UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 17, 2019

Mr. Tom Simril
Site Vice President
Catawba Nuclear Station, Units 1 and 2
Duke Energy Carolinas, LLC
4800 Concord Road
York, SC 29745

SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 302 AND 298 RELATED TO THE REMOVAL OF CONTAINMENT VALVE INJECTION WATER SYSTEM SUPPLY FROM SPECIFIED CONTAINMENT ISOLATION VALVES (EPID NO. L-2018-LLA-0200)

Dear Mr. Simril:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment No. 302 to Renewed Facility Operating License No. NPF-35 and Amendment No. 298 to Renewed Facility Operating License No. NPF-52 for the Catawba Nuclear Station (Catawba), Units 1 and 2, respectively. The amendments are in response to your application dated July 19, 2018.

The amendments approve modifications to the Catawba, Units 1 and 2, Updated Final Safety Analysis Report (UFSAR) to revise Section 6.2.4.2.2, "Containment Valve Injection Water System," to remove the Containment Valve Injection Water System Supply from certain Safety Injection and Containment Spray Containment Isolation Valves and to exempt these valves from Type-C Local Leak Rate Testing.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Michael Mahoney, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-413 and 50-414

Enclosures:
1. Amendment No. 302 to NPF-35
2. Amendment No. 298 to NPF-52
3. Safety Evaluation

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE ENERGY CAROLINAS, LLC

NORTH CAROLINA ELECTRIC MEMBERSHIP CORPORATION

DOCKET NO. 50-413

CATAWBA NUCLEAR STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 302
Renewed License No. NPF-35

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Catawba Nuclear Station, Unit 1 (the facility), Renewed Facility Operating License No. NPF-35, filed by Duke Energy Carolinas, LLC (licensee), dated July 19, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, by Amendment No. 302, Renewed Facility Operating License No. NPF-35, is amended to authorize revision to the Updated Final Safety Analysis Report (UFSAR), as set forth in the application dated July 19, 2018. The licensee shall update the USFAR to incorporate the changes as described in the licensee's application dated July 19, 2018, and the NRC staff's safety evaluation attached to this amendment.

3. This license amendment is effective as of its date of issuance and shall be implemented within 120 days of issuance. The UFSAR changes shall be implemented in the next periodic update to the UFSAR in accordance with 10 CFR 50.71(e) following the implementation period.

FOR THE NUCLEAR REGULATORY COMMISSION

Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: June 17, 2019

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE ENERGY CAROLINAS, LLC

NORTH CAROLINA MUNICIPAL POWER AGENCY NO. 1

PIEDMONT MUNICIPAL POWER AGENCY

DOCKET NO. 50-414

CATAWBA NUCLEAR STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 298
Renewed License No. NPF-52

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Catawba Nuclear Station, Unit 2 (the facility), Renewed Facility Operating License No. NPF-52, filed by the Duke Energy Carolinas, LLC (the licensee), dated July 19, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, by Amendment No. 298, Renewed Facility Operating License No. NPF-52, is amended to authorize revision to the Updated Final Safety Analysis Report (UFSAR), as set forth in the application dated July 19, 2018. The licensee shall update the USFAR to incorporate the changes as described in the licensee's application dated July 19, 2018, and the NRC staff's safety evaluation attached to this amendment.

3. This license amendment is effective as of its date of issuance and shall be implemented within 120 days of issuance. The UFSAR changes shall be implemented in the next periodic update to the UFSAR in accordance with 10 CFR 50.71(e) following the implementation period.

