



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

May 25, 2017

Ms. Tanya M. Hamilton
Site Vice President
Shearon Harris Nuclear Power Plant
Duke Energy
5413 Shearon Harris Road
M/C HNP01
New Hill, NC 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – ISSUANCE OF
AMENDMENT RE: RELOCATION OF EXPLOSIVE GAS MONITORING
PROGRAM TECHNICAL SPECIFICATIONS (CAC NO. MF8067)

Dear Ms. Hamilton:

The U.S. Nuclear Regulatory Commission has issued Amendment No. 159 to Renewed Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant, Unit 1. This amendment changes the Technical Specifications in response to your application dated June 29, 2016, as supplemented by letter dated November 4, 2016.

The amendment revises Technical Specification (TS) 3/4.11.1.4, "Liquid Holdup Tanks"; TS 3/4.11.2.5, "Explosive Gas Mixture"; and TS 6.8.4.j, "Gas Storage Tank Radioactivity Monitoring Program."

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

Sincerely,

A handwritten signature in black ink, appearing to read "MB", written over a light blue horizontal line.

Martha Barillas, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosures:

1. Amendment No. 159 to NPF-63
2. Safety Evaluation

cc w/enclosures: Distribution via Listserv

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – ISSUANCE OF AMENDMENT RE: RELOCATION OF EXPLOSIVE GAS MONITORING PROGRAM TECHNICAL SPECIFICATIONS (CAC NO. MF8067) DATED MAY 25, 2017

DISTRIBUTION:

Public
 LPL2-2 R/F
 RidsNrrDorlLpl2-2 Resource
 RidsNrrLABClayton Resource
 RidsACRS_MailCTR Resource
 RidsNrrPMShearonHarris Resource
 RidsRgn2MailCenter Resource
 RidsNrrDssStsb Resource
 RidsNrrDssSbpb Resource
 RidsNrrDraArcb Resource
 CTilton, NRR
 SJones, NRR
 MSmith, NRR

ADAMS Accession No.: ML17074A672

*by memorandum dated

OFFICE	DORL/LPL2-2/PM	DORL/LPL2-2/LA	DSS/STSB*	DSS/SBPB*
NAME	MBarillas	BClayton (LRonewicz for)	AKlein	RDennig
DATE	05/11/17	05/10/17	02/15/17	02/13/17
OFFICE	DRA/ARCB*	OGC - NLO	DORL/LPL2-2/BC	DORL/LPL2-2/PM
NAME	UShoop	RNorwood	BBeasley	MBarillas
DATE	02/03/17	05/23/17	05/25/17	05/25/17

OFFICIAL RECORD COPY



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

DUKE ENERGY PROGRESS, LLC

DOCKET NO. 50-400

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 159
Renewed License No. NPF-63

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duke Energy Progress, LLC (the licensee), dated June 29, 2016, as supplemented by letter dated November 4, 2016, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations 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;
 - 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.

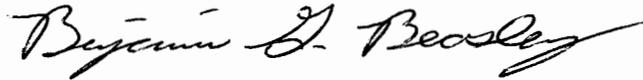
2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-63 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 159, are hereby incorporated into this license. Duke Energy Progress, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Benjamin G. Beasley, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed License
and the Technical Specifications

Date of Issuance: May 25, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 159
SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1
RENEWED FACILITY OPERATING LICENSE NO. NPF-63
DOCKET NO. 50-400

Replace the following page of the renewed facility operating license with the revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove
Page 4

Insert
Page 4

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove
i
xii
xvi
1-3
3/4 11-7
3/4 11-15
6-19b

Insert
i
xii
xvi
1-3
3/4 11-7
3/4 11-15
6-19b
6-19bi

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below.

(1) Maximum Power Level

Duke Energy Progress, LLC, is authorized to operate the facility at reactor Core power levels not in excess of 2948 megawatts thermal (100 percent rated core power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 159, are hereby incorporated into this license. Duke Energy Progress, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Antitrust Conditions

Duke Energy Progress, LLC. shall comply with the antitrust conditions delineated in Appendix C to this license.

