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CNS-18-031

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Catawba Nuclear Station, Unit 2
Docket Number 50-414
Notice of Enforcement Discretion (NOED) Request
Technical Specifications (TS):
TS 3.8.1, "AC Sources Operating" (primary TS)
TS 3.7.8, "Nuclear Service Water System (NSWS)" (secondary TS)
TS 3.7.5, "Auxiliary Feedwater (AFW) System" (secondary TS)
TS 3.6.6, "Containment Spray System" (secondary TS)

This document provides the background and technical information supporting the Duke Energy request for a Notice of Enforcement Discretion (NOED) associated with the 72 hour Completion Time of Technical Specifications (TS) TS 3.8.1, "AC Sources Operating," TS 3.7.8, "Nuclear Service Water System (NSWS)," TS 3.7.5, "Auxiliary Feedwater (AFW) System," and TS 3.6.6, "Containment Spray System," for Catawba Nuclear Station Unit 2.

This request concerns an extension of the TS Completion Time for 2A Diesel Generator (DG) inoperability from the current 72 hours by an additional 48 hours, for a total of 120 hours. The requested extension was necessary to restore the 2A DG to operable status. The 2A DG was declared inoperable on June 11, 2018, at 0408 hours Eastern Daylight Time (EDT) for planned maintenance. At 2111 EDT, during a scheduled surveillance test of the 2A DG, the output breaker 2ETA-18 tripped open, caused by actuation of Lockout Relay 86D. Failure of the surveillance test required additional troubleshooting and maintenance to return the 2A DG to operable. Absent enforcement discretion, the 2A DG would be required to enter the respective TS Limiting Condition for Operation (LCO) Required Actions for Unit 2 to be in Mode 3 on June 14, 2018, by 1008 hours. The details of this request are fully explained in the enclosure to this letter.

Duke Energy requests that the NRC grant discretion from enforcing the shutdown requirements of the above technical specifications. This request was discussed with the NRC staff in a telephone conference call on Thursday, June 14, 2018. The enforcement discretion was granted verbally by the NRC during the conference call at 0234 EDT. During this call, the NRC also agreed that a follow-up license amendment request is not

necessary. This submittal (i.e., letter and enclosure) fulfills the requirement to submit the written enforcement discretion request within two working days following NRC verbal approval of the NOED. The enclosure to this letter provides the information required by NRC Inspection Manual Chapter 0410, "Notices of Enforcement Discretion."

As shown in the enclosed justification, Duke Energy maintains that granting of enforcement discretion in this case is in the best interest of nuclear safety.

Duke Energy has reviewed NRC Inspection Manual Chapter 0410 and has concluded that Section 06.02a.1(a) is satisfied. Enforcement discretion is required to avoid an unnecessary downpower and shutdown of Unit 2, as a result of complying with the requirements of the above TS. Enforcement discretion would minimize potential safety consequences and operational risks.

This NOED request was reviewed and approved by the Catawba On-Site Review Committee on June 13, 2018. Catawba restored 2A DG operable status June 14, 2018, at 2106 hours and the LCOs for TS 3.8.1 and TS 3.7.8 were exited. The LCOs for TS 3.7.5 and TS 3.6.6 were exited at 2141 hours on June 14, 2018.

There are no regulatory commitments in this submittal.

Inquiries on this matter should be directed to Cecil Fletcher, Manager, Catawba Regulatory Affairs, at (803) 701-3622.

Sincerely,

Tom Simril

Tom Simril
Vice President, Catawba Nuclear Station

Enclosure

xc (with enclosure):

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**Enclosure**
**Catawba Nuclear Station, Unit 2**
**Request for Notice of Enforcement Discretion (NOED) Regarding Technical Specifications (TSs):**
**TS 3.8.1, "AC Sources - Operating" (Primary TS)**
**TS 3.7.8, "Nuclear Service Water System (NSWS)" (Secondary TS)**
**TS 3.7.5, "Auxiliary Feedwater (AFW) System" (Secondary TS)**
**TS 3.6.6, "Containment Spray System" (Secondary TS)**

## Background

Duke Energy requests that the NRC grant discretion from enforcing the shutdown requirements of TS 3.8.1 by extending the Completion Time for a period of time not to exceed 48 hours. This request was discussed with the NRC staff in a telephone conference call on Thursday, June 14, 2018. The enforcement discretion was granted verbally by the NRC during the conference call. This submittal (i.e., letter and enclosure) fulfills the requirement to submit the written enforcement discretion request within two working days following NRC verbal approval of the NOED.

