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CNS-17-039 10 CFR 50.55a

July 27, 2017

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Catawba Nuclear Station, Unit 1
Docket Number 50-413
Relief Request 17-CN-002
Request for Alternative Method to Establish New Inservice Testing Values for a Chemical and Volume Control Pump

Pursuant to 10 CFR 50.55a(z)(2), Duke Energy hereby requests NRC approval of an alternative method to establish new reference values for testing the Train A Unit 1, Chemical and Volume Control Pump (1NVPUACC) during the 4th 10-year inservice testing interval for Catawba Nuclear Station (CNS), Unit 1. The relief is requesting an exception from the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code requirement to perform a Group A pump test at the conditions of an existing set of reference values and the results analyzed prior to establishing new reference values for pump 1NVPUACC.

Due to the degraded condition of a manual isolation valve, re-creating the conditions of an existing set of reference values and the results analyzed to test pump 1NVPUACC, would put the plant at risk of an unnecessary plant shutdown. The valve lineup needed to accomplish an online repair of the valve is prohibited by Technical Specifications. The pump has had consistent acceptable performance with no indications of degradation. Thus compliance with the OM Code method for establishing a new set of reference values, creates a hardship without a compensating increase in quality and safety as described in the enclosed relief request.

Duke Energy requests approval of the proposed alternative by August 11, 2017, in support of the planned quarterly test that is due August 13, 2017, and no later than August 30, 2017, to avoid missing the "Late Date" (end of grace period for the test) which is September 5, 2017.

There are no regulatory commitments contained in this letter.

If you have any questions regarding this submittal, please contact Tolani E. Owusu at (803) 701-5385.

Sincerely,

Tom Simril
Vice President, Catawba Nuclear Station

Enclosure: Catawba Nuclear Station, Unit 1 Relief Request 17-CN-002 Proposed Alternative in Accordance with 10 CFR 50.55a(z)(2)

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ELL-EC02ZF

Enclosure

Catawba Nuclear Station, Unit 1

Relief Request 17-CN-002
Proposed Alternative in Accordance with 10 CFR 50.55a(z)(2)

Relief Request 17-CN-002
Proposed Alternative
in accordance with 10 CFR 50.55a(z)(2)

1. **ASME Code Component(s) Affected**

Train A Unit 1, Chemical and Volume Control Pump (1NVPUACC)
Flow Diagram: CN-1554-01.07
IST Pump Group: A
ASME Class: 2

2. **Component Function**

The accident mitigation function of the Chemical and Volume Control (NV) System is to provide high pressure injection and recirculation of borated water to the Reactor Coolant (NC) System as part of the Emergency Core Cooling System (ECCS) during a design basis accident. During an accident, the NV System is isolated except for the Centrifugal Charging Pumps (CCPs), Safety Injection (NI) and Reactor Coolant (NC) Pump seal injection flow paths.

There are three primary functions of the ECCS. These functions are: (1) removing stored and fission product decay heat, (2) controlling reactivity, and (3) precluding reactor vessel boron precipitation. The CCPs have the highest discharge pressure and are first to be effective in delivering flow to the NC System. Injection of borated water from the Refueling Water Storage Tank (FWST) continues and increases with any decrease in NC System pressure. As NC pressure is reduced, sequentially lower pressure portions of the ECCS become effective in delivering flow. The Design Basis Events which impose requirements on the design of the ECCS System are: Main Feedwater Line Rupture, Main Steamline Break (including spurious steam line valve openings), Steam Generator Tube Rupture, Loss of Coolant Accident - Small Break (including spurious pressurizer valve openings), Loss of Coolant Accident - Large Break, and Control Rod Drive Mechanism Rupture. The CCPs will start automatically on a Safety Injection or on a Loss of Offsite Power (LOOP) in order to accomplish their safety related function as part of the ECCS. The CCPs are sequenced onto the diesel generator on Load Group 2.

3. **Applicable Code Edition and Addenda**

ASME Operations and Maintenance Code (OM Code) 2004 through 2006 Addenda.