(4) Initial Startup Test Program (Section 14)¹

Any changes to the Initial Test Program described in Section 14 of the FSAR made in accordance with the provisions of 10 CFR 50.59 shall be reported in accordance with 50.59(b) within one month of such change.

(5) Steam Generator Tube Rupture (Section 15.6.3)

Prior to startup following the first refueling outage, Carolina Power & Light Company* shall submit for NRC review and receive approval if a steam generator tube rupture analysis, including the assumed operator actions, which demonstrates that the consequences of the design basis steam generator tube rupture event for the Shearon Harris Nuclear Power Plant are less than the acceptance criteria specified in the Standard Review Plan, NUREG-0800, at 15.6.3 Subparts II (1) and (2) for calculated doses from radiological releases. In preparing their analysis Carolina Power & Light Company* will not assume that operators will complete corrective actions within the first thirty minutes after a steam generator tube rupture

¹ The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

* On April 29, 2013, the name "Carolina Power & Light Company" (CP&L) was changed to "Duke Energy Progress, Inc." On August 1, 2015, the name "Duke Energy Progress, Inc." was changed to "Duke Energy Progress, LLC."

INDEX

1.0 DEFINITIONS

<u>SECTION</u>		<u>PAGE</u>
1.1	ACTION	1-1
1.2	ACTUATION LOGIC TEST	1-1
1.3	ANALOG CHANNEL OPERATIONAL TEST	1-1
1.4	AXIAL FLUX DIFFERENCE	1-1
1.5	CHANNEL CALIBRATION	1-1
1.6	CHANNEL CHECK	1-1
1.7	CONTAINMENT INTEGRITY	1-2
1.8	CONTROLLED LEAKAGE	1-2
1.9	CORE ALTERATION	1-2
1.9a	CORE OPERATING LIMITS REPORT	1-2
1.10	DIGITAL CHANNEL OPERATIONAL TEST	1-2
1.11	DOSE EQUIVALENT I-131	1-2a
1.12	\bar{E} - AVERAGE DISINTEGRATION ENERGY	1-3
1.13	ENGINEERED SAFETY FEATURES RESPONSE TIME	1-3
1.14	EXCLUSION AREA BOUNDARY	1-3
1.15	FREQUENCY NOTATION	1-3
1.16	(DELETED)	1-3
1.17	IDENTIFIED LEAKAGE	1-3
1.18	MASTER RELAY TEST	1-4
1.19	MEMBER(S) OF THE PUBLIC	1-4
1.20	OFFSITE DOSE CALCULATION MANUAL	1-4
1.21	OPERABLE - OPERABILITY	1-4
1.22	OPERATIONAL MODE - MODE	1-4
1.23	PHYSICS TESTS	1-4
1.24	PRESSURE BOUNDARY LEAKAGE	1-4
1.25	PROCESS CONTROL PROGRAM	1-5
1.26	PURGE - PURGING	1-5
1.27	QUADRANT POWER TILT RATIO	1-5
1.28	RATED THERMAL POWER	1-5
1.29	REACTOR TRIP SYSTEM RESPONSE TIME	1-5
1.30	REPORTABLE EVENT	1-5
1.31	SHUTDOWN MARGIN	1-5

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>		<u>PAGE</u>
<u>3/4.11</u>	<u>RADIOACTIVE EFFLUENTS</u>	
3/4.11.1	LIQUID EFFLUENTS	
	(DELETED).....	3/4 11-1
	(DELETED).....	3/4 11-7
3/4.11.2	GASEOUS EFFLUENTS	
	(DELETED).....	3/4 11-8
	(DELETED).....	3/4 11-15
	(DELETED).....	3/4 11-16
3/4.11.3	(DELETED).....	3/4 11-17
3/4.11.4	(DELETED).....	3/4 11-19
<u>3/4.12</u>	<u>RADIOLOGICAL ENVIRONMENTAL MONITORING</u>	
3/4.12.1	(DELETED).....	3/4 12-1
3/4.12.2	(DELETED).....	3/4 12-1
3/4.12.3	(DELETED).....	3/4 12-1

