is modified by a Note that excludes final actuation of pumps and valves to minimize plant upsets that would occur. The Frequency is adequate based on operating experience, considering instrument reliability and operating history data.

SR 3.3.2.4

SR 3.3.2.4 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 check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity. This test is performed every 31 days on a STAGGERED TEST BASIS. The time allowed for the testing (4 hours) and the surveillance interval are justified in Reference 7.

SR 3.3.2.5

SR 3.3.2.5 is the performance of a COT.

A COT is performed on each required channel to ensure the channel will perform the intended Function. The tested portion of the loop must trip within the Allowable Values specified in Table 3.3.1-1.

The setpoint shall be left set consistent with the assumptions of the setpoint methodology.

The Frequency of 92 days is justified in Reference 7.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.11

SR 3.3.2.11 is the performance of a COT on the NSWS Suction Transfer - Low Pit Level.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.2-1. This test is performed every 18 months. The Frequency is adequate based on operating experience.

REFERENCES

1. UFSAR, Chapter 6.
2. UFSAR, Chapter 7.
3. UFSAR, Chapter 15.
4. IEEE-279-1971.
5. 10 CFR 50.49.
6. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
7. WCAP-10271-P-A, Supplement 1 and Supplement 2, Rev. 1, May 1986 and June 1990.
8. WCAP-13632-P-A Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements" Sep., 1995.
9. WCAP-14036-P-A Revision 1, "Elimination of Periodic Protection Channel Response Time Tests" Oct., 1998.

Place INSERT C4 Here

INSERT C4

SR 3.3.2.12

SR 3.3.2.12 is the performance of an ACTUATION LOGIC TEST on the NSWS Suction Transfer-Emergency Low Pit Level.

An ACTUATION LOGIC TEST to satisfy the requirements of GL 96-01 is performed on each NSWS Pit Suction Transfer instrumentation to ensure all combinations will initiate a transfer to the SNSWP. This test is performed every 18 months. The Frequency is adequate based on operating experience.

Attachment 3

Catawba Units 1 and 2 Technical Specifications

Reprinted Pages

Remove	Insert
3.3.2-5	3.3.2-5
3.3.2-10	3.3.2-10
3.3.2-13	3.3.2-13
3.3.2-14	3.3.2-14
3.3.2-15	3.3.2-15
B3.3.2-19 thru B3.3.2-30	B3.3.2-19 thru B3.3.2-30
B3.3.2-33	B3.3.2-33
B3.3.2-36 thru B3.3.2-47	B3.3.2-36 thru B3.3.2-48

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. One channel inoperable.	J.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
	OR	
	J.2 Be in MODE 3.	12 hours
K. One Main Feedwater Pumps trip channel inoperable.	K.1 Place channel in trip.	1 hour
	OR	
	K.2 Be in MODE 3.	7 hours
L. Not Used.		

(continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.8	----------NOTE---------- Verification of setpoint not required for manual initiation functions. ---------- Perform TADOT.	18 months
SR 3.3.2.9	----------NOTE---------- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	18 months
SR 3.3.2.10	----------NOTE---------- Not required to be performed for the turbine driven AFW pump until 24 hours after SG pressure is $\geq$ 600 psig. ---------- Verify ESFAS RESPONSE TIMES are within limit.	18 months on a STAGGERED TEST BASIS
SR 3.3.2.11	Perform COT.	18 months
SR 3.3.2.12	Perform ACTUATION LOGIC TEST.	18 months

Table 3 3 2-1 (page 3 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
4. Steam Line Isolation (continued)						
(2) Negative Rate - High	3(b)(c)	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	≤ 122.8(d) psi	100(d) psi
5 Turbine Trip and Feedwater Isolation						
a Turbine Trip						
(1) Automatic Actuation Logic and Actuation Relays	1,2	2 trains	I	SR 3 3.2.2 SR 3.3 2 4 SR 3.3 2.6	NA	NA
(2) SG Water Level-High-High (P-14)	1,2	4 per SG	J	SR 3 3 2.1 SR 3 3.2 2 SR 3.3 2 4 SR 3.3 2.5 SR 3 3 2 6 SR 3 3 2.9 SR 3 3 2.10	≤ 85.6% (Unit 1) ≤ 78 9% (Unit 2)	83 9% (Unit 1) 77.1% (Unit 2)
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements. See Item 5.a (1) for Applicable MODES.					
b. Feedwater Isolation						
(1) Automatic Actuation Logic and Actuation Relays	1,2(e),3(e)	2 trains	H	SR 3 3.2 2 SR 3.3 2 4 SR 3.3 2 6	NA	NA

(continued)

(b) Except when all MSIVs are closed and de-activated.

