Duke Power
A Duke Energy Company

D.M. JAMIL
Vice President

Duke Power
Catawba Nuclear Station
4800 Concord Rd. / CN01VP
York, SC 29745-9635

803 831 4251
803 831 3221 fax

January 28, 2004

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Corporation
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Proposed Technical Specifications Amendments
3.3.2, Engineered Safety Feature Actuation System
Instrumentation
TAC Nos. MC0498 and MC0499

Reference: Letter from NRC to Duke Energy Corporation, dated December 15, 2003

The reference letter transmitted a Request for Additional Information concerning a proposed Technical Specifications (TS) amendment request submitted by Duke Energy Corporation on August 19, 2003 and supplemented on October 23, 2003. The purpose of this letter is to respond to the reference request.

The attachment to this letter contains the request and the response. Each question in the request is restated and is followed by Catawba's response.

This response does not result in changes to the originally transmitted No Significant Hazards Consideration Analysis or Environmental Analysis.

There are no NRC commitments contained in this letter or its attachment.

Pursuant to 10 CFR 50.91, a copy of this letter is being sent to the appropriate state official.

Inquiries on this matter should be directed to L.J. Rudy at (803) 831-3084.

A001

Very truly yours,

Dhiaa M. Jamil

LJR/s

Attachment

Dhiaa M. Jamil, 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.

Dhiaa M. Jamil, Vice President

Subscribed and sworn to me: 1/28/04
Date

Notary Public

My commission expires: 1/17/2013
Date

SEAL

xc (with attachment):

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

E.F. Guthrie
Senior Resident Inspector (CNS)
U.S. Nuclear Regulatory Commission
Catawba Nuclear Station

S.E. Peters (addressee only)
NRC Project Manager (CNS)
U.S. Nuclear Regulatory Commission
Mail Stop O-8 G9
Washington, D.C. 20555-0001

H.J. Porter, Director
Division of Radioactive Waste Management
Bureau of Land and Waste Management
Department of Health and Environmental Control
2600 Bull St.
Columbia, SC 29201

ATTACHMENT

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

# REQUEST FOR ADDITIONAL INFORMATION

# DUKE POWER COMPANY

# CATAWBA NUCLEAR STATION, UNITS 1 AND 2

# DOCKET NOS. 50-413 AND 50-414

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal dated August 19, 2003, regarding proposed changes to the Technical Specifications for the Containment Pressure Control System (CPCS). The NRC staff has identified the following information that is needed to enable the continuation of its review.

1. Title 10 of the *Code of Federal Regulations,* Section 50.36(c)(1)(ii)(A), defines limiting safety system setting (LSSS) as a setting that must be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. The Improved technical specifications (TS) Bases define the allowable value (AV) to be equivalent to the LSSS and defines that a channel is operable if the trip setpoint is found not to exceed the AV during channel operational testing. Any request for safety-related instrument setpoint modification should provide a reference to the NRC approved setpoint methodology for the licensed plant as the basis for the modification. Provide the setpoint methodology reference for this TS amendment request. If you use method 3 specified in ISA S67.04.02, then confirm that a check calculation is performed to account for all loop uncertainty not measured during the Channel Operational Test/Channel Functional Test. Provide a sample calculation to demonstrate this.

**Duke Energy Corporation Response:**

**Although the CPCS is included in TS Table 3.3.2-1, Engineered Safety Feature Actuation System Instrumentation, it is technically not an ESFAS system. The purpose of the CPCS is to provide a**

start permissive such that ESFAS systems (Containment Spray System and Air Return System) can operate when required and to terminate their operation when not required. The Catawba Updated Final Safety Analysis Report (UFSAR) lists all of the ESFAS systems in Section 7.3, Engineered Safety Features Actuation System. The CPCS is not listed as an ESFAS in this UFSAR section. Rather, the CPCS is described in UFSAR Section 7.6, All Other Systems Required for Safety. Specifically, the CPCS is described in UFSAR Section 7.6.4, Containment Pressure Control System. In this section, the following statements are indicative of the fact that the CPCS is not an ESFAS. "The CPCS is designed such that it does not affect the accuracy, margin, or response of the ESFAS as the permissive setpoint is below the ESFAS setpoint for high containment pressure. Initiation of these engineered safety features is discussed in Section 7.3."

The NRC originally reviewed the design of the CPCS during the Catawba licensing process. NUREG-0954, "Safety Evaluation Report related to the operation of Catawba Nuclear Station, Units 1 and 2," February 1983, documented the results of the NRC review. The summary of the NRC review of the CPCS is contained in Section 7.3.2.10, Containment Pressure Control System, of this NUREG. In this section, the NRC required the TS to include the CPCS. The CPCS requirements were subsequently included in the original Catawba TS in the ESFAS section. Inclusion in this particular section was primarily for convenience, since the CPCS is associated with the ESFAS, although it itself is not an ESFAS.