INDEX

BASES

<u>SECTION</u>	<u>PAGE</u>
<u>3/4.10 SPECIAL TEST EXCEPTIONS</u>	
3/4.10.1 SHUTDOWN MARGIN	B 3/4 10-1
3/4.10.2 GROUP HEIGHT, INSERTION, AND POWER DISTRIBUTION LIMITS	B 3/4 10-1
3/4.10.3 PHYSICS TESTS.....	B 3/4 10-1
3/4.10.4 REACTOR COOLANT LOOPS.....	B 3/4 10-1
3/4.10.5 POSITION INDICATION SYSTEM - SHUTDOWN.....	B 3/4 10-1
<u>3/4.11 RADIOACTIVE EFFLUENTS</u>	
3/4.11.1 (DELETED).....	B 3/4 11-1
3/4.11.2 (DELETED).....	B 3/4 11-1
3/4.11.3 (DELETED).....	B 3/4 11-2
3/4.11.4 (DELETED).....	B 3/4 11-2
<u>3/4.12 RADIOLOGICAL ENVIRONMENTAL MONITORING</u>	
3/4.12.1 (DELETED).....	B 3/4 12-1
3/4.12.2 (DELETED).....	B 3/4 12-1
3/4.12.3 (DELETED).....	B 3/4 12-1

DEFINITIONS

\bar{E} – AVERAGE DISINTEGRATION ENERGY

- 1.12 \bar{E} shall be the average, weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling, of the sum of the average beta and gamma energies per disintegration (MeV/d) for isotopes, with half-lives greater than 15 minutes, making up at least 95% of the total non-iodine activity in the coolant.

ENGINEERED SAFETY FEATURES RESPONSE TIME

- 1.13 The ENGINEERED SAFETY FEATURES (ESF) RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF Actuation Setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by the NRC.

EXCLUSION AREA BOUNDARY

- 1.14 The EXCLUSION AREA BOUNDARY shall be that line beyond which the land is not controlled by the licensee to limit access.

FREQUENCY NOTATION

- 1.15 The FREQUENCY NOTATION specified for the performance of Surveillance Requirements shall correspond to the intervals defined in Table 1.1.
- 1.16 (DELETED)

IDENTIFIED LEAKAGE

- 1.17 IDENTIFIED LEAKAGE shall be:
- a. Leakage (except CONTROLLED LEAKAGE) into closed systems, such as pump seal or valve packing leaks that are captured and conducted to a sump or collecting tank, or
 - b. Leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of Leakage Detection Systems or not to be PRESSURE BOUNDARY LEAKAGE, or
 - c. Reactor Coolant System leakage through a steam generator to the Secondary Coolant System (primary-to-secondary leakage).

RADIOACTIVE EFFLUENTS
LIQUID HOLDUP TANKS - DELETED

RADIOACTIVE EFFLUENTS
EXPLOSIVE GAS MIXTURE - DELETED

|

ADMINISTRATIVE CONTROLS

PROCEDURES AND PROGRAMS (Continued)

h. Radioactive Effluent Controls Program (Cont.)

- 8) Limitations on the annual and quarterly air doses resulting from noble gases released in gaseous effluents to areas beyond the SITE BOUNDARY conforming to Appendix I to 10 CFR Part 50,
- 9) Limitations on the annual and quarterly doses to a MEMBER OF THE PUBLIC from Iodine-131, Iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released to areas beyond the SITE BOUNDARY conforming to Appendix I to 10 CFR Part 50, and
- 10) Limitations on the annual dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from uranium fuel cycle sources conforming to 40 CFR Part 190.

i. Radiological Environmental Monitoring Program

A program shall be provided to monitor the radiation and radionuclides in the environs of the plant. The program shall provide (1) representative measurements of radioactivity in the highest potential exposure pathways, and (2) verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways. The program shall (1) be contained in the ODCM, (2) conform to the guidance of Appendix I to 10 CFR Part 50, and (3) include the following:

- 1) Monitoring, sampling, analysis, and reporting of radiation and radionuclides in the environment in accordance with the methodology and parameters in the ODCM,
- 2) A Land Use Census to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the monitoring program are made if required by the results of this census, and
- 3) Participation in a Interlaboratory Comparison Program to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring.

j. Explosive Gas and Storage Tank Radioactivity Monitoring Program

This program provides controls for potentially explosive gas mixtures contained in the Gaseous Waste Processing System (GWPS), the quantity of radioactivity contained in gas storage tanks, and the quantity of radioactivity contained in unprotected outdoor liquid storage tanks. The gaseous radioactivity quantities shall be determined following the methodology in Branch Technical Position (BTP) ETSB 11-5, "Postulated Radioactive Release due to Waste Gas System Leak or Failure." The liquid radwaste quantities shall be determined in accordance with Standard Review Plan, Section 15.7.3, "Postulated Radioactive Release due to Tank Failures."