(c) Trip function automatically blocked above P-11 (Pressurizer Pressure) interlock and may be blocked below P-11 when Steam Line Isolation Steam Line Pressure - Low is not blocked.

(d) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(e) Except when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

Table 3 3.2-1 (page 4 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
(2) SG Water Level- High High (P-14)	1,2(e),3(e)	4 per SG	D	SR 3 3 2.1 SR 3.3.2.2 SR 3 3.2.4 SR 3 3.2.5 SR 3 3.2 6 SR 3.3.2 9 SR 3.3 2.10	≤ 85 6% (Unit 1) ≤ 78.9% (Unit 2)	83.9% (Unit 1) 77.1% (Unit 2)
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements See Item 5.b (1) for Applicable MODES.					
(4) Tavg-Low	1,2(e)	4	J	SR 3 3 2.1 SR 3 3.2.5 SR 3 3.2.9	≥ 561°F	564°F
coincident with Reactor Trip, P-4	Refer to Function 8.a (Reactor Trip, P-4) for all initiation functions and requirements.					
6 Auxiliary Feedwater						
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	H	SR 3 3 2.2 SR 3.3 2.4 SR 3 3 2 6	NA	NA
b. SG Water Level - Low Low	1,2,3	4 per SG	D	SR 3 3.2.1 SR 3 3.2 5 SR 3 3 2.9 SR 3.3 2.10	≥ 9% (Unit 1) ≥ 35.1% (Unit 2)	10.7% (Unit 1) 36.8% (Unit 2)
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
d. Loss of Offsite Power	1,2,3	3 per bus	D	SR 3.3 2.3 SR 3.3 2.9 SR 3 3 2.10	≥ 3242 V	3500 V
e Trip of all Main Feedwater Pumps	1,2	3 per pump	K	SR 3 3 2.8 SR 3 3.2.10	NA	NA
f Auxiliary Feedwater Pump Train A and Train B Suction Transfer on Suction Pressure - Low	1,2,3	3 per train	M	SR 3 3 2.8 SR 3.3 2.10	A) ≥ 9.5 psig B) ≥ 5 2 psig (Unit 1) ≥ 5.0 psig (Unit 2)	A) 10.5 psig B) 6 2 psig (Unit 1) 6.0 psig (Unit 2)

(continued)

(e) Except when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

Table 3 3.2-1 (page 5 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
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	1,2,3,4	4	N	SR 3.3 2.1 SR 3 3 2.7 SR 3 3 2.9 SR 3 3 2.10	≥ 162.4 inches	177.15 inches
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
8 ESFAS Interlocks						
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	F	SR 3 3 2 8	NA	NA
b Pressurizer Pressure, P-11	1,2,3	3	O	SR 3.3 2.5 SR 3.3 2.9	≥ 1944 and ≤ 1966 psig	1955 psig
c T_{avg} - Low Low, P-12	1,2,3	1 per loop	O	SR 3 3.2.5 SR 3 3 2.9	≥ 550°F	553°F
9. Containment Pressure Control System						
a Start Permissive	1,2,3,4	4 per train	P	SR 3 3 2.1 SR 3 3 2.7 SR 3 3 2 9	≤ 0 45 psid	0 4 psid
b Termination	1,2,3,4	4 per train	P	SR 3.3 2.1 SR 3.3 2.7 SR 3.3 2.9	≥ 0.25 psid	0 3 psid
10. Nuclear Service Water Suction Transfer - Low Pit Level	1,2,3,4	3 per pit	Q,R	SR 3.3.2.1 SR 3 3.2.9 SR 3 3 2.11 SR 3 3.2.12	≥ El. 555.4 ft	El. 557.5 ft

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

(2) Steam Line Pressure-Negative Rate-High

Steam Line Pressure-Negative Rate-High provides closure of the MSIVs for an SLB when less than the P-11 setpoint, to maintain at least one unfaulted SG as a heat sink for the reactor, and to limit the mass and energy release to containment. When the operator manually blocks the Steam Line Pressure-Low main steam isolation signal when less than the P-11 setpoint, the Steam Line Pressure-Negative Rate-High signal is automatically enabled. Steam Line Pressure-Negative Rate-High provides no input to any control functions. Thus, three OPERABLE channels are sufficient to satisfy requirements with a two-out-of-three logic on each steam line.