FOR THE NUCLEAR REGULATORY COMMISSION

Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: June 17, 2019

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 302 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-35

AND

AMENDMENT NO. 298 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-52

DUKE ENERGY CAROLINAS, LLC

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-413 AND 50-414

1.0 INTRODUCTION

By letter to the U. S. Nuclear Regulatory Commission (NRC, Commission) dated July 19, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML18200A252), Duke Energy Carolinas, LLC (Duke Energy, the licensee) submitted an application requesting approval to change the Updated Final Safety Analysis Report (UFSAR) for the Catawba Nuclear Station (Catawba), Units 1 and 2. The amendments pertain to certain isolation valves in containment penetrations, which provide isolation of liquid effluents from the Safety Injection System (NI), Containment Spray System (NS), Residual Heat Removal System (ND), and Reactor Coolant System (NC), to the environment. The subject NS system valves are in penetrations that supply the NS spray rings which communicate with the containment atmosphere, so these NS valves also provide isolation of containment atmosphere (gas) emissions to the environment.

The amendments would modify the Catawba, Units 1 and 2, UFSAR Section 6.2.4.2.2, "Containment Valve Injection Water System," to remove the Containment Valve Injection Water System (NW) supply from the following Containment Isolation Valves (CIVs) and to exempt these CIVs from Type-C Local Leak Rate Testing (LLRT):

- 1(2)NI-162A: NI Pumps to Cold Leg Injection Header Isolation Valve
- 1(2)NI-173A: Residual Heat Removal System (ND) Header A to Reactor Coolant System (NC) Loops C and D Cold Legs Isolation Valve
- 1(2)NI-178B: ND Header B to NC Loops A and B Cold Legs Isolation Valve
- 1(2)NI-183B: ND Header A and B Hot Leg Injection Isolation
- 1(2)NS-29A: NS Pump A to NS Header A Containment Isolation Valve
- 1(2)NS-32A: NS Pump A to NS Header A Containment Isolation Valve
- 1(2)NS-43A: ND Pump A to NS Spray Header Containment Isolation Valve
- 1(2)NS-12B: NS Pump B to NS Header B Containment Isolation Valve

- 1(2)NS-15B: NS Pump B to NS Header B Containment Isolation Valve
- 1(2)NS-38B: ND Pump B to NS Spray Header Containment Isolation Valve

2.0 REGULATORY EVALUATION

2.1 System Description

The licensee provided detailed descriptions of the subject valves and their functions. Additionally, the licensee provided system descriptions of the systems to which the valves are connected. These descriptions are provided below to provide background on the valves that are affected by the licensee's license amendment request.

2.1.1 Containment Valve Injection Water (NW) System

The licensee provided the following description in Section 3.1 of its letter dated July 19, 2018:

> The NW System is designed to inject water between the two seating surfaces of gate valves used for Containment isolation. The injection pressure is higher than Containment design peak pressure during a LOCA [loss-of-coolant accident]. This will prevent leakage of the Containment atmosphere through the gate valves, thereby reducing potential offsite dose below the values specified by 10CFR100 limits following the postulated accident.
>
> ...
>
> The Containment Valve Injection Water System, (NW) is designed to provide a water seal to a specific class of containment isolation valves (gate valves) during a LOCA, to prevent leakage of containment atmosphere through the gate valves. During normal power operation, the system is in a standby mode and does not perform any function.
>
> The NW System shall be activated by an ST signal to perform its safety related function. That function is limiting the release of containment atmosphere past specific containment isolation valves, in order to mitigate the consequences of a LOCA. Containment Isolation Valves, for systems which are not used to mitigate the consequences of an accident, will be supplied with NW System seal water upon receipt of an ST signal. Containment Isolation Valves, for accident mitigating systems which are supplied with seal water from the NW System, have their seal water supplies actuated by an SP signal.
>
> ...
>
> Reference 6.35 [Catawba UFSAR Table 6-77, "Containment Isolation Valve and Actuator Data"], provides design information associated with the NW System containment penetrations. This table identifies NW System valves provided in accordance with containment penetration design criteria. NW System containment penetrations M243 and M253 are classified as Overpressure Protection Category 2.a per Section 3.2.13 of Reference 6.34 [CNS-1465.00-00-0003, "Plant Design Basis Specification for Containment Process Penetrations"].

