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CNS-14-004  
February 3, 2014

10 CFR 50.54(f)

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

Catawba Nuclear Station, Units 1 and 2  
Docket Nos. 50-413, 50-414  
Renewed License Nos. NPF-35 and NPF-52

**Subject:** Response to Request for Additional Information Dated December 20, 2013,  
Regarding Response to Bulletin 2012-01, "Design Vulnerability in Electric Power  
Systems"

**References:**

1. NRC Bulletin 2012-01: Design Vulnerability in Electric Power System, *Request for Information Pursuant to Title 10 of the Code of Federal Regulation 50.54(f)* dated July 27, 2012, ADAMS Accession No. ML12074A115
2. Duke Energy Letter, *Duke Energy Carolinas, LLC (Duke Energy) Catawba Nuclear Station (CNS), Units 1 and 2, Docket Nos. 50-413 and 50414, Renewed License Nos. NPF-35 and NPF-52, Response to NRC Bulletin 2012-01: Design Vulnerability in Electric Power Systems*, dated October 23, 2012, ADAMS Accession No. ML12299A253

By letter dated December 20, 2013, the U.S. Nuclear Regulatory Commission (NRC) issued a Request for Additional Information (RAI) related to the July 27, 2012, Bulletin 2012-01, "Design Vulnerability in Electric Power System" (Agencywide Documents Access and Management System Accession (ADAMS) Accession No. ML12074A115). The RAI requires submission for response by February 3, 2014. Pursuant to 10 CFR 50.54(f) Catawba's responses to the RAIs are provided in the attachment to this letter.

There are no new regulatory commitments contained in this correspondence.

If you have questions or need additional information, please contact Tolani Owusu at (803) 701-5385.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 3, 2014.

Sincerely,

Kelvin Henderson  
Vice President, Catawba Nuclear Station

IE76  
NRR

Attachment: Catawba Nuclear Station Response Units 1 and 2 to the NRC Request for Additional Information Regarding Bulletin 2012-01, Design Vulnerability in Electric Power System"

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NRC letter (ADAMS ML13351A314) dated December 20, 2013 requests the following:

"In order for the NRC staff to complete its review of responses to the bulletin, the following additional information is requested:

1. Provide a summary of all interim corrective actions that have been taken since the January 30, 2012, event at Byron Station, Unit 2, to ensure that plant operators can promptly diagnose and respond to open phase conditions on the offsite power circuits for Class-1E vital buses until permanent corrective actions are completed.
2. Provide a status and schedule for completion of plant design changes and modifications to resolve issues with an open phase of electric power."

### **NRC Question 1**

*Provide a summary of all interim corrective actions that have been taken since the January 30, 2012, event at Byron Station, Unit 2, to ensure that plant operators can promptly diagnose and respond to open phase conditions on the offsite power circuits for Class-1 E vital buses until permanent corrective actions are completed.*

### **Response to Question 1 – Summary of All Interim Corrective Actions**

Lessons learned from the events at Byron station were reviewed and various interim corrective actions evaluated for effectiveness based on Catawba Nuclear Station and transformer design. Based on lessons learned, the following actions have been taken to ensure plant operators can promptly diagnose and respond to an open phase condition:

#### **Interim Corrective Actions**

1. Bi-annual infrared inspections of switchyard and transformer yard equipment have been completed.
2. Transformer yard rounds are performed daily and include general and detailed inspections of the transformers to ensure parameters are within expected limits.
3. An Engineering Change has been implemented which adds alarms to the operator aid computer (OAC) based on existing data points of switchyard busline currents
4. Operations procedures have been revised to include the appropriate response to the OAC alarm.
5. Updated OPS procedures to direct a walkdown of unit buslines to look for possible open phases, arcing, failed connectors, broken insulators, and damaged conductors after outages.
6. Existing 4 kV essential bus voltage is monitored for a Loss-of-Voltage (LOV) condition by three single-phase undervoltage relays.
7. A degraded voltage condition is also monitored at each 4 kV essential bus by three single phase undervoltage relays.
8. OPS checks the voltage on all three phases of essential 4160 switchgear on the cubicle door for the sole purpose of verifying individual phase voltages. If the voltage is not

within established parameters, the Shift Manager has guidance to contact engineering and evaluate operability of the associated offsite power circuit.

## **NRC Question Question 2**

*Provide a status and schedule for completion of plant design changes and modifications to resolve issues with an open phase of electric power.*

## **Response to Question 2 – Status and Schedule for Completion of Plant Design Changes**

### **Status**

The Duke Energy fleet is investigating options being researched by several vendors (PSC2000, EPRI, Schweitzer, etc.) to detect open phase fault conditions. There is currently no industry technology that has been proven to detect all the required open phase fault conditions for all plant and transformer designs. With the goal of ensuring accurate detection without compromising nuclear safety or increasing plant risk, it is paramount that this new technology being evaluated be tested and fully analyzed before installation.

Design studies of the single open phase fault conditions have been started for the Duke Energy nuclear fleet. The Duke Energy nuclear fleet is fully engaged in the development of enhancements to the ETAP software tool being used to analyze open phase fault conditions.

### **Schedule**

Duke Energy intends to follow the NEI Industry Initiative document and the generic schedule provided therein. A provision in the NEI Industry Initiative has already been identified for any deviations required for items such as the accommodation of outage schedules or technology availability and will be documented through the NEI Industry Initiative exemption process.