Steam Line Pressure-Negative Rate-High must be OPERABLE in MODE 3 when less than the P-11 setpoint, when a secondary side break or stuck open valve could result in the rapid depressurization of the steam line(s). In MODES 1 and 2, and in MODE 3, when above the P-11 setpoint, this signal is automatically disabled and the Steam Line Pressure-Low signal is automatically enabled. The Steam Line Isolation Function is required to be OPERABLE 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 primary and secondary sides to have an SLB or other accident that would result in a release of significant enough quantities of energy to cause a cooldown of the RCS.

5. Turbine Trip and Feedwater Isolation

The primary functions of the Turbine Trip and Feedwater Isolation signals are to prevent damage to the turbine due to water in the steam lines, stop the excessive flow of feedwater into the SGs, and to limit the energy released into containment. 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. Feedwater Isolation serves to limit the energy released into containment upon a feedwater line or steam line break inside containment.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The Functions are 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.

Turbine Trip and Feedwater Isolation signals are both 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. A Feedwater Isolation signal is also generated by a reactor trip (P-4) coincident with T_{avg}-Low. 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

(1) Turbine Trip-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.

(2) Turbine Trip-Steam Generator Water Level-High High (P-14)

This signal prevents damage to the turbine due to water in the steam lines. The ESFAS SG water level 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. The setpoints are based on percent of narrow range

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

instrument span.

(3) Turbine Trip-Safety Injection

Turbine Trip is also initiated by all Functions that initiate SI. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements. Item 5.a.(1) is referenced for the applicable MODES.

The Turbine Trip Function must be OPERABLE in MODES 1 and 2. In lower MODES, the turbine generator is not in service and this Function is not required to be OPERABLE.

b. Feedwater Isolation

(1) 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.

(2) Feedwater Isolation-Steam Generator Water Level-High High (P-14)

This signal provides protection against excessive feedwater flow. The ESFAS SG water level instruments provide input to the SG Water Level

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

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. The setpoints are based on percent of narrow range instrument span.

(3) Feedwater Isolation-Safety Injection

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. Item 5.b.(1) is referenced for the applicable MODES.

(4) Feedwater Isolation - RCS T_{avg}- Low coincident with Reactor Trip (P-4)

This signal provides protection against excessive cooldown, which could subsequently introduce a positive reactivity excursion after a plant trip. There are four channels of RCS T_{avg} - Low (one per loop), with a two-out-of-four logic required coincident with a reactor trip signal (P-4) to initiate a feedwater isolation. The P-4 interlock is discussed in Function 8.a.

The Feedwater Isolation Function must be OPERABLE in MODES 1 and 2 and also in MODE 3 (except for the functions listed in Table 3.3.2-1). Feedwater Isolation is not required OPERABLE when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve. In lower MODES, the MFW System is not in service and this Function is not required to be OPERABLE.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

6. Auxiliary Feedwater

The AFW System is designed to provide a secondary side heat sink for the reactor in the event that the MFW System is not available. The system has two motor driven pumps and a turbine driven pump, making it available during normal and accident operation. The normal source of water for the AFW System is the condensate storage system (not safety related). A low suction pressure to the AFW pumps will automatically realign the pump suctions to the Nuclear Service Water System (NSWS)(safety related). The AFW System is aligned so that upon a pump start, flow is initiated to the respective SGs immediately.

a. Auxiliary Feedwater-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. Auxiliary Feedwater-Steam Generator Water Level-Low Low

SG Water Level-Low Low provides protection against a loss of heat sink. A feed line break, inside or outside of containment, or a loss of MFW, would result in a loss of SG water level. SG Water Level-Low Low provides input to the SG 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. The setpoints are based on percent of narrow range instrument span.

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.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

c. Auxiliary Feedwater—Safety Injection

An SI signal 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 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 essential service bus. Loss of power to either essential service bus will start the turbine driven and motor driven AFW pumps to ensure that at least two SGs contain enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip.