This request concerns an extension of the TS Completion Times for 2A DG governed by the above TS. The issue necessitating this NOED request is the replacement of the Voltage Regulator and a silicon controlled rectifier (SCR) due to a maintenance induced failure that resulted in damage of the 2A DG Voltage Regulator circuitry. The subsequent maintenance and required testing associated with this activity cannot be completed within the Completion Time requirements of the above TS.

The following information is provided to address the items contained in Section 07 of NRC Inspection Manual Chapter 0410, "Notices of Enforcement Discretion."

The onsite standby power source for each 4160 volt Engineered Safety Features (ESF) bus at Catawba is a dedicated DG. For each unit, DGs A and B are dedicated to ESF buses ETA and ETB, respectively. Each DG starts automatically on a Safety Injection (SI) signal (i.e., low pressurizer pressure or high containment pressure) or on an ESF bus degraded voltage or undervoltage signal. After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage, independent of or coincident with an SI signal. With no SI signal, there is a ten-minute delay between the degraded voltage signal and the DG start signal. The DGs will also start and operate in the standby mode without tying to the ESF bus on an SI signal alone. Following the trip of offsite power, a sequencer strips loads from the ESF bus. When the DG is tied to the ESF bus, loads are then sequentially connected to its respective ESF bus by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading the DG by automatic load application.

In the event of a loss of preferred power, the ESF electrical loads are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a Design Basis Accident (DBA) such as a Loss of Coolant Accident (LOCA).

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Approximately one minute after the initiating signal is received, all loads needed to recover the unit or to maintain it in a safe condition are returned to service.

TS 3.8.1 governs the DGs. Limiting Condition for Operation (LCO) 3.8.1 requires two operable DGs for each unit that is in Modes 1, 2, 3, and 4. With one DG inoperable, the inoperable DG must be restored to operable status within 72 hours per Required Action B.4. If this is not accomplished, the unit must be placed in Mode 3 within 6 hours and in Mode 5 within 36 hours per Required Actions G.1 and G.2.

The Nuclear Service Water System (NSWS) provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, and a normal shutdown, the NSWS also provides this function for various safety related and non-safety related components.

The NSWS consists of two independent loops (A and B) of essential equipment. Each loop contains two NSWS pumps, each of which is supplied from a separate DG. Each set of two pumps supplies two trains (1A and 2A, or 1B and 2B) of essential equipment through common discharge piping. While the pumps are unit designated (i.e., 1A, 1B, 2A, 2B), all train-related pumps receive automatic start signals from a corresponding train-related Safety Injection (SI) or blackout signal from either unit. Therefore, a pump designated to one unit will supply post-accident cooling to equipment in that loop on both units. For example, the 1A NSWS pump, whose emergency power is supplied by 1A DG, will supply post-accident cooling to NSWS trains 1A and 2A.

The NSWS system is shared between the two units. The shared portions of the system must be operable for each unit when that unit is in the mode of applicability. Additionally, both normal and emergency power for shared components must also be operable. If a shared NSWS component becomes inoperable, or normal or emergency power to shared components becomes inoperable, then the required actions of the NSWS LCO must be entered independently for each unit that is in the mode of applicability of the LCO. If both units are in the mode of applicability with the NSWS operating in the normal dual supply and discharge header alignment, one unit may exit the LCO provided that unit's NSWS pump is operable and one unit's flow path to the non-essential header, AFW pumps, and Containment Spray System heat exchangers are isolated (or equivalent flow restrictions). In this case, sufficient flow is available, however, this configuration results in inoperabilities within other required systems on one unit and the associated required actions must be entered.

TS 3.7.8 governs the NSWS. LCO 3.7.8 requires two operable NSWS trains for each unit that is in Modes 1, 2, 3, and 4. With one NSWS train inoperable, the inoperable NSWS train must be restored to operable status within 72 hours per Required Action A.1. If this is not accomplished, the unit must be placed in Mode 3 within 6 hours and in Mode 5 within 36 hours per Required Actions D.1 and D.2. Thus, the LCO for TS 3.7.8 on Unit 1 can be met, while the Unit 2 LCO cannot be met, requiring an extension to the Completion Time.