2.1.2 Safety Injection (NI) System

The licensee provided the following description in Section 3.2 of its letter dated July 19, 2018:

> The Catawba Safety Injection (NI) System constitutes a major portion of the Emergency Core Cooling System (ECCS). The NI System, along with the Refueling Water (FW) System, Residual Heat Removal (ND) System, and Chemical and Volume Control (NV) System, provides emergency cooling to the reactor core in the event of a break in either the primary (reactor coolant) system or the secondary (steam) systems. An incident which causes a loss of fluid from the Reactor Coolant (NC) system is referred to as a Loss of Coolant Accident (LOCA). In the event of a Steam Line Break (SLB) or a Feedwater Line Break (FLB), the NI System provides borated water to the core to control core reactivity.
>
> The NI System is used to make up to the Cold Leg Accumulators (CLAs) during Normal Operation in order to meet the level, pressure and boron concentration Technical Specifications requirements for the CLAs.
>
> The safety related function of the Safety Injection (NI) System is to provide emergency core cooling in order to prevent unacceptable fuel damage and to assure that the core remains intact during all phases of a Design Basis Event (DBE). To avoid excessive core damage, it is necessary to limit fuel temperatures, particularly the cladding temperature, and limit any zirconium-water reaction to an insignificant amount...

2.1.2.1 Subject NI System Valves

The licensee provided the following description in Section 3.2 of its letter dated July 19, 2018:

> Valve 1(2) NI-I62A is a motor operated gate valve located on the cold leg injection header from the NI Pump discharge. This valve is normally open and remains open with power removed to preclude inadvertent closure during cold leg injection and recirculation.
>
> Valve 1(2) NI-I73A is a motor operated gate valve located on the ND Pump A discharge line to NC Loops C and D cold legs. This valve is normally open with power removed to preclude inadvertent closure and remains open during cold leg injection and recirculation.
>
> Valve 1(2) NI-I78B is a motor operated gate valve located on the ND Pump B discharge line to NC Loops A and B cold legs. This valve is normally open with power removed to preclude inadvertent closure and remains open during cold leg injection and recirculation.
>
> Valve 1(2) NI-183B is a motor operated gate valve located on the ND Pump discharge header to NC Loops B and C hot legs. This valve is normally closed with power removed to preclude inadvertent opening and remains closed during cold leg injection and recirculation.

For Valves 1(2) NI-162A, 1(2) NI-173A, & 1(2) NI-178B:
Following a Loss of Coolant Accident, power is restored, and these valves are closed when realigning the NI System to the hot leg recirculation mode of operation. Each valve serves as an outside containment isolation valve for its respective penetration; however, it does not perform an automatic containment isolation function since the penetration is sealed against leakage by a water seal provided by the NW System when the valve is closed during hot leg recirculation and open during cold leg injection and recirculation. The control circuit for the NI MOV [motor operated valve] provides interlocks for the control of its associated NW SOV [solenoid operated valve], which controls the injection of water between the disks of the NI MOV to aid in containment isolation.

For Valve 1(2) NI-183B:
In the event that neither NI pump is able to provide hot leg recirculation flow following a Loss of Coolant Accident, power to the valve can be restored and the valve opened to align the ND pump discharge to the NC system Hot Legs. It should be noted that this alignment is not credited for the mitigation of any DBE and is only available as an added level of defense. 1(2) NI-183B serves as an outside containment isolation valve for penetration M207; however, it does not perform an automatic containment isolation function since the penetration is sealed against leakage by a water seal provided by the NW System when the valve is closed during cold leg injection and recirculation and open during hot leg recirculation. The control circuit for 1(2) NI-I83B provides interlocks for the control of valve 1(2) NW-242B, which controls the injection of water between the disks of valve 1(2) NI-183B to aid in containment isolation.