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. 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.

e. Auxiliary Feedwater-Trip of All Main Feedwater Pumps

A Trip of all MFW pumps is an 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 three pressure switches on the trip oil system. A low pressure signal from two-out-of-three of these pressure switches indicates a trip of that pump. Three

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

OPERABLE channels per pump satisfy redundancy requirements with two-out-of-three logic. A trip of all MFW pumps starts the motor driven AFW pumps to ensure that at least two SGs are available with water to act as the heat sink for the reactor. This function must be OPERABLE in MODES 1 and 2. This ensures that at least two SGs are provided with water to serve as the heat sink to remove reactor decay heat and sensible heat in the event of an accident. In MODES 3, 4, and 5, the MFW pumps may be normally shut down, and thus neither pump trip is indicative of a condition requiring automatic AFW initiation.

f. Auxiliary Feedwater-Pump Suction Transfer on Suction Pressure-Low

A low pressure signal in the AFW pump suction line protects the AFW pumps against a loss of the normal supply of water for the pumps, the condensate storage system. Three pressure switches per train are located on the AFW pump suction line from the condensate storage system. A low pressure signal sensed by two-out-of-three switches will align their train related motor driven AFW pump and the turbine driven AFW pump to the assured water supply (NSWS). The NSWS (safety grade) is then lined up to supply the AFW pumps to ensure an adequate supply of water for the AFW System to maintain at least two of the SGs as the heat sink for reactor decay heat and sensible heat removal.

This Function must be OPERABLE in MODES 1, 2, and 3 to ensure a safety grade supply of water for the AFW System to maintain the SGs as the heat sink for the reactor. This Function does 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 automatic suction transfer does not need to be OPERABLE because RHR will already be in operation, or sufficient time is available to place RHR in operation, to remove decay heat.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

7. Automatic Switchover to Containment Sump

At the end of the injection phase of a LOCA, the RWST will be nearly empty. Continued cooling must be provided by the ECCS to remove decay heat. The source of water for the ECCS pumps is automatically switched to the containment recirculation sump. The low head residual heat removal (RHR) pumps and containment spray pumps draw the water from the containment recirculation sump, the RHR pumps pump the water through the RHR heat exchanger, inject the water back into the RCS, and supply the cooled water to the other ECCS pumps. Switchover from the RWST to the containment sump must occur before the RWST empties to prevent damage to the RHR pumps and a loss of core cooling capability.

a. Automatic Switchover to Containment Sump-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. Automatic Switchover to Containment Sump-Refueling Water Storage Tank (RWST) Level-Low Coincident With Safety Injection

During the injection phase of a LOCA, the RWST is the source of water for all ECCS pumps. A low level in the RWST coincident with an SI signal provides protection against a loss of water for the ECCS pumps and indicates the end of the injection phase of the LOCA. The RWST is equipped with four level transmitters. These transmitters provide no control functions. Since an inadvertent switchover to the containment sump could have a significant safety impact, this instrumentation is placed in a bypass condition for testing. Therefore, four channels are supplied such that, during testing, the remaining three channels could perform

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

the intended function, and no single failure could result in either a failure to accomplish the intended function, or in an inadvertent switchover to the containment sump.

Automatic switchover occurs only if the RWST low level signal is coincident with SI. This prevents accidental switchover during normal operation. Accidental switchover could damage ECCS pumps if they are attempting to take suction from an empty sump. The automatic switchover Function requirements for the SI 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.

These Functions must be OPERABLE in MODES 1, 2, 3, and 4 when there is a potential for a LOCA to occur, to ensure a continued supply of water for the ECCS pumps. 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 systems, pumps, and other equipment to mitigate the consequences of an abnormal condition or accident. System 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.

8. Engineered Safety Feature Actuation System Interlocks

To allow some flexibility in unit operations, several interlocks are included as part of the ESFAS. These interlocks permit the operator to block some signals, automatically enable other signals, prevent some actions from occurring, and cause other actions to occur. The interlock Functions back up manual actions to ensure bypassable functions are in operation under the conditions assumed in the safety analyses.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

a. Engineered Safety Feature Actuation System Interlocks—Reactor Trip, P-4

The P-4 interlock is enabled when a reactor trip breaker (RTB) and its associated bypass breaker is open. Operators are able to reset SI 60 seconds after initiation. If a P-4 is present when SI is reset, subsequent automatic SI initiations will be blocked until the RTBs have been manually closed. This Function allows operators to take manual control of SI systems after the initial phase of injection is complete while avoiding multiple SI initiations. The functions of the P-4 interlock are:

- Trip the main turbine;
- Isolate MFW with coincident low T_{avg};
- Prevent reactuation of SI after a manual reset of SI;
- Transfer the steam dump from the load rejection controller to the unit trip controller; and
- Prevent opening of the MFW isolation valves if they were closed on SI or SG Water Level—High High.