The NSWS also supports the AFW and Containment Spray Systems since it serves as the assured water source for these systems. TS 3.7.5 governs the AFW System. LCO

3.7.5 requires three AFW trains to be operable in Modes 1, 2, and 3, and one motor-driven AFW train to be operable in Mode 4 when the steam generators are relied upon for heat removal. With one AFW train inoperable in Mode 1, 2, or 3 for reasons other than an inoperable steam supply to the turbine-driven AFW pump, the inoperable AFW train must be restored to operable status within 72 hours per Required Action B.1. If this is not accomplished, the unit must be placed in Mode 3 within 6 hours and in Mode 4 within 12 hours per Required Actions C.1 and C.2. TS 3.6.6 governs the Containment Spray System. LCO 3.6.6 requires two containment spray trains to be operable in Modes 1, 2, 3, and 4. With one containment spray train inoperable, the inoperable containment spray train must be restored to operable status within 72 hours per Required Action A.1. If this is not accomplished, the unit must be placed in Mode 3 within 6 hours and in Mode 5 within 84 hours per Required Actions B.1 and B.2.

**Need for Enforcement Discretion**

Enforcement discretion is needed to avoid an unnecessary shutdown of Catawba Unit 2 without a commensurate benefit in nuclear safety. NRC Inspection Manual Chapter 0410 indicates that, whenever possible, licensees should request an emergency license amendment in accordance with 10 CFR 50.91 rather than enforcement discretion. The guidance also indicates that the NRC will consider enforcement discretion on a case-by-case basis.

The 2A DG was declared inoperable on June 11, 2018, at 0408 hours. This inoperability was planned as part of scheduled maintenance activity. One of the major maintenance activities was Doble testing of the 2A DG Voltage Regulator components. During the post maintenance test, the 2A DG and associated breaker 2ETA-18 tripped on an actuation of Lockout Relay 86D when trying to load in parallel and therefore failed the post maintenance test.

During troubleshooting, two disconnected cables were identified in the Voltage Regulator circuitry. These two cables connect the current transformer to the linear reactor. The two cables were left disconnected from the linear reactor terminal during the current maintenance activities. There were no signs of the cables coming disconnected, as the same terminal where these two cables are landed had two other cables properly secured. The likely cause of the disconnected cables is a failure to properly reassemble the connection after maintenance.

During extent of damage visual inspections of the voltage regulator cabinet, evidence of arcing between a heat sink mounting screw and the heat sink for SCR1 was discovered. Under normal operation the distance between the heat sink and mounting screw is sufficient to prevent arcing or conduction. However, when the two cables were not terminated, they were allowed to ground against the DG control cabinet and resulted in arcing between the heat sink and mounting screw. This resulted in the need to replace the SCRs and Diodes.

The current transformer was replaced, the associated linear reactor was tested and found to be operating satisfactorily with no damage. The cables were re-landed per design drawings. The SCRs and diodes were replaced with new components. During the functional run, it was determined that the Voltage Regulator module was not operating correctly. Two of the three SCRs were not firing as required. These SCRs receive their firing signals from the Voltage Regulator module. Therefore, this indicates

that the extent of damage from the two cables that were left disconnected also resulted in damage to the Voltage Regulator module.

Specific NOED Criteria from NRC Inspection Manual Chapter 0410, Section 07:

1. **Specifically address what type of NOED is being requested (regular or natural event), which of the NOED criteria for appropriate plant conditions specified in subsection 03.03 of this guidance is satisfied, and how the licensee satisfied those criteria.**

   A regular NOED is being requested to avoid an unnecessary transient (shutdown) as a result of compliance with the TS. The requested enforcement discretion is not associated with a natural event. Compliance with the TS would result in an unnecessary shutdown of Catawba Unit 2 without a corresponding health and safety benefit. The proposed enforcement discretion request meets NOED criteria b in Section 03.03 of IMC 0410 by avoiding an unnecessary down-power and shutdown of a reactor without a corresponding health and safety benefit, and thus minimizes potential safety consequences and operational risks as a result of compliance with TS 3.8.1, Required Actions B.4 and G .

2. **Clearly identify the TS or other license conditions that will be violated.**

   Catawba is requesting enforcement discretion from TS 3.8.1, TS 3.7.8, TS 3.7.5, and TS 3.6.6 Completion Times as indicated.