2.1.3 Containment Spray (NS) System

The licensee provided the following description in Section 3.3 of its letter dated July 19, 2018:

> The Catawba Containment Spray (NS) System is an engineered safeguard feature which serves to remove thermal energy from the containment atmosphere in the event of a Loss of Coolant Accident (LOCA). It performs this function in conjunction with the Emergency Core Cooling System (ECCS), which cools the reactor during injection and recirculation modes of operation. However, the NS System is not part of the ECCS. The heat removal capability of the spray system maintains containment pressure below the design pressure value after the ice in the Ice Condenser (NF) has been depleted, and steam generated in the core continues to enter containment. The NS System also serves to remove fission product iodine from the post-accident containment atmosphere. In addition, the NS System is designed for the suppression of steam partial pressure in the upper containment volume due to operating deck leakage from a LOCA.
>
> The primary safety related function of the Containment Spray (NS) System is to remove thermal energy from the containment atmosphere in the event of a Loss of Coolant Accident (LOCA). Pressure suppression is provided for all break sizes up to and including the double-ended rupture of the largest pipe in the Reactor Coolant (NC) System. The NS design is based on the conservative assumption that reactor core residual heat is continuously released to the containment as steam, eventually depleting the ice in the Ice Condenser. The

Containment Spray (NS) System is sized to maintain the containment pressure below the design pressure (15 psig). In addition, the NS System is capable of rapidly reducing the containment pressure and temperature following a LOCA and maintaining them at acceptably low levels.

In addition to the energy input to the containment assumed for the Design Basis Event (DBE) described above, the NS System is also designed, assuming the energy release from a metal-water reaction of 33 percent of the Zircaloy fuel cladding, with hydrogen burned as it is produced, to limit containment internal pressure to below design pressure. The NS System also serves to remove fission product iodine from the post-accident containment atmosphere.

In addition, the NS System is designed for the suppression of steam partial pressure in the upper containment volume due to operating deck leakage from a LOCA. This capability is inherent in the system if the primary design requirement is met. The requirement for the spray is to absorb steam leakage through the operating deck at the maximum possible long term deck differential pressure of one pound per square foot, which is equivalent to the Ice Condenser door opening differential pressure.

During normal unit operation, the Containment Spray (NS) System is in a standby ready mode and does not perform any specific function.

2.1.3.1 Subject NS System Valves

The licensee provided the following description in Section 3.3 of its letter dated July 19, 2018:

Valve 1(2) NS-12B is a motor operated gate valve located on the NS Pump B discharge line to NS spray header B. This valve, along with 1(2) NS-15B, 1(2) NS-29A, 1(2) NS-32A, is normally closed during unit operation. 1(2) NS-12B serves as an outside containment isolation valve for penetration M387.

Valve 1(2) NS-15B is a motor operated gate valve located on the NS Pump B discharge line to NS spray header B. This valve, along with 1(2) NS-12B, 1(2) NS-29A, 1(2) NS-32A, is normally closed during unit operation. 1(2) NS-15B serves as an outside containment isolation valve for penetration M380.

Valve 1(2) NS-29A is a motor operated gate valve located on the NS Pump A discharge line to NS spray header A. This valve, along with 1(2) NS-12B, 1(2) NS-15B, 1(2) NS-32A, is normally closed during unit operation. 1(2) NS-29A serves as an outside containment isolation valve for penetration M370.

Valve 1(2) NS-32A is a motor operated gate valve located on the NS Pump A discharge line to NS spray header A. This valve, along with 1(2) NS-12B, 1(2) NS-15B, 1(2) NS-29A, is normally closed during unit operation. 1(2) NS-32A serves as an outside containment isolation valve for penetration M362.

Valve 1(2) NS-38B is a motor operated gate valve located on the ND Pump B discharge line to its respective ND Auxiliary Containment Spray Header. This valve, along with 1(2) NS-43A, is normally closed during unit operation. 1(2) NS-38B serves as an outside containment isolation valve for penetration M381.