The program shall include:

- 1) The limits for concentrations of hydrogen and oxygen in the GWPS and a surveillance program to ensure the limits are maintained. Such limits shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion).

ADMINISTRATIVE CONTROLS

PROCEDURES AND PROGRAMS (Continued)

- j. Explosive Gas and Storage Tank Radioactivity Monitoring Program (Cont.)
- 2) A surveillance program to ensure that the quantity of radioactivity contained in each gas storage tank is less than the amount that would result in a whole body exposure of ≥ 0.5 rem to any individual in an unrestricted area, in the event of an uncontrolled release of the tanks' contents.
 - 3) A surveillance program to ensure that the quantity of radioactivity contained in all outdoor liquid radwaste tanks that are not surrounded by liners, dikes, or walls, capable of holding the tanks' contents and that do not have tank overflows and surrounding area drains connected to the Liquid Waste Processing System is less than the amount that would result in concentrations that exceed the limits of 10 CFR 20, Appendix B, Table 2, Column 2, at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tanks' contents.

The provisions of SR 4.0.2 and SR 4.0.3 are applicable to the Explosive Gas and Storage Tank Radioactivity Monitoring Program surveillance frequencies.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 159 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-63

DUKE ENERGY PROGRESS, LLC

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

1.0 INTRODUCTION

By letter dated June 29, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16182A387), as supplemented by letter dated November 4, 2016 (ADAMS Accession No. ML16309A528), Duke Energy Progress, LLC (the licensee) submitted a request for changes to the Shearon Harris Nuclear Power Plant, Unit 1 (Shearon Harris), Technical Specifications (TSs). The requested changes would revise TS 3/4.11.1.4, "Liquid Holdup Tanks"; TS 3/4.11.2.5, "Explosive Gas Mixture"; and TS 6.8.4.j, "Gas Storage Tank Radioactivity Monitoring Program." The licensee proposed to delete TS Definition 1.16, "GASEOUS RADWASTE TREATMENT SYSTEM." The licensee proposed to delete TS 3/4.11.1.4, "Liquid Holdup Tanks," and TS 3/4.11.2.5, "Explosive Gas Mixture," and relocate the deleted requirements for these TSs to licensee control under TS 6.8.4.j, "Gas Storage Tank Radioactivity Monitoring Program." The description for TS 6.8.4.j will be modified to include the controls for potentially explosive gas mixtures contained in the Gaseous Waste Processing System (GWPS) and the quantity of radioactivity contained in unprotected outdoor liquid storage tanks. The licensee also proposed to relocate requirements associated with TS 3/4.11.1.4 and TS 3/4.11.2.5 to the licensee-controlled Plant Programs Procedure PLP-114, "Relocated Technical Specifications and Design Basis Requirements."

The supplement dated November 4, 2016, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's initial proposed no significant hazards consideration determination as published in the *Federal Register* on October 25, 2016 (81 FR 73433).

2.0 REGULATORY EVALUATION

Section 11.3 of the Shearon Harris Final Safety Analysis Report (FSAR) provides a description of the GWPS. The GWPS is designed to collect, process, and store gaseous wastes generated during plant operations, including anticipated operational occurrences. The GWPS consists mainly of two waste gas compressors, two catalytic hydrogen recombiners, ten waste gas decay tanks to accommodate collected fission product and other gases, and associated instrumentation, valves,

and piping. One of the hydrogen recombiners is in long-term shutdown. One of the ten waste gas decay tanks is normally kept at low pressure to collect relief valve discharges from the inservice tank.

The primary source of waste gases is from the volume control tank (VCT) purge flow. Smaller quantities of gases are collected from vent connections to equipment that receives reactor coolant discharges, including the pressurizer relief tank and the reactor coolant drain tank.