   Without enforcement discretion, Catawba Unit 2 will have to enter TS 3.8.1 Condition G and TS 3.7.8 Condition D no later than Thursday, June 14, 2018, at 0408 hours, be in Mode 3 in 6 hours (i.e., by 1008 hours on Thursday, June 14, 2018), and be in Mode 5 in 36 hours (i.e., by 1608 hours on Friday June 15, 2018).

   Without enforcement discretion, Catawba Unit 2 will have to enter TS 3.7.5 Condition C no later than Thursday, June 14, 2018, at 0408 hours, be in Mode 3 in 6 hours (i.e., by 1008 hours on Thursday, June 14, 2018) and be in Mode 4 in 12 hours (i.e., by 1608 hours on Thursday, June 14, 2018).

   Without enforcement discretion, Catawba Unit 2 will have to enter TS 3.6.6 Condition B no later than Thursday, June 14, 2018, at 0408 hours, be in Mode 3 in 6 hours (i.e., by 1008 hours on Thursday, June 14, 2018), and be in Mode 5 in 84 hours (i.e., by 1608 hours on Sunday, June 17, 2018).

3. **Address the circumstances, surrounding the situation: including likely causes; the need for prompt action; action taken in an attempt to avoid the need for a NOED; and identification of any relevant historical events.**

   The 2A DG was declared inoperable on June 11, 2018, at 0408 hours. This inoperability was planned as part of scheduled maintenance activity. One of the major maintenance activities was Doble testing of the 2A DG Voltage Regulator

components. During the post maintenance test, the 2A DG and associated breaker 2ETA-18 tripped on an actuation of Lockout Relay 86D when trying to load in parallel for a surveillance run. This failure occurred at 2111 on June 11, 2018, approximately 17 hours into the 72 hour LCO.

Duke Energy has been engaged in troubleshooting and repair efforts since the output breaker tripped open, resulting in a trip of the 2A DG. A Unit Threat was declared for Unit 2 at approximately 2200 June 11, 2018.

During troubleshooting, two disconnected cables were identified in the Voltage Regulator circuitry. These two cables connect the current transformer to the linear reactor. The two cables were left disconnected from the linear reactor terminal during the current maintenance activities. There were no signs of the cables coming disconnected, as the same terminal where these two cables are landed, there are two other cables properly secured. The likely cause of the disconnected cables is a failure to properly reassemble the connection after maintenance.

During extent of damage visual inspections of the voltage regulator cabinet, evidence of arcing between a heat sink mounting screw and the heat sink for SCR1 was discovered. Under normal operation, the distance between the heat sink and mounting screw is sufficient to prevent arcing or conduction. However, when the two cables were not terminated, they were allowed to ground against the DG control cabinet and resulted in arcing between the heat sink and mounting screw. This resulted in the decision to proactively replace the SCRs and Diodes for the 2A DG.

The current transformer was replaced, and the associated linear reactor was tested and found to be operating satisfactorily with no damage. The cables were re-landed per design drawings. The SCRs and diodes were replaced with new components. During the functional run, it was determined that the Voltage Regulator module was not operating correctly. Two of the three SCRs were not firing as required. These SCRs receive their firing signals from the Voltage Regulator module. Therefore, this indicates that the extent of damage from the two cables that were left disconnected also resulted in damage to the Voltage Regulator module.

**4. Provide information to show that the cause of the situation leading to the NOED request is fully understood.**

Duke Energy has been engaged in repair efforts since the output breaker tripped open resulting in a trip of the 2A DG. A Unit Threat was declared at approximately 2200 on June 11, 2018.

The Failure Investigation Process (FIP) team developed a fault tree to determine possible failure modes and actions required. One failure mode included issues with the maintenance activities during Doble testing.

A walk down was completed to visually inspect the cable connections manipulated during the Doble testing. Two cables were found disconnected from the linear reactor terminal. These two cables connect to the current transformer. There were no signs of the cables coming disconnected as the same terminal, where these

two cables are landed, there are two other cables properly secured. The likely cause of the disconnected cables is a failure to properly reassemble the connection after maintenance.

During extent of damage visual inspections of the voltage regulator cabinet, evidence of arcing between a heat sink mounting screw and the heat sink for SCR1 was discovered. Under normal operation the distance between the heat sink and mounting screw is sufficient to prevent arcing or conduction. However, when the two cables were not terminated, they were allowed to ground against the DG control cabinet and resulted in arcing between the heat sink and mounting screw. This resulted in the decision to proactively replace the SCRs and Diodes.