Valve 1(2) NS-43A is a motor operated gate valve located on the ND Pump A discharge line to its respective ND Auxiliary Containment Spray Header. This valve, along with 1(2) NS-38B, is normally closed during unit operation. 1(2) NS-43A serves as an outside containment isolation valve for penetration M369.

The following functional description for 1(2) NS-12B is the equivalent for 1(2) NS-15B1, 1(2) NS-29A, and 1(2) NS-32A (except 1(2) NS-29A and 1(2) NS-32A are Train A related):

1(2) NS-12B is interlocked with the Containment Pressure Control System (CPCS). 1(2) NS-12B is manually operated from the control room, concurrent with the CPCS permissive (containment pressure greater than or equal to 1.00 psig), to provide a flow path from NS Pump B to its respective spray nozzles. 1(2) NS-12B is closed and prevented from opening by the CPCS when containment atmosphere pressure is less than or equal to 0.25 psig.

The CPCS controls for the NS valves are independent of those for the NS Pumps. If a single failure allowed NS Pump B to continue to operate with containment pressure being less than or equal to 0.25 psig, 1(2) NS-128 would not open, thereby preventing an erroneous spray inside containment. Closure of 1(2) NS-128 also serves to minimize the effects of a potential waterhammer due to NS Pump restart following the subsequent trip at the CPCS setpoint. This valve serves as a second line of defense against potential waterhammer in addition to check valve 1(2) NS-99 which is intended to prevent backleakage of the water in the vertical piping to the spray header through NS Pump B.

With containment pressure, either actual or simulated, at or above 1.00 psig, 1(2) NS-12B may be manually operated via Open/Close pushbuttons located on main control board MC11 with "red-green" position indicating lights.

The following functional description for 1(2) NS-38B is the same for 1(2) NS-43A (< > reflects 43A related):

As a backup provision for the NS System, the ND System can be manually aligned through valves 1(2) NS-38B and 1(2) NS-43A to provide flow to two separate sets of spray nozzles. The ND Auxiliary Containment Spray headers can be aligned for beyond design basis events where containment pressure could exceed the design pressure.

1(2) NS-38B <1(2) NS-43A> is interlocked with the Containment Pressure Control System (CPCS). 1(2) NS-38B <1(2) NS-43A> is closed and prevented from opening by the CPCS when containment atmosphere pressure is less than or equal to 0.25 psig. Closure of 1(2) NS-38B <1(2) NS-43A> also serves to minimize the effects of a potential waterhammer due to ND Pump operation following the first actuation of ND Auxiliary Spray and automatic isolation at the CPCS setpoint. This valve serves as a second line of defense against potential water-hammer in addition to check valve 1(2) ND-44 <1(2) ND-10> which is intended to prevent backleakage of the water in the vertical piping to the spray header through ND Pump B <A>. Valve interlocks are provided such that 1(2) NS-38B <1(2) NS-43A> can only be opened if containment isolation valve 1(2) NI-184B <1(2) NI-185A> is fully opened, ND isolation valve (1(2) ND-36B or 1(2)

ND-37A) <1(2) ND-1B or 1(2) ND-2A> is closed, and containment pressure is greater than or equal to 1.00 psig.

1(2) NS-38B <1(2) NS-43A> may be manually operated, subject to the above interlocks, via Open/Close pushbuttons located on main control board MC11 with "red-green" position indicating lights.