Each of the above Functions is interlocked with P-4 to avert or reduce the continued cooldown of the RCS following a reactor trip. An excessive cooldown of the RCS following a reactor trip could cause an insertion of positive reactivity with a subsequent increase in generated power. To avoid such a situation, the noted Functions have been interlocked with P-4 as part of the design of the unit control and protection system.

None of the noted Functions serves a mitigation function in the unit licensing basis safety analyses. Only the turbine trip Function is explicitly assumed since it is an immediate consequence of the reactor trip Function. Neither turbine trip, nor any of the other four Functions associated with the reactor trip signal, is required to show that the unit licensing basis safety analysis acceptance criteria are not exceeded.

The RTB position switches that provide input to the P-4 interlock only function to energize or de-energize or open or close contacts. Therefore, this Function has no adjustable

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

trip setpoint with which to associate a Trip Setpoint and Allowable Value.

This Function must be OPERABLE in MODES 1, 2, and 3 when the reactor may be critical or approaching criticality. This Function does not have to be OPERABLE in MODE 4, 5, or 6 because the main turbine, the MFW System, and the Steam Dump System are not in operation.

b. Engineered Safety Feature Actuation System Interlocks-Pressurizer Pressure, P-11

The P-11 interlock permits a normal unit cooldown and depressurization without actuation of SI or main steam line isolation. With two-out-of-three pressurizer pressure channels (discussed previously) less than the P-11 setpoint, the operator can manually block the Pressurizer Pressure-Low SI signal and the Steam Line Pressure-Low steam line isolation signal (previously discussed). When the Steam Line Pressure-Low steam line isolation signal is manually blocked, a main steam isolation signal on Steam Line Pressure-Negative Rate-High is enabled. This provides protection for an SLB by closure of the MSIVs. With two-out-of-three pressurizer pressure channels above the P-11 setpoint, the Pressurizer Pressure-Low SI signal and the Steam Line Pressure-Low steam line isolation signal are automatically enabled. The operator can also enable these trips by use of the respective manual reset buttons. When the Steam Line Pressure-Low steam line isolation signal is enabled, the main steam isolation on Steam Line Pressure-Negative Rate—High is disabled.

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 or main steam isolation. This Function does not have to be OPERABLE in MODE 4, 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 provides an arming signal to the Steam Dump System. On a

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

decreasing temperature, the P-12 interlock 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. These channels 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.

9. Containment Pressure Control System Permissives

The Containment Pressure Control System (CPCS) protects the Containment Building from excessive depressurization by preventing inadvertent actuation or continuous operation of the Containment Spray and Containment Air Return Systems when containment pressure is at or less than the CPCS permissive setpoint. The control scheme of CPCS is comprised of eight independent control circuits (4 per train), each having a separate and independent pressure transmitter and current alarm module. Each pressure transmitter monitors the containment pressure and provides input to its respective current alarm. The current alarms are set to inhibit or terminate containment spray and containment air return systems when containment pressure falls to or below 0.25 psig. The alarm modules switch back to the permissive state (allowing the systems to operate) when containment pressure is greater than or equal to 0.45 psig.

This function must be OPERABLE in MODES 1, 2, 3, and 4 when there is sufficient energy in the primary and secondary sides to pressurize containment following a pipe break. In MODES 5 and 6, there is insufficient energy in the primary and secondary sides to significantly pressurize the containment.

10. Nuclear Service Water System Suction Transfer – Low Pit Level

Upon an emergency low pit level signal from either NSWS pit, interlocks isolate the NSWS from Lake Wylie, align NSWS to the standby nuclear service water pond, close particular crossover

ACTIONS (continued)

- Phase B Isolation; and
- Automatic Switchover to Containment Sump.

This action addresses the train orientation of the SSPS and the master and slave relays. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The specified Completion Time is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be restored to OPERABLE status, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within an additional 6 hours (12 hours total time) and in MODE 5 within an additional 30 hours (42 hours total time). The 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.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. The Required Actions are not required to be met during this time, unless the train is discovered inoperable during the testing. This allowance is based on the reliability analysis assumption of WCAP-10271-P-A (Ref. 7) that 4 hours is the average time required to perform channel surveillance.

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

Condition D applies to:

- Containment Pressure-High;
- Pressurizer Pressure-Low;
- Steam Line Pressure-Low;
- Steam Line Pressure-Negative Rate-High;
- Loss of offsite power;
- SG Water level—Low Low; and
- SG Water level—High High (P-14) for the Feedwater Isolation Function.

ACTIONS (continued)

Functions, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. In MODE 4, the unit does not have any analyzed transients or conditions that require the explicit use of the protection functions noted above.