After the discussed maintenance activities occurred and the 2A DG was started for the functional run, it was determined that the Voltage Regulator was not operating correctly. Two of the three SCRs were not firing as required. These SCRs receive their firing signals from the Voltage Regulator module. Therefore, this indicates that the extent of damage from the two cables that were left disconnected also resulted in damage to the Voltage Regulator module. Due to the extent of damage resulting from the disconnected cables that were not properly reassembled, it is known that the damage is contained within the 2A DG Voltage Regulator module.

**5. Provide detailed information on the proposed course of action and how it will resolve the situation and that it can be completed within the proposed NOED time frame.**

A work plan has been developed to return 2A DG to operable status. This work is being performed around the clock by a dedicated Unit Threat team. This will ensure that appropriate focus is placed on scheduling, prioritization, contingencies, and relief turnover. Senior Corporate and Site Management personnel will continue to closely monitor the work activities to assure prompt completion. Catawba has confidence that this plan will be successful in restoring 2A DG to an operable status within the additional 48 hours requested by this NOED. The course of action is as follows:

1) As a precaution, the current transformer was replaced to ensure the disconnected cable did not result in any damage.

2) The associated linear reactor was tested and found to be operating satisfactorily with no damage.

3) The cables were re-landed per design drawings. All other cables disconnected during the maintenance evaluation were verified to be connected properly.

4) Due to the potential damage to SCRs and Diodes, the decision was made to proactively replace the SCRs and Diodes with new components.

5) After the discussed maintenance activities occurred and the 2A DG was started for the functional run, it was determined that the Voltage Regulator module and SCR1 will need replaced.

6) Complete all required post-maintenance testing to ensure the Voltage Regulator module is operating correctly.

6. **Provide detailed information to show that the resolution itself does NOT or will NOT result in a different unnecessary transient.**

The planned resolution to the 2A DG inoperable condition is to replace the 2A DG Voltage Regulator module. Post-maintenance testing ensures proper operation of the 2A DG prior to being interfaced with the electrical distribution system and the testing will not perturb the electrical distribution system or result in any change in status of other plant systems.

7. **Explain why there is insufficient time to process an emergency TS or LAR or why a license amendment is NOT needed or required.**

The 2A DG was declared inoperable on June 11, 2018, at 0408 hours during scheduled maintenance. The 2A DG and associated breaker 2ETA-18 tripped on an actuation of Lockout Relay 86D when trying to load in parallel during the post maintenance test. This failure occurred at 2111 on June 11, 2018, approximately 17 hours into the 72 hour LCO. The LCO Completion Time for TS 3.8.1, Condition B, is 72 hours and ends on June 14, 2018, at 0408.

Duke Energy has been engaged in troubleshooting and repair efforts on a continuous basis since that time. By the time the condition with 2A DG was evaluated to determine the necessary repairs, there was insufficient time for Catawba to prepare, and the NRC to process and approve, an emergency TS amendment.

8. **Describe the condition and operational status of the plant, including safety-related equipment out of service or otherwise inoperable, and nonsafety-related equipment that is degraded or out of service that may have risk significance and that may increase the probability of a plant transient or may complicate the recovery from a transient or may be used to mitigate the condition.**

Catawba Units 1 and 2 are both in Mode 1 at 100% power operation. There is no safety related or risk significant non-safety related equipment inoperable which has a bearing on this NOED request. The 1A,1B, and 2B DGs are all fully operable. The common cause evaluation of the failure determined that no common mode failure mechanism exists on the 1A, 1B, and 2B DGs. A review of active TS action items and scheduled surveillances revealed the following equipment out of service:

Safety Equipment:

- The 1A Containment Valve Injection Water (NW) train is currently inoperable due to planned maintenance and expected to be operable by 0000 on 6/14/18.

9. **Provide a specific period for the NOED including a justification for the duration of the noncompliance.**

The TS 3.8.1, TS 3.7.8, TS 3.7.5, and TS 3.6.6 LCOs expire at 0408 on June 14, 2018. Up to 48 hours of extended Completion Time is being requested to complete operability surveillance requirements. This time is based on the work activities remaining to complete associated testing and inspections. The 2A DG is expected to become available by 0000 hours on June 15, 2018, followed by functional tests and an operability run. The 2A DG is expected to be declared operable by 0500 hours on June 15, 2018.