2.2 Licensee's Proposed Changes

As proposed by the applicant, certain language in Catawba, Units 1 and 2, UFSAR, section 6.2.4.2.2, "Containment Valve Injection Water System," would be deleted, as shown below, to state, in part, as follows:

> Each train consists of a surge chamber which is filled with water and pressurized with nitrogen. One main header exits the chamber and splits into several headers. A solenoid valve is located in the main header before any of the branch headers which will open after 60 second delay on ST signal. Each of the headers supply injection water to containment isolation valves located in the same general location, and close on the same engineered safety signal. ~~A solenoid valve is located in each header which supplies seal water to valves closing on SP signal. These solenoid valves open after a 60 second delay on SP signal. Since a ST signal occurs before a SP signal, the solenoid valve located in the main header will already be injecting water to Containment isolation valves closing on ST signal. This leaves an open path to the headers supplying injection water on SP signal.~~ The delay for the solenoid valves opening is to allow adequate time for the slowest gate valve to close, before water is injected into the valve seat.
>
> ~~Individual solenoid valves are provided for the NI and NS containment isolation valves receiving seal water injection. Following a postulated accident one or more of the NI or NS containment isolation valves may be open. These solenoid valves will receive a signal to open, following a ST signal and once its associated containment isolation valve has closed. If the containment isolation valve subsequently opens, its associated NW solenoid valve closes. Thus, after a ST signal, the NW solenoid valve will be open when its containment isolation valve is closed and vice versa.~~
>
> One header for each train penetrates the Containment. The NW Containment isolation valve on the outside of the Containment opens on ST signal, allowing seal water to be injected to those containment isolation valves located inside the Containment. ~~Inside Containment, solenoid valves isolate the headers that supply injection water to those valves closing on SP signal. The solenoid valves open after a 60 second delay on SP signal.~~

Additionally, the amendments would modify UFSAR, Table 6-77, "Containment Isolation Valve Data," to make corresponding changes.

2.3 Applicable Regulatory Requirements

10 CFR Part 50, Appendix J, Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors.

Section 3.1, "Conformance With General Design Criteria [GDC]," of Catawba's Updated Final Safety Analysis Report (UFSAR) states that Catawba complies with GDC 55, "Reactor coolant pressure boundary penetrating containment," by stating, in part;

> Lines that are part of the reactor coolant pressure boundary and penetrate the primary containment are provided with two barriers in series where they penetrate the containment, so that failure of one active component does not prevent isolation. Isolation valves outside the containment are located as close to the containment as practical. Upon loss of actuating power automatic isolation valves are designed to take the position that provides the safety function in accordance with the single failure criterion.

Section 3.1 of the UFSAR states that Catawba complies with GDC 56, "Primary containment isolation," by stating, in part;

> Lines which connect directly to the containment atmosphere and penetrate the primary containment are provided with two barriers in series where they penetrate the containment, so that failure of one active component does not prevent isolation. Isolation valves outside the Containment are located as close to the containment as practical. Upon loss of actuating power automatic isolation valves are designed to take the position that provides the safety function in accordance with the single failure criterion.

Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," September 1995 (ADAMS Accession No. ML003740058).

NEI 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J", Rev. 3-A (ADAMS Accession No. ML12221A202).

American National Standards Institute (ANSI) 56.8-2002, "Containment System Leakage Testing Requirements."

American Nuclear Society (ANS)-56.2/ANSI N271-1976, "Containment Isolation Provisions for Fluid Systems."

3.0 TECHNICAL EVALUATION

Catawba was approved for conformance with 10 CFR Part 50, Appendix J, Option B and RG 1.163 under License Amendment No. 192/184 on July 31, 2001 (ADAMS Accession No. ML012290327). Compliance with 10 CFR Part 50, Appendix J provides assurance that (a) the primary containment and systems and components which penetrate the primary containment, do not exceed the allowable leakage rate specified in the TS, and (b) the integrity of the containment structure is maintained. 10 CFR Part 50, Appendix J, Option B, "Performance-Based Requirements," allows licensees to voluntarily replace the prescriptive testing requirements of 10 CFR Part 50, Appendix J, Option A, with performance-based test requirements.