G.1 and G.2

Condition G applies to manual initiation of Steam Line Isolation.

This action addresses the operability of the manual steam line isolation function for each individual main steam isolation valve. If a channel is inoperable, 48 hours is allowed to return it to an OPERABLE status. If the train cannot be restored to OPERABLE status, the Conditions and Required Actions of LCO 3.7.2, "Main Steam Isolation Valves," must be entered for the associated inoperable valve. The specified Completion Time is reasonable considering that there is a system level manual initiation train for this Function and the low probability of an event occurring during this interval.

H.1, H.2.1 and H.2.2

Condition H applies to the automatic actuation logic and actuation relays for the Steam Line Isolation, Feedwater Isolation, and AFW actuation Functions.

The action addresses the train orientation of the SSPS and the master and slave relays for these functions. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly

ACTIONS (continued)

manner and without challenging unit systems. Placing the unit in MODE 4 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 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

I.1 and I.2

Condition I applies to the automatic actuation logic and actuation relays for the Turbine Trip Function.

This action addresses the train orientation of the SSPS and the master and slave relays for this Function. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the following 6 hours. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit 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 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 7) assumption that 4 hours is the average time required to perform channel surveillance.

ACTIONS (continued)

J.1 and J.2

Condition J applies to:

- SG Water Level—High High (P-14) for the Turbine Trip Function; and
- T_{avg}-Low.

If one channel is inoperable, 6 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition where one-out-of-three logic will result in actuation. The 6 hour Completion Time is justified in Reference 7. Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit to be placed in MODE 3 within the following 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, these Functions are no longer required OPERABLE.

The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to place the inoperable channel in the tripped condition, and the 4 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 7.

K.1 and K.2

Condition K applies to the AFW pump start on trip of all MFW pumps.

This action addresses the auto start function of the AFW System on loss of all MFW pumps. The OPERABILITY of the AFW System must be assured by allowing automatic start of the AFW System pumps. If a channel is inoperable, 1 hour is allowed to return it to an OPERABLE status or to place the channel in trip. If the function cannot be returned to an OPERABLE status or placed in a trip condition, 6 hours are allowed to place the unit in MODE 3. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above.

ACTIONS (continued)

L.1

Not Used.

M.1, M.2.1 and M.2.2

Condition M applies to the Auxiliary Feedwater Pumps Suction Transfer on Suction Pressure Low.

If one channel is inoperable, 1 hour is allowed to restore the channel to OPERABLE status or to place it in the tripped condition. The failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-three configuration that satisfies redundancy requirements.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 1 hour requires the unit to be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 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. In MODE 4, this Function is no longer required OPERABLE.

N.1, N.2.1 and N.2.2

Condition N applies to:

- RWST Level—Low Low Coincident with Safety Injection.

RWST Level—Low Low Coincident With SI provides actuation of switchover to the containment sump. Note that this Function requires the bistables to energize to perform their required action. The failure of up to two channels will not prevent the operation of this Function. However, placing a failed channel in the tripped condition could result in a premature switchover to the sump, prior to the injection of the minimum volume from the RWST. Placing the inoperable channel in bypass results in a two-out-of-three logic configuration, which satisfies the requirement to allow another failure without disabling actuation of the switchover when required. Restoring the channel to OPERABLE status or placing the inoperable channel in the bypass condition within 6 hours is sufficient to ensure that the Function remains OPERABLE, and minimizes

ACTIONS (continued)

the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed high). The 6 hour Completion Time is justified in Reference 7. If the channel cannot be returned to OPERABLE status or placed in the bypass condition within 6 hours, the unit must be brought to MODE 3 within the following 6 hours and MODE 5 within the next 30 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. In MODE 5, the unit does not have any 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 placing a second channel in the bypass condition for up to 2 hours for surveillance testing. The total of 12 hours to reach MODE 3 and 2 hours for a second channel to be bypassed is acceptable based on the results of Reference 7.

O.1, O.2.1 and O.2.2

Condition O applies to the P-11 and P-12 interlocks.

With one channel inoperable, the operator must verify that the interlock is in the required state for the existing unit condition. This action manually accomplishes the function of the interlock. Determination must be made within 1 hour. The 1 hour Completion Time is equal to the time allowed by LCO 3.0.3 to initiate shutdown actions in the event of a complete loss of ESFAS function. If the interlock is not in the required state (or placed in the required state) for the existing unit condition, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 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. Placing the unit in MODE 4 removes all requirements for OPERABILITY of these interlocks.