10. **Provide details and explain Compensatory Measures that have been taken AND will be taken to reduce the risk associated with the specific configuration.**

The following compensatory measure strategy will be employed:

- Defer non-essential surveillances or other maintenance activities on equipment required by TS and on risk significant equipment. This action reduces risk associated with the NOED extension period in that other risk significant equipment is not removed from service at the same time as 2A DG.

The following specific compensatory measures are being taken to reduce the risk during the NOED period:

- The full time response team will remain in place throughout the evolution and the remaining maintenance activities will be completed utilizing 24-hour coverage.
- The Standby Shutdown Facility (SSF) will be staffed. This action will improve the reliability of the SSF by reducing the time required to staff the SSF following an event. This action will improve the operator success probability for events such as fires by reducing the confusion/stress associated with the early stages of a fire. The operator will already be at the SSF and will not need to travel through the plant to the SSF.
- Dedicated operators will be assigned to: 1) transfer plant control from the control room to the SSF if necessary, and 2) transfer power for the hydrogen igniters from normal power to SSF power if necessary. These actions improve the operator success probability by designating the specific operators to perform the specific task. SSF and hydrogen igniters are important equipment identified in the risk analysis.
- The following equipment will be protected in accordance with station procedures and no surveillances or maintenance activities will be allowed except for emergent issues:
  - 2B DG and equipment supported by it
  - SSF
  - Unit 2 turbine-driven AFW pump
  - Switchyard and Unit 1 and Unit 2 main transformer yards

- Prior to entering the period of enforcement discretion, the operating crews will review the procedures governing operation of the SSF, operation of the Unit 2 turbine-driven AFW pump, tripping of the reactor coolant pumps, initiating reactor coolant system feed and bleed, and cross tying AC power between the units.
- Operations will contact the system dispatcher once per day to ensure no significant grid perturbations are expected and no planned switching actions in the Catawba switchyard.
- Closer controls over transient combustibles will be provided to reduce the contribution of these fire sources during the period of enforcement discretion. The Shift Technical Advisor will evaluate all transient combustible material requests and consult the site fire marshal and fire protection engineer for any increase in risk incurred. Based on this information, the Shift Manager will approve all transient combustible requests.
- Stage FLEX equipment for Auxiliary Feedwater recovery and battery life extension (The NRC agreed that this action was not needed prior to the initial LCO expiration, but as soon as possible after the expiration).

The additional administrative controls and dedicated operator measures will provide a measure of risk reduction, though not specifically quantified in the risk analysis.

**11. Discuss the status and potential challenges to off-site and on-site power sources including any current or planned maintenance to the emergency diesel generators or other emergency power source.**

Currently, the grid is stable. No challenges to grid stability are expected as a result of severe weather or other events. Switchyard or grid work that would impact the grid reliability will be restricted during the NOED period. PCB-16 (a non-Unit Tie PCB) in the CNS switchyard, is currently removed from service for scheduled maintenance. If PCB-16 becomes available during the NOED period switching will be delayed until 2A DG is available.

The 1A, 1B, and 2B DGs are fully operable. No elective maintenance or testing activities will be allowed on these components during the NOED period.

**12. Provide the safety basis for the request, including an evaluation of the safety significance and potential consequences of the proposed course of action:**

***Use the zero maintenance PRA model to establish baseline risk and the estimated risk increase (incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP)) associated with the period of enforcement discretion.***

The Catawba no-maintenance Probabilistic Risk Assessment (PRA) model was solved accounting for the unavailability of 2A DG and the isolation of Nuclear Service Water (NSWS) to Auxiliary Feedwater (AFW) as the assured source.

Based on this analysis, the Increase in Conditional Core Damage Probability (ICCDP) and the Increase in Conditional Large Early Release Probability (ICLERP) have been evaluated for a potential NOED duration of 48 hours as shown below:

| | |
|---|---|
| ICCDP | 3E-7 |
| ICLERP | 4E-8 |

The above values include internal events, internal flooding, and fire events. High wind and tornado event frequencies were maintained at their nominal values. The above values are less than the guidance thresholds of 5E-7 for ICCDP and 5E-8 ICLERP for the period of enforcement discretion.