The regulations in 10 CFR Part 50, Appendix J, Option B endorse RG 1.163, "Performance-Based Containment Leak-Test Program" as acceptable guidance for implementing Option B. RG 1.163 further endorses NEI 94-01, Revision 0, "Industry Guideline for Implementing Performance Based Option of 10 CFR 50, Appendix J." NEI 94-01, Rev. 3-A incorporates regulatory positions stated in RG 1.163, as modified by NRC Safety Evaluations dated June 25, 2008 (ADAMS Accession No. ML081140105) and June 8, 2012 (ADAMS Accession No. ML121030286). NEI 94-01, Rev. 3-A establishes criteria for when an LLRT is not required on isolation valves in containment penetrations by stating on page 6, in part:

> An LLRT is a test performed on Type B and Type C components. An LLRT is not required for the following cases:
>
> - Primary containment boundaries that do not constitute potential primary containment atmospheric pathways during and following a Design Basis Accident (DBA);
>
> - Boundaries sealed with a qualified seal system; or,
>
> - Test connection vents and drains between primary containment isolation valves which are one inch or less in size, administratively secured closed and consist of a double barrier.

The exclusion of the CIVs listed in Section 1.0 of this safety evaluation from the LLRT program is based 10 CFR Part 50, Appendix J, Option B; NEI 94-01, Rev. 3A; and ANSI 56.8-2002. These valves do not constitute a potential primary containment atmospheric pathway during and following a DBA, as noted in UFSAR Table 6-74.

The NRC staff reviewed the licensee's justification for crediting a closed system outside containment as a mechanism for precluding the leakage of containment atmosphere to the external environment for the subject CIVs. The licensee asserts that its Radioactive System Leakage Inspection (RSLI) Program assures that the pertinent closed systems outside containment will reliably and effectively maintain radioactive releases within the assumptions of the dose analyses. Therefore, the licensee asserts that the CIVs in question no longer require testing.

The four subject NI system valves per unit are isolation valves located in penetrations connected to the Reactor Coolant System, and are classified as GDC 55 components. The six subject NS system valves per unit are isolation valves located in penetrations that supply the NS spray rings which communicate with the containment atmosphere, and are classified as GDC 56 components. These penetrations also perform Engineered Safety Functions (ESF) in support of containment heat removal in the event of an accident. The design requirements for containment penetrations are established in ANSI N271/ANS-56.2. GDCs 55 and 56 require a normally closed or automatic containment isolation valve inside and outside containment unless it can be demonstrated that the design is acceptable on some other defined basis.

Section 3.6 of ANSI N271/ANS-56.2 describes the guidelines for "Other Defined Basis", and Section 3.6.3 allows remote manual valves for systems associated with ESF instead of an automatically closing isolation valve. For Catawba, the penetration is isolated by a check valve inside containment and a remotely operated manual gate valve outside containment. These penetrations are not classified as potential bypass leakage pathways in Catawba's USFAR, Table 6-74 "Potential Bypass Leakage Paths through Containment Isolation Valves." These

penetrations are attached to a closed system boundary, and the closed system boundary design requirements are defined in Note 2 of Table 6-74, as follows:

2. An attached closed system is considered as a boundary which precludes bypass leakage if the system:

   A. Either (1) does not directly communicate, i.e., present a closed pressure boundary, with the containment atmosphere or (2) does not directly communicate, i.e., present a closed pressure boundary with the environment, following a LOCA.

   B. Closed pressure boundary is designed to quality Group B or C standards.

   C. System closed pressure boundary is Seismic Category I.

   D. If the system closed pressure boundary is inside containment, its design pressure and temperature exceeds or is equal to containment design pressure and temperature. If the system closed pressure boundary is outside containment, its design pressure exceeds or is equal to containment design pressure.

   E. System closed pressure boundary is designed for protection from the effects of pipe whip, missiles, and any jet forces resulting from the LOCA.

   F. System closed pressure boundary is maintained during normal plant operation.

Since these penetrations are connected to closed loop systems outside containment, any leakage past the inner or outer isolation would be retained by the Class B, missile protected, closed systems outside containment. The check valves inside containment on each of these penetrations do require type C LLRT. The subject manual gate valves outside containment are currently supplied with NW and can be exempted from the LLRT program based on 10 CFR Part 50, Appendix J, Option B.