4. **Applicable Code Requirement:**

Establishment of Additional Set of Reference Values ASME OMb-2006, Section ISTB-3320; specifically, the requirement in paragraph one states: "If it is necessary or desirable, for some reason other than stated in ISTB-3310, to establish an additional set of reference values, a Group A or comprehensive test shall be run at the conditions of an existing set of reference values and the results analyzed."

Note: This relief is being requested to allow Catawba Nuclear Station Unit 1, to take a one-time exception from the requirements of performing the Group A test at an existing set of reference values for 1NVPUACC.

5. Reason for Request

During the Catawba Unit 1 Refueling Outage 23, (C1R23), the 1NVPUACC mini-flow isolation valve 1NV269 was identified to have a packing leak. Per that work order, the packing was adjusted (tightened) to eliminate leakage. Per the current test method and reference values, this manual isolation valve is closed during the quarterly 1NVPUACC inservice test to isolate the mini-flow line. Following the Unit 1 outage, when attempting to perform the first quarterly test on 6/23/17, the mini-flow valve was extremely difficult to operate, indicating binding in the packing or stem. The packing gland was re-adjusted (loosened) on 7/10/17, but the valve continues to be extremely difficult to operate and it is likely the valve problem makes it susceptible to getting stuck in the closed position. The inability to reopen the valve upon completion of future pump tests would result in entering a Technical Specification (TS) Limiting Condition for Operation (LCO) that requires shutdown within 72 hours. An online repair of the mini-flow isolation valve would require isolation that makes both CCP trains inoperable which is not allowed by TS in Modes 1-4. Therefore, this repair must be performed during an outage.

6. Proposed Alternative and Basis for Use:

Alternative Test Method
Catawba Nuclear Station proposes to establish an additional set of reference values for Group A testing of pump 1NVPUACC based on data analysis that shows acceptable performance, using prior performance data, in lieu of the OM Code requirement of performing a test at existing reference values prior to establishing additional reference values.

Per ASME OMb-2006, ISTB-3320, states that prior to establishing additional reference values, the licensee is to perform a Group A test at the existing set of reference values and analyze the results. Establishing the conditions for performing a test at the existing reference values will likely lead to a plant shutdown. Therefore, Catawba has performed an analysis of previous test data at the existing reference values in order to verify acceptable pump performance. This analysis provides the basis for establishing an additional set of reference values per ISTB-3300 (a) for a test configuration that does not challenge a plant shutdown.

Per ISTB-3300 (a), new reference values will be established by placing the pump in the appropriate alignment to establish the new desired test flow. Pump data will then be gathered at this new flow condition to establish the new reference values. The lower acceptable limit for differential pressure will be set at 2381 psid, as determined by the expected pump flow rate (approximately 150 GPM), which is more limiting than that of table ISTB-5121-1. Once the new reference conditions are established the first in-service test will be run at these reference conditions to verify the new reference conditions, per ISTB-3320.