10 CFR 50.36(c)(1)(ii)(A) defines limiting safety system settings. However, the CPCS is not directly associated with a LSSS, since the purpose of the CPCS is to only provide an enable/disable function for ESFAS equipment. The actual ESFAS equipment (Containment Spray System and Air Return System) actuates at a setpoint (high-high containment pressure of 3.0 psid) that is directly associated with a LSSS. The TS Bases definition of an allowable value cited in this NRC question

is intended to be a general statement with respect to ESFAS functions.

The setpoint calculation for the CPCS is independent of the setpoint calculations for ESFAS functions. The following Duke Energy Corporation document and industry standards were used in the development of the calculation and revision:

- Engineering Directive Manual (EDM-102) Instrument Setpoint/Uncertainty Calculations, Rev. 2
- ISA-S67.04, Part I, Setpoints for Nuclear Safety-Related Instrumentation, Approved September 1994
- ISA-RP67.04, Part II, Methodologies for the Determination of Setpoints for Nuclear Safety Related Instrumentation, Approved September 1994

Catawba does utilize method 3 specified in ISA S67.04.02 and has performed the check calculation described in this question. A sample calculation is provided at the end of the response to this Request for Additional Information.

2. In the submittal dated August 19, 2003, Attachment 3, Page 3, it states that the proposed solution to the CPCS circuit fluctuation problem will: 1) widen the deadband for the CPCS start permissive, and 2) narrow the span viewed by the CPCS pressure instrument. The proposed CPCS start permissive AV changed from $\leq$0.45 psid to $\leq$1.0 psid, and the Nominal Trip Setpoint changed from 0.4 psid to 0.9 psid. Additionally, the CPCS termination Nominal Trip Setpoint changed from 0.3 psid to 0.35 psid. Provide a summary of the setpoint calculation to demonstrate that the instrument uncertainties of the new pressure transmitters for the CPCS start permissive circuit will not affect any of the safety significant functions (i.e. to start containment spray), and the termination uncertainties will not cause the containment pressure to fall to the negative region.

Duke Energy Corporation Response:

The Containment Spray System and Air Return System setpoints do not occur until 3.0 psid, which is controlled from the Solid State Protection System. The start permissive setpoint of the CPCS will be revised to 0.9 psid and the termination setpoint of the CPCS will be revised to 0.35 psid. The start permissive allowable value of the CPCS will be revised to $\leq$ 1.0 psid. Given the following uncertainties, which were taken from the CPCS setpoint calculation, it is clear that the new transmitters will actually improve the accuracy of the instrumentation loop.

Old transmitter loop uncertainty:

Loss of Control Room TLUCAM(LOCR)
= ±0.21 psid

Worst Case Normal/Post Seismic TLUCAM(WCN)
= +0.24 psid, -0.29 psid

Design Basis Accident TLUCAM(DBA)
= +0.46 psid, -0.38 psid

New transmitter loop uncertainty:

Loss of Control Room TLUCAM(LOCR)
= ±0.09 psid

Worst Case Normal/Post Seismic TLUCAM(WCN)
= +0.10 psid, -0.11 psid

Design Basis Accident TLUCAM(DBA)
= +0.29 psid, -0.27 psid

Therefore, the above accuracy determination concludes that even with the revised start permissive and termination setpoints and the revised start permissive allowable value, the Containment Spray System and Air Return System setpoints of 3.0 psid and the containment design negative pressure of -1.5 psid will not be adversely impacted.

3. Please discuss any effects that the proposed changes will have on the containment safety analyses. If there are no changes to the containment safety analyses, please explain why this is so.

**Duke Energy Corporation Response:**

**The CPCS is in no way modeled in any Catawba safety analyses. The safety analyses model only the performance of the Containment Spray System and Air Return System equipment. The CPCS merely enables these systems to operate at the start permissive setpoint and disables their operation at the termination setpoint. The proposed start permissive (enable) setpoint of the CPCS (0.9 psid) is considerably below the high-high containment pressure setpoint at which the Containment Spray System and Air Return System are designed to function (3.0 psid). Similarly, the proposed terminate (disable) setpoint of the CPCS (0.35 psid) is considerably above the containment design negative pressure (-1.5 psid). Neither the CPCS start permissive setpoint nor the CPCS termination setpoint is explicitly modeled in the safety analyses because the relevant transients in UFSAR Section 6.2, Containment Systems, are not analyzed to the point where containment pressure decreases below 3.0 psid; no analysis credit is taken for their proper function.**

Sample Calculation for ISA S67.04.02, Method 3

The following check calculation comprises Section 7.4 of calculation CNC-1210.04-00-0081.

(Note: In the discussion below, Reference D.3 is procedure AP/1/A/5500/17, "Loss of Control Room", D.4 is procedure AP/2/A/5500/17, "Loss of Control Room", E.2 is TS Section 3.6.4, "Containment Pressure", F.2 is UFSAR Section 6.2.1, "Containment Functional Design", G.1 is CNS-1465.00-00-0014, "Plant Design Basis Specification for the Loss of Control Room", and G.2 is CNS-1563.NS-00-001, "Design Basis Specification for the Containment Spray (NS) System".