P.1

Condition P applies to the Containment Pressure Control System Start and Terminate Permissives.

With one or more channels inoperable, the affected containment spray and containment air return systems components must be declared

ACTIONS (continued)

inoperable immediately. The supported system LCOs provide the appropriate Required Actions and Completion Times for the equipment made inoperable by the inoperable channel. The immediate Completion Time is appropriate since the inoperable channel could prevent the supported equipment from starting when required. Additionally, protection from an inadvertent actuation may not be provided if the terminate function is not OPERABLE.

Q.1, Q.2, Q.3.1, and Q.3.2

With one channel of NSWS Suction Transfer - Low Pit Level inoperable in one or more NSWS pits, 4 hours are allowed to place it in the tripped condition or align the NSWS to the Standby NSWS Pond. The failure of one channel places the Function in a two-out-of-two configuration. The failed channel must either be tripped to place the Function in a one-out-of-two configuration that satisfies redundancy requirements, or the NSWS realigned to fulfill the safety function.

Failure to place the channel in the tripped condition or to realign the NSWS suction and discharge within 4 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 5 within the next 30 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. In MODE 5, this Function is no longer required OPERABLE.

R.1, R.2.1, and R.2.2

With two or more channels of NSWS Suction Transfer - Low Pit Level inoperable in one or more pits, the NSWS must be aligned to the Standby NSWS Pond within 4 hours. Failure to accomplish the realignment within 4 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 5 within the next 30 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. In MODE 5, this Function is no longer required OPERABLE.

SURVEILLANCE REQUIREMENTS

The SRs for each ESFAS Function are identified by the SRs column of Table 3.3.2-1.

A Note has been added to the SR Table to clarify that Table 3.3.2-1 determines which SRs apply to which ESFAS Functions.

Note that each channel of process protection supplies both trains of the ESFAS. When testing channel I, train A and train B must be examined. Similarly, train A and train B must be examined when testing channel II, channel III, and channel IV (if applicable). The CHANNEL CALIBRATION and COTs are performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies.

SR 3.3.2.1

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

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including indication and reliability. 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.

SR 3.3.2.2

SR 3.3.2.2 is the performance of an ACTUATION LOGIC TEST. The SSPS is tested every 31 days on a STAGGERED TEST BASIS, using the semiautomatic tester. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the

SURVEILLANCE REQUIREMENTS (continued)

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 that there is an intact voltage signal path to the master relay coils. The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.3

SR 3.3.2.3 is the performance of a TADOT every 31 days. This test is a check of the Loss of Offsite Power Function. Each Function is tested up to, and including, the master transfer relay coils.

This test also includes trip devices that provide actuation signals directly to the SSPS. The SR is modified by a Note that excludes final actuation of pumps and valves to minimize plant upsets that would occur. The Frequency is adequate based on operating experience, considering instrument reliability and operating history data.

SR 3.3.2.4

SR 3.3.2.4 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 check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity. This test is performed every 31 days on a STAGGERED TEST BASIS. The time allowed for the testing (4 hours) and the surveillance interval are justified in Reference 7.

SR 3.3.2.5

SR 3.3.2.5 is the performance of a COT.

A COT is performed on each required channel to ensure the channel will perform the intended Function. The tested portion of the loop must trip within the Allowable Values specified in Table 3.3.2-1.

SURVEILLANCE REQUIREMENTS (continued)

The setpoint shall be left set consistent with the assumptions of the setpoint methodology.

The Frequency of 92 days is justified in Reference 7.

SR 3.3.2.6

SR 3.3.2.6 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation MODE is either allowed to function, or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation MODE is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing the slave relay. This test is performed every 92 days. The Frequency is adequate, based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.2.7

SR 3.3.2.7 is the performance of a COT on the RWST level and Containment Pressure Control Start and Terminate Permissives.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.1-1. This test is performed every 31 days. The Frequency is adequate, based on operating experience, considering instrument reliability and operating history data.

SR 3.3.2.8

SR 3.3.2.8 is the performance of a TADOT. This test is a check of the Manual Actuation Functions, AFW pump start on trip of all MFW pumps, AFW low suction pressure, Reactor Trip (P-4) Interlock, and Doghouse Water Level - High High Feedwater Isolation. It 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 (i.e., pump starts, valve cycles, etc.). The Frequency is adequate, based on industry operating experience and is

SURVEILLANCE REQUIREMENTS (continued)

consistent with the typical refueling cycle. The SR is modified by a Note that excludes verification of setpoints during the TADOT for manual initiation Functions. The manual initiation Functions have no associated setpoints.