Basis for Use

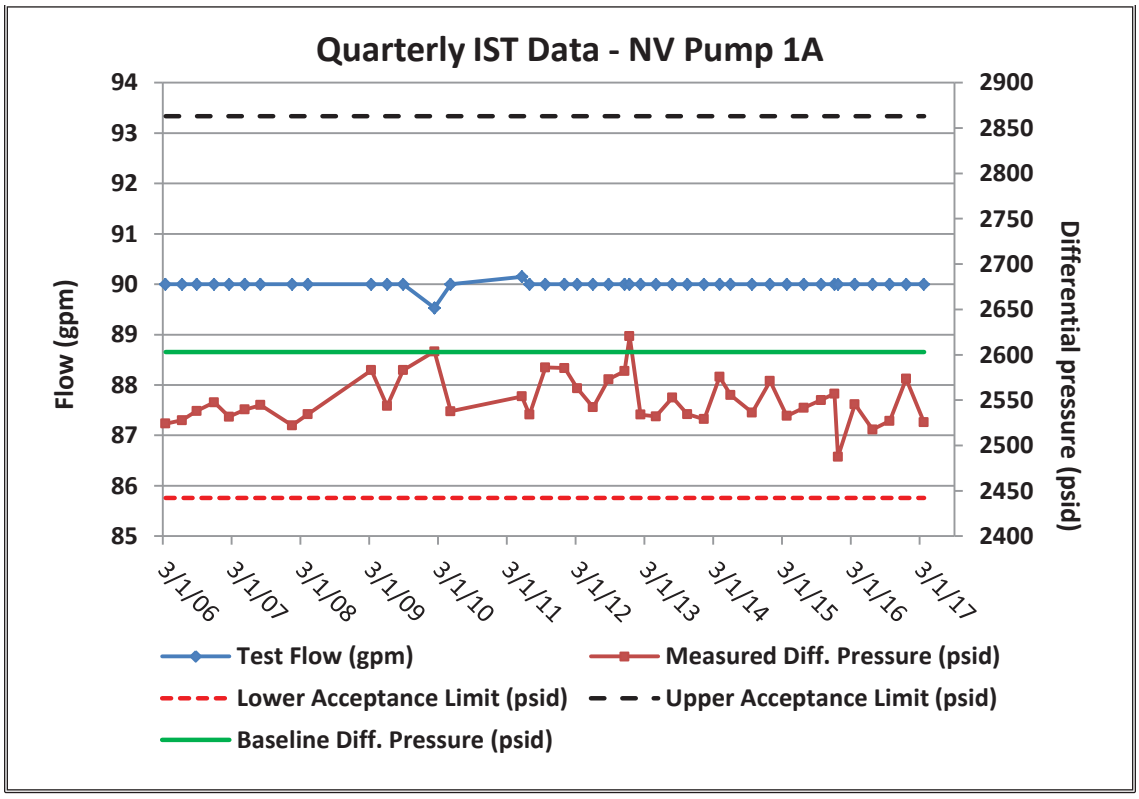
The relief is being requested for Catawba Nuclear Station Unit 1, to be excluded from the requirements of re-performing the Group A test at an existing set of reference values for pump 1NVPUACC. The equipment issue explained in Section 5, prevents the quarterly Group A test from being performed at the existing reference values, because there is a high potential that the mini-flow isolation valve would not be capable of reopening upon completion of the quarterly test. This would lead to a TS required shutdown of the Unit.

The current 1NVPUACC was installed in November 2000 and no work significantly affecting the hydraulic characteristics of the pump (dP/flow) has been performed. Trending data since 2006 (earliest electronic data available) indicates that pump 1NVPUACC performance has been steady and well within the limits of the IST requirements. See subsequent trending discussion below for