Original Calculation:

**7.4 Setpoint and Loop Indication Uncertainty Analysis**

**From Reference F.2, the Design Basis Accident internal, or positive, containment pressure is 15 psig. This is referred to here as the Positive Safety Limit, SL(Positive). Containment is tested to a pressure of 14.68 psig (Reference F.2), which is referred to here as the Positive Analytical Limit, AL(Positive). The peak containment pressure during an accident at Catawba, PPeak, has been calculated to be 12.26 psig (Reference F.2). To summarize:**

$$SL_{(Positive)} = 15.0 psig$$
$$AL_{(Positive)} = 14.68 psig$$
$$P_{(Positive)} = 12.26 psig$$

**This gives a Margin, M, from the analytical limit as follows:**

$$M = 14.68 psig - 12.26 psig = 2.42 psig$$

**From References F.2 and G.2, the external, or negative, containment design pressure is 1.5 psig negative. This is referred to here as the Negative Safety Limit, SL(Negative), and is also the Negative Analytical Limit, AL(Negative).**

$$SL_{(Negative)} = AL_{(Negative)} = -1.5 psig$$

7.4.1 Local Indication Total Loop Uncertainty

Local indication on the CPCS Control Panels is used during a LOCR event to provide indication of Containment Pressure (References D.3, D.4, and G.1). Reference E.2 requires containment pressure to be maintained between - 0.1 and + 0.3 psig during Modes 1, 2, 3, and 4. These two limits are referred to here as the Technical Specification limits, TSL's. The surveillance requires this determination to be made at least once per 12 hours (Reference E.2). As stated in Section 1.2, the indicators are used during a LOCR event to verify containment pressure is within the TSL's. Though the reactor is tripped and the unit is no longer in the applicable modes required by Technical Specifications during the event, containment pressure is still verified to be within the TSL's (References D.3, D.4 and G.1).

The maximum actual containment pressure at an indicated pressure of + 0.3 psig during a LOCR event is:

Maximum Actual LOCR Pressure = + 0.3 psig + 0.47 psig = + 0.77 psig.

Note that this is well within the positive analytical limit of + 14.68 psig.

The minimum actual containment pressure at an indicated pressure of 0.1 psig during a LOCR event is:

Maximum Actual LOCR Pressure = 0.1 psig + 0.47 psig = 0.57 psig.

Note that this is well within the negative analytical limit of 1.5 psig.

New Calculation:

7.4 Setpoint and Loop Indication Uncertainty Analysis

From Reference F.2, the Design Basis Accident internal, or positive, containment pressure is 15 psig. This is referred to here as the Positive Safety Limit, SL(Positive). Containment is tested to a pressure of 14.68 psig (Reference F.2), which is referred to here as the Positive Analytical Limit, AL(Positive). The peak containment pressure during an accident at Catawba, PPeak, has been calculated to be 12.26 psig (Reference F.2). To summarize:

$$SL_{(Positive)} = 15.0\,psig$$
$$AL_{(Positive)} = 14.68\,psig$$
$$P_{(Positive)} = 12.26\,psig$$

This gives a Margin, M, from the analytical limit as follows:

$$M = 14.68\,psig - 12.26\,psig = 2.42\,psig$$

From References F.2 and G.2, the external, or negative, containment design pressure is 1.5 psig negative. This is referred to here as the Negative Safety Limit, SL(Negative), and is also the Negative Analytical Limit, AL(Negative).

$$SL_{(Negative)} = AL_{(Negative)} = -1.5\,psig$$

### 7.4.1 Local Indication Total Loop Uncertainty

Local indication on the CPCS Control Panels is used during a LOCR event to provide indication of Containment Pressure (References D.3, D.4, and G.1). Reference E.2 requires containment pressure to be maintained between - 0.1 and + 0.3 psig during Modes 1, 2, 3, and 4. These two limits are referred to here as the Technical Specification limits, TSL's. The surveillance requires this determination to be made at least once per 12 hours (Reference E.2). As stated in Section 1.2, the indicators are used during a LOCR event to verify containment pressure is within the TSL's. Though the reactor is tripped and the unit is no longer in the applicable modes required by Technical Specifications during the event, containment pressure is still verified to be within the TSL's (References D.3, D.4 and G.1).

The maximum actual containment pressure at an indicated pressure of + 0.3 psig during a LOCR event is:

Maximum Actual LOCR Pressure = + 0.3 psig + 0.13 psig = + 0.43 psig.

Note that this is well within the positive analytical limit of + 14.68 psig.

The minimum actual containment pressure at an indicated pressure of 0.1 psig during a LOCR event is:

Minimum Actual LOCR Pressure = 0.1 psig + 0.13 psig = 0.23 psig.

Note that this is well within the negative analytical limit of 1.5 psig.