SR 3.3.2.9

SR 3.3.2.9 is the performance of a CHANNEL CALIBRATION.

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 measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology.

The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology.

This SR is modified by a Note stating that this test should include verification that the time constants are adjusted to the prescribed values where applicable. The applicable time constants are shown in Table 3.3.2-1.

SR 3.3.2.10

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis. Response Time testing acceptance criteria are included in the UFSAR (Ref. 2). Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the Trip Setpoint value at the sensor, to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position).

For channels that include dynamic transfer functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer functions set to one with the resulting measured response time compared to the appropriate UFSAR response time. Alternately, the response time

SURVEILLANCE REQUIREMENTS (continued)

test can be performed with the time constants set to their nominal value provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) inplace, onsite, or offsite (e.g. vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements" provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. In addition, while not specifically identified in the WCAP, ITT Barton 386A and 580A-0 sensors were compared to sensors which were identified. It was concluded that the WCAP results could be applied to these two sensor types as well. Response time verification for other sensor types must be demonstrated by test.

WCAP-14036-P-A Revision 1, "Elimination of Periodic Protection Channel Response Time Tests" provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time. The allocations for sensor, signal conditioning and actuation logic response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. Specific components identified in the WCAP may be replaced without verification testing. One example where response time could be affected is replacing the sensing assembly of a transmitter.

ESF RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit

operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 600 psig in the SGs.

SR 3.3.2.11

SR 3.3.2.11 is the performance of a COT on the NSWS Suction Transfer - Low Pit Level.

A COT is performed on each required channel to ensure the entire channel will perform the intended Function. Setpoints must be found within the Allowable Values specified in Table 3.3.2-1. This test is performed every 18 months. The Frequency is adequate based on operating experience.

SR 3.3.2.12

SR 3.3.2.12 is the performance of an ACTUATION LOGIC TEST on the NSWS Suction Transfer-Emergency Low Pit Level.

An ACTUATION LOGIC TEST to satisfy the requirements of GL 96-01 is performed on each NSWS Pit Suction Transfer instrumentation to ensure all combinations will initiate a transfer to the SNSWP. This test is performed every 18 months. The Frequency is adequate based on operating experience.

REFERENCES

1. UFSAR, Chapter 6.

2. UFSAR, Chapter 7.

3. UFSAR, Chapter 15.

4. IEEE-279-1971.

5. 10 CFR 50.49.

6. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).

7. WCAP-10271-P-A, Supplement 1 and Supplement 2, Rev. 1, May 1986 and June 1990.

8. WCAP-13632-P-A Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements" Sep., 1995.

9. WCAP-14036-P-A Revision 1, "Elimination of Periodic Protection Channel Response Time Tests" Oct., 1998.

Attachment 4

No Significant Hazards Consideration Determination

The following discussion is a summary of the evaluation of the changes contained in this proposed amendment against the 10 CFR 50.92(c) requirements to demonstrate that all three standards are satisfied. A no significant hazards consideration is indicated if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated, or

2. Create the possibility of a new or different kind of accident from any accident previously evaluated, or

3. Involve a significant reduction in a margin of safety.

First Standard

Implementation of this amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated. Approval of this amendment will have no effect on accident probabilities or consequences. The proposed changes to Technical Specifications (TS) 3.3.2, Engineered Safety Features Actuation System (ESFAS), do not affect any accident initiating equipment. Therefore, there will be no impact on any accident probabilities caused by the NRC approval of this amendment. Additionally, since the design of the equipment is not being adversely modified by these proposed changes, there will be no impact on any accident consequences.

Second Standard

Implementation of this amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated. No new accident causal mechanisms are created as a result of the NRC approval of this license amendment request. No changes are being made to the plant that will introduce any new accident causal mechanisms. This amendment request does not impact any plant systems that are accident initiators; therefore, no new accident types are being created.

Attachment 4

No Significant Hazards Consideration Determination

Third Standard

Implementation of this amendment would not involve a significant reduction in a margin of safety. Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. The performance of these fission product barriers will not be impacted by implementation of this proposed amendment. The equipment referenced in the proposed change to TS 3.3.2 will remain capable of performing as designed. No safety margins will be impacted.

Conclusion

Based upon the preceding discussion, Duke Energy Corporation has concluded that this proposed amendment does not involve a significant hazards consideration.