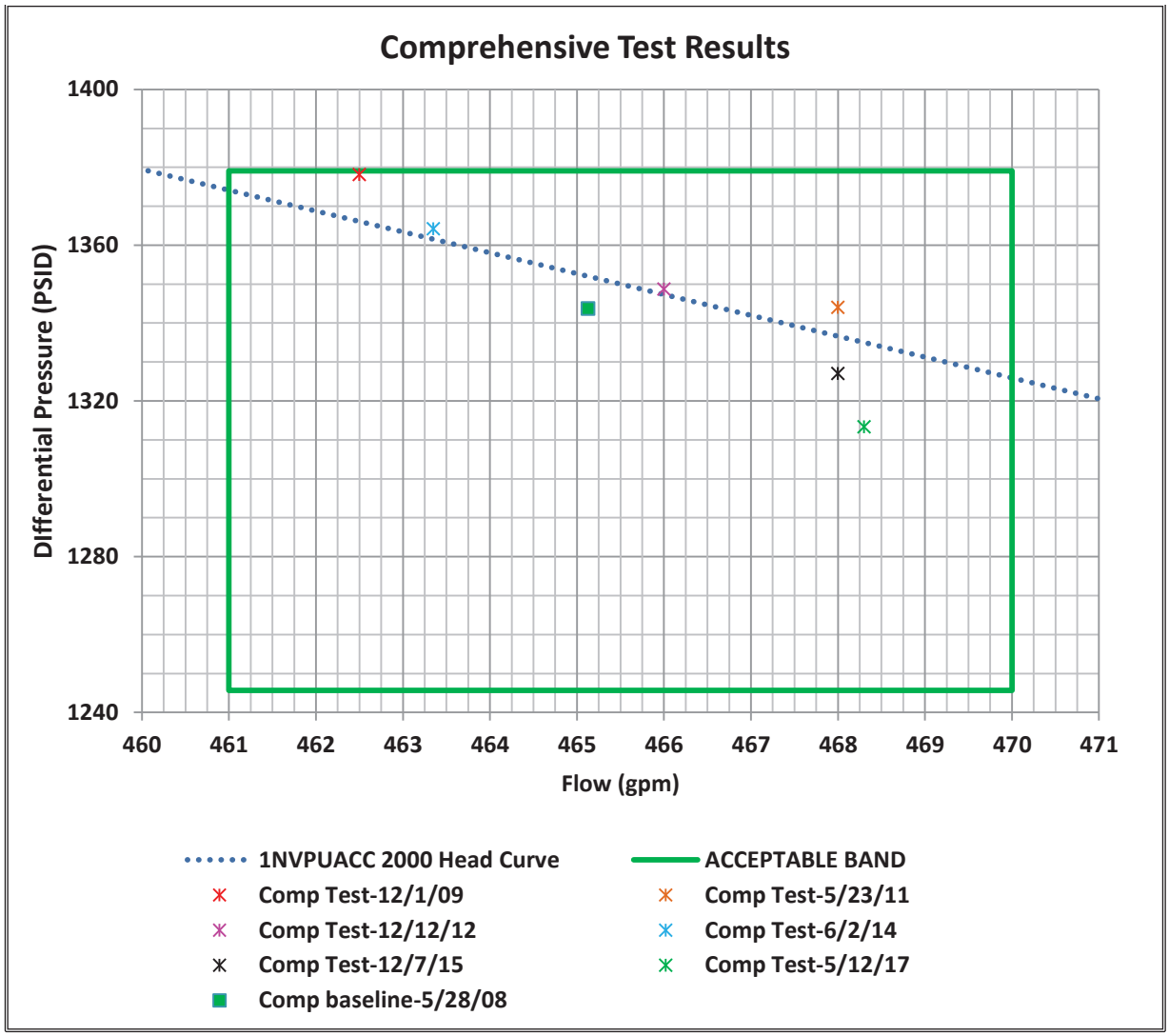
details. Additionally, as further evidence of no pump degradation since the last performance of the quarterly IST, Operations Rounds data was reviewed dating back to September 2016, and found that when pump flow was similar (dependent on Rx coolant system letdown), that the differential pressure was also very similar.

Pump Performance Data:

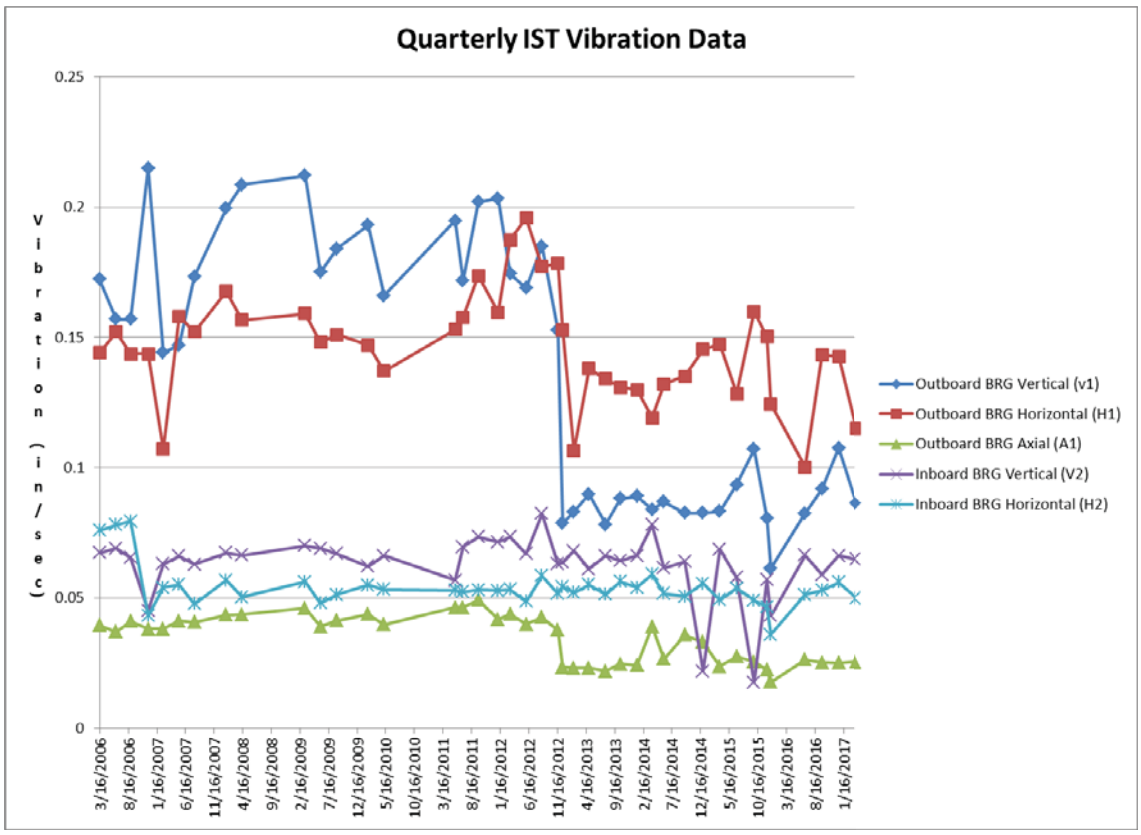
Quarterly Differential Pressure:. The lower limit for quarterly IST differential pressure (at the current 90 gpm flowrate) is 2442 psid, as established by the system flow requirements. The upper limit, established by table ISTB-5121-1, is 2863 psid. The data since 2006 indicates that pump differential pressure has been relatively steady, remaining between 2488 - 2620 psid, with an average of 2550 psid.



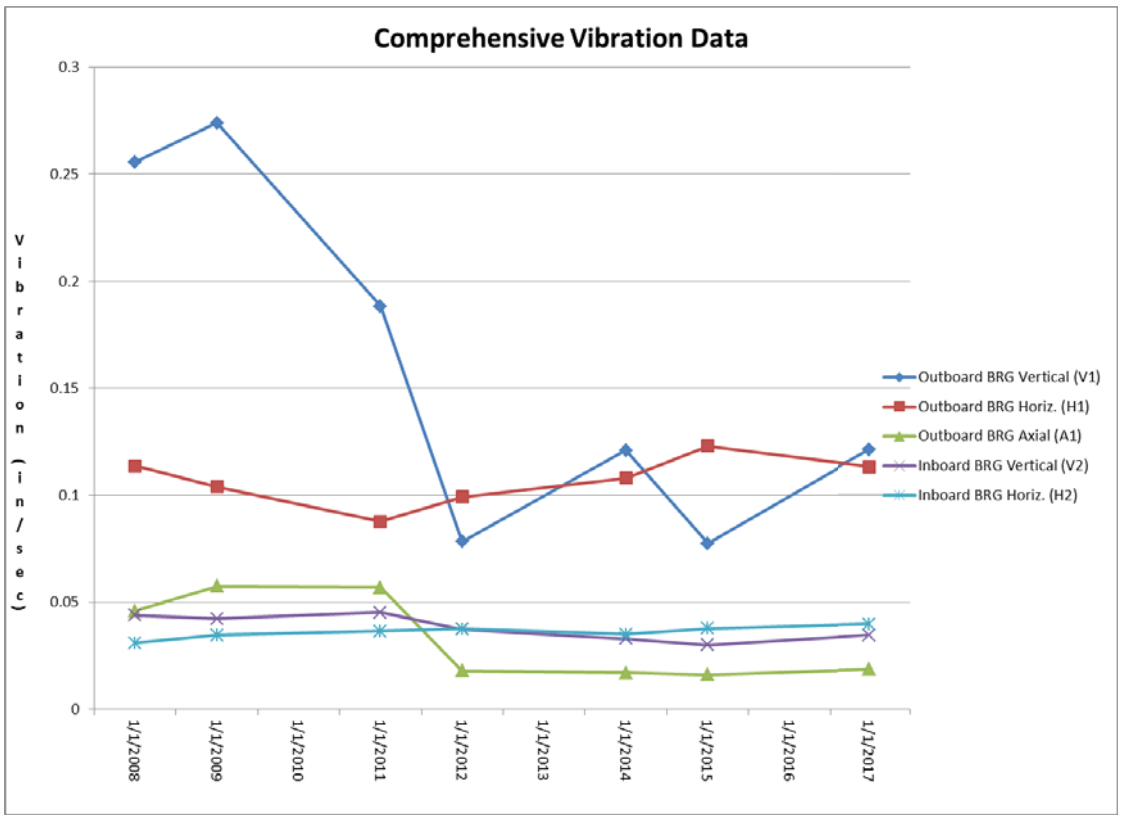
Comprehensive Differential Pressure (performed during refueling outages): The acceptable range for the comprehensive pump test, established via table ISTB-5121-1, is 1250 - 1384 psid at flows between 461 gpm and 470 gpm (see Green Box below). The data since 2008, when the current reference point was established indicates pump differential pressure remained within the acceptance range and within 15 to 20 psid of the pump curve.