The licensee states that leakage from the closed system outside containment is monitored and minimized by its RSLI program and that closed systems are suitable barriers to ensure the containment isolation function is maintained.

3.1 Radioactive System Leakage Inspection Program

The overall objective of the RSLI program is to monitor and reduce leakage from those portions of systems outside containment that contain highly radioactive fluids during post-accident operation to as low as reasonably achievable (ALARA) levels. Leakage from radioactive systems outside containment are monitored to meet the requirements of Technical Specification (TS) 5.5.3 "Primary Coolant Sources Outside Containment" which reads:

5.5.3 Primary Coolant Sources Outside Containment

This program provides controls to minimize leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident to levels as low as

practicable. The systems include Containment Spray, Safety Injection, Chemical and Volume Control, and Nuclear Sampling. The program shall include the following:

a. Preventive maintenance and periodic visual inspection requirements; and

b. Integrated leak test requirements for each system at refueling cycle intervals or less.

The licensee stated that provisions to detect potential leakage from the lines outside containment during normal operation are required by TS 5.5.3 and are governed for NI and NS systems by the periodic test procedures to ensure that the closed systems outside containment provide an acceptable secondary containment boundary during and after a LOCA. Under the RSLI Program, operations, engineering, and maintenance personnel perform tests, walkdowns, and inspections on a frequent basis, and any leakage is identified and quantified so that corrective actions can be initiated as necessary. System engineers review RSLI test data and other significant leakage data and applicable corrective action documents on RSLI system components to maintain a RSLI program leakage table for each unit. This will ensure that the unit's cumulative leakage for portions of systems covered by this program remain within the leakage criteria. Maintenance personnel implement corrective actions as soon as reasonably possible on leakage identified by RSLI tests or other inspections. These corrective actions include adjusting packing or replacement of seals, gaskets, o-rings, etc., on RSLI systems components.

The licensee's proposed changes to the UFSAR do not affect the TSs, and, therefore, no changes to the TSs are required. The NRC staff notes that the removal of these valves from the LLRT does not exclude the valves from TS control.

3.3 NRC Staff Conclusion

The NRC staff reviewed the licensee's RSLI program, and concludes that the information provided by the licensee demonstrates an acceptable program that monitors and reduces leakage from the portions of containment penetration systems that are located outside containment. As a result, the NRC staff concludes that there is reasonable assurance that leakage from the pertinent closed systems outside containment will be minimized by the RSLI program, and accordingly, these closed systems will maintain their containment isolation functions.

Based on the requirements of 10 CFR Part 50, Appendix J, and the above evaluation, the NRC staff finds that the closed systems outside containment will preclude leakage of containment atmosphere to the environment through the subject isolation valves listed in Section 1.0 of this safety evaluation, during a LOCA. Therefore, the NRC staff finds that these isolation valves do not constitute potential containment atmospheric pathways during and following a design basis accident, and that continued testing of these isolation valves does not provide a significant additional safety benefit. Accordingly, local leak rate tests under Appendix J, Option B, are not required. Therefore, the licensee's proposed UFSAR change to delete the subject isolation valves from the LLRT program is acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the NRC staff notified the South Carolina State official of the proposed issuance of the amendments on April 29, 2019. The State official confirmed on May 13, 2019, that the State of South Carolina had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on this finding (83 FR 56810; November 20, 2018). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: June 17, 2019

SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2 – ISSUANCE OF AMENDMENTS RELATED TO THE REMOVAL OF CONTAINMENT VALVE INJECTION WATER SYSTEM SUPPLY FROM SPECIFIED CONTAINMENT ISOLATION VALVES (EPID NO. L-2018-LLA-0200) DATED JUNE 17, 2019

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