***Discuss the dominant risk contributors (cut sets/sequences) and summarize the risk insights for the plant-specific configuration the plant intends to operate in during the period of enforcement discretion.***

Large Early Release Frequency (LERF) is the limiting risk metric and dominated by two type of events. The first type are containment bypass sequences involving SGTR initiating events where normal condensate suction sources are depleted and the Auxiliary Feedwater (CA) Assured Suction Valve is isolated. The second type are early containment failures caused by loss of offsite power (LOOP) events. With the 2A DG unavailable, the 2B DG fails either due to common cause or independent reasons leading to a station blackout. Recovery using the SSF fails due to equipment failure or operator error. Hot leg creep rupture occurs or a seal LOCA develops. Loss of the hydrogen igniters due to loss of power leads to containment failure and a large early release should there be a hydrogen detonation.

The dominant contributors to core damage frequency CDF are switchyard-centered LOOP events and LOOP events induced by tornado strikes. With the 2A DG unavailable, the 2B DG fails either due to common cause or independent reasons leading to a station blackout. The turbine driven CA pump or SSF fail due to equipment failure or operator error that leads to core damage.

***Explain compensatory measures that will be taken to reduce the risk associated with the specified condition.***

See response to Number 10.

***Discuss the extent of condition of the failed or unavailable component(s) to other trains/divisions of equipment and what adjustments, if any, to the PRA common cause factors have been made to account for potential increases in the failure probabilities.***

An evaluation was performed to consider whether the failure or degradation mechanisms that may be indicated on the 2A DG could be present on any of the other DGs at the Catawba site (i.e., the 1A,1B, or 2B DGs). This evaluation determined that no common mode failure concerns exist for the other DGs.

Based on the known extent of condition, this issue is limited to 2A DG. However, to account for uncertainty, the 2B DG failure probability was conservatively increased to the DG common cause beta factor value in the risk analysis.

***Discuss external event risk for the specified plant configuration.***

External events (fire and internal flood) are accounted for in the PRA models with the exception of seismic events and external flooding. Although no severe weather conditions are forecast for the Catawba site during the extension period, high wind and tornado event frequencies were maintained at their nominal values. The seismic results typically are not sensitive to unavailability of individual components and the seismic contribution is judged to be insignificant relative to the non-seismic contribution. This assumption is further supported because the seismic Initiating Event Frequency (IEF) is less than the loss of offsite power IEF. The external flooding has been evaluated as not a hazard requiring evaluation based upon the predicted weather during the NOED time frame.

**13. Provide risk information to demonstrate that the NOED condition, along with any compensatory measures, will NOT result in more than a minimal increase in radiological risk, either in a quantitative assessment that risk will be within the normal work control levels (ICCDP less than or equal to 5E-7 or ICLERP less than or equal to 5E-8) or in a defensible qualitative manner.**

The results meet the criteria of NRC Inspection Manual Chapter 0410 with the additional 48 hours of Completion Time. Continued operation of the unit during the period of enforcement discretion will not cause risk to exceed the level determined acceptable during normal work controls and therefore there is not a net increase in the radiological risk to the public.

As noted, the increase in conditional core damage probability (ICCDP) and the increase in conditional large early release probability (ICLERP) are below the guideline of 5.0E-7 (ICCDP) and 5.0E-8 (ICLERP) when considering the entire enforcement discretion period requested.

**14. Discuss forecasted weather and pandemic conditions for the NOED period and any plant vulnerabilities related to weather or pandemic conditions.**

The weather forecast for the area is as follows:

- **Wednesday Night:** mostly cloudy, lows around 70. Southwest winds around 5 mph. Chance of rain 30 percent
- **Thursday:** Partly sunny. A chance of showers and thunderstorms in the afternoon. Humid with highs in the lower 90s. Northwest winds around 5 mph. Chance of rain 40 percent. Thursday night, Mostly cloudy with a chance of showers and thunderstorms. Lows in the upper 60s. Northeast winds around 5 mph. Chance of rain 40 percent.

- **Friday:** Mostly sunny. Highs in the lower 90s. Friday night, mostly cloudy with a chance of showers and thunderstorms. Lows in the upper 60s. Chance of rain 40 percent.
- **Saturday:** Mostly sunny with a chance of showers and thunderstorms. Highs around 90. Change of rain 40 percent. Saturday night, partly cloudy. A change of showers and thunderstorms in the evening. Lows in the lower 70s. Chance of rain 30 percent.