Similarly, pump vibration readings over time indicate acceptable pump performance with no degrading trends. The relative reference values for vibration (only) were rebaselined once in 2012 due to a rebuild of the pump's mechanical seals and the gear drive .that improved vibration characteristics. Pump hydraulic performance was unaffected by the work so hydraulic reference values remained unchanged.



Current Vibration Alert Range Criteria (rebaselined in 2012)					
Measurement Location	Outboard BRG Vertical (V1)	Outboard BRG Horiz. (H1)	Outboard BRG Axial (A1)	Inboard BRG Vertical (V2)	Inboard BRG Horiz. (H2)
Quarterly Limit (inches/sec)	0.19625	0.26600	0.05825	0.15900	0.13550



Current Vibration Alert Range Criteria (rebaselined in 2012)					
Measurement Location	Outboard BRG Vertical (V1)	Outboard BRG Horiz. (H1)	Outboard BRG Axial (A1)	Inboard BRG Vertical (V2)	Inboard BRG Horiz. (H2)
Comprehensive Limit (inches/sec)	0.19600	0.24800	0.04475	0.09350	0.09375

7. Duration of Proposed Alternative

The Proposed Alternative will be utilized to establish an additional set of reference values for the 1NVPUACC. This condition is only intended to permit Catawba Unit 1 a one-time exception from the requirements to re-perform the quarterly Group A test prior to establishing new reference values. The licensee will return to the ASME OM Code specified test method for establishing additional sets of reference values following repair of the mini-flow isolation valve. Currently the next Catawba Unit 1 refueling outage C1R24, is scheduled to begin on November 17, 2018. For any subsequent performance test, any deviation in pump performance that exceeds the newly established acceptable limits will be evaluated in accordance with ISTB-6200, Corrective Action.

8. References:

a) Duke Energy, Catawba Nuclear Station ASME OM Code Inservice Testing Program, Revision 31, dated May 30, 2017

b) NEI white paper "Standard Format for Requests from Commercial Reactor Licensees Pursuant to

10CFR 50.55a" Revision 1 dated June 7, 2004.

c) Duke Energy Fleet Procedure AD-EG-ALL-1720 "Inservice Testing (IST) Program Implementation" Revision 02 dated February 2, 2017.

d) Technical Specification Surveillance Requirement 3.5.2

e) NCR-02124639/WR-20069989: 1NV-269, ACTIVE BORIC ACID LEAKAGE

f) NCR-02132906/WR-20076737: 1NV VA 0269: EXTREMELY DIFFICULT TO OPERATE

g) CNTC-1554-NV.P003-01: Catawba Nuclear Station, Unit 1 NV System Test Acceptance Criteria-NV (Centrifugal Charging) Pumps

h) CNS-1554.NV-00-0001: Design Basis Specification for the Chemical and Volume Control System (NV)