Overall, there is only a slight chance of thunderstorms in the York area including the city of Rock Hill area during the NOED period. Tornadoes are unlikely. Conditions do not appear to be conducive for tornado development.

There is no threat of pandemic conditions during the proposed duration of the enforcement discretion.

**15. Describe the basis for the conclusion that the noncompliance will not create undue risk to public health and safety.**

Duke Energy has evaluated the proposed request and determined that it involves no significant hazards considerations. According to 10 CFR 50.92, "Issuance of amendment," paragraph (c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

(A) Involve a significant increase in the probability or consequences of an accident previously evaluated;

(B) Create the possibility of a new or different kind of accident from any accident previously evaluated;

(C) Involve a significant reduction in a margin of safety

In support of this determination, an evaluation of each of the three criteria set forth in 10 CFR 50.92 is provided below regarding the proposed action.

(A) The request for enforcement discretion does not involve a significant increase in the probability of occurrence or consequences of any accident previously evaluated

The probability of occurrence of an accident will not be significantly affected by granting this enforcement discretion. As discussed in Item 13 above, the requested period for enforcement discretion does not significantly increase the total base case CDF or LERF values. The ICCDP calculated for the requested 48 hour enforcement discretion period is 3E-7 which is below the 5E-07 threshold. The ICLERP calculated for the 48 hour enforcement discretion period is 4E-8, which is below the 5E-08 threshold.

(B) The request for enforcement discretion does not create the possibility of a new or different kind of accident from any accident previously evaluated.

As a result of this request for enforcement discretion, no new equipment is being introduced, and installed equipment is not being operated in a different manner. There are no changes being made to the parameters within which the unit is operated, and similarly, no setpoints at which protective or mitigative actions are initiated are affected. This request for enforcement discretion does not alter the manner in which equipment operation is initiated, and demands on credited equipment will not change. No alteration in the procedures that ensure the unit remains within analyzed limits is proposed, and no change is being made to procedures relied upon to respond to an off-normal event. As such, no new failure modes are being introduced. The proposed action does not alter assumptions made in the safety analysis. Therefore, the request for enforcement discretion does not create the possibility of a new or different kind of accident from any accident previously evaluated.

(C) The request for enforcement discretion does not involve a significant reduction in a margin of safety

Based on the operability of 2B DG and offsite power sources, the accident analysis assumptions continue to be met for the proposed period of enforcement discretion. Similarly, the system's design and operation are not affected by proposed period of enforcement discretion, and the safety analysis acceptance criteria are not altered by the proposed changes. Finally, the proposed compensatory measures will provide assurance that no significant reduction in safety margin occurs.

Based on the above, the extended Completion Time will not create undue risk to public health and safety.

The results meet the criteria of NRC Inspection Manual Chapter 0410 for 48 hours. Continued operation of the unit during the period of enforcement discretion will not cause risk to exceed the level determined acceptable during normal work controls and therefore there is not a net increase in the radiological risk to the public.

**16. Describe the basis for the conclusion that the noncompliance will not involve adverse consequences to the environment.**

This request for enforcement discretion does not result in any significant changes in the types, or significant increase in the amounts, of any effluents that may be released offsite. In addition, no significant increase in individual or cumulative occupational radiation exposures is involved as a result of the request. Therefore, it can be concluded that the NRC's granting of this request for enforcement discretion does not involve any adverse consequences to the environment.

**17. Include a statement that the request has been reviewed and approved by the ORC).**

The requested NOED was reviewed and approved by the Catawba Plant On-Site Review Committee (ORC) on June 13, 2018.

**18. Provide a statement that the written NOED request will be submitted within two working days and a follow-up License Amendment Request within four working days following the staff's verbal granting of the NOED, if needed.**

This letter fulfills the requirement to submit a written NOED request within two working days. This request for enforcement discretion involves a non-compliance with a TS Required Action that is not expected to re-occur. Based on the short duration (i.e., a maximum of 48 hours) of the requested non-compliance, a follow-up license amendment request is not warranted to revise the respective TS LCOs on a permanent basis. IMC 0410 states that a follow-up amendment is not required if the NRC agrees before granting the NOED. The NRC agreed during the conference call providing verbal approval of the NOED that no other follow-up amendment request is required.