The GWPS normally collects a mixture of nitrogen, hydrogen, and fission gases through the VCT purge. The nitrogen is used for initial GWPS purge and as a VCT cover gas when the reactor is in cold shutdown or refueling. The reactor coolant may initially contain air due to opening of the system for maintenance or filling and venting. Excess air may be vented to the atmosphere or to the waste gas system with a nitrogen purge. When the reactor is placed in operation, operators gradually transition the VCT cover gas to nearly all hydrogen. Gases from the VCT purge pass through the hydrogen recombiner to the inlet to the waste gas compressors.

A sufficient amount of oxygen is added to the hydrogen recombiner to yield a low residual hydrogen concentration in the discharge. The water vapor produced by the recombiner is condensed and removed from the GWPS.

The inservice waste gas compressor discharge is initially directed to the inservice waste gas decay tank. When the inservice GWPS decay tank pressure reaches a moderate value, bypass lines are opened to direct flow in a loop back to the hydrogen recombiner inlet. Operation can continue in this mode until the pressure necessitates removing the tank from service and placing another decay tank at a lower pressure into service. The waste gas decay tanks allow collection of fission product gases from the reactor coolant system and holdup of those gases for radioactive decay such as to maintain releases to the environment as low as reasonably achievable. The tanks are located in separate compartments such that an explosion would only affect a single tank and the consequences of that event would be comparable to a postulated waste gas decay tank rupture.

The GWPS is designed to preclude development of a potentially explosive gas mixture. The operation of the hydrogen recombiner maintains a low hydrogen concentration within the storage tanks. Instrumentation monitors the concentration of hydrogen and oxygen at several points in the GWPS and initiates automatic action to prevent development of a potentially explosive gas mixture if the hydrogen recombiner does not work as designed. The instrumentation separately monitors oxygen and hydrogen concentrations and terminates additions of these gases to the system as necessary to prevent conditions that could support combustion.

The proposed change to the Shearon Harris TSs involve relocation of information from existing TSs related to gaseous and liquid radwaste to licensee-controlled documents and expansion of an existing TS program to include controls on the development of potentially explosive gas mixtures in the GWPS. The programmatic controls for potentially explosive gas mixtures and radioactivity in unprotected outdoor liquid holdup tanks would be moved to TS 6.8.4.j, and the procedural details for control of explosive gas mixtures and liquid holdup tanks would be moved to the licensee-controlled Plant Programs Procedure PLP-114, "Relocated Technical Specifications and Design Basis Requirements." The PLP-114 procedure is part of the Shearon Harris current licensing basis. Therefore, changes to this licensee-controlled procedure are subject to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, "Changes, tests and experiments." The proposed changes would also revise TS 6.8.4.j to

include programmatic limitations on radioactive gas storage tanks to be consistent with NUREG-1431, Revision 4, "Standard Technical Specifications – Westinghouse Plants."

The NRC staff reviewed the licensee's application, as supplemented, against the following regulatory requirements and regulatory guidance documents.

The regulations in 10 CFR 20.1101 require that licensees use, to the extent practical, procedures and engineering controls to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

The regulations in 10 CFR 20.1301 establish dose limits for individual members of the public such that the total effective dose equivalent does not exceed 100 mrem in a year. In addition, 10 CFR 20.1301(e) requires compliance with the Environmental Protection Agency's 40 CFR 190 dose limits for any member of the public in the general environment (i.e., 25 millirem (mrem) to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ).

Appendix B, "Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage," to 10 CFR Part 20 contains columns in Table 2 that are applicable to the assessment and control of dose to members of the public. One of the methods that licensees can use to demonstrate compliance with dose limits contained in 10 CFR 20.1301 is by demonstrating that the annual average concentration of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area does not exceed the values specified in the columns of Table 2 of 10 CFR Part 20, Appendix B.

Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low As Is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents," to 10 CFR Part 50 provides the numerical guidance on limiting conditions for operation sufficient to meet the ALARA requirements for light-water nuclear power reactors.

The regulation in 10 CFR 50.36a requires licensees to develop and follow operating procedures for the control of effluents to keep average annual releases of radioactive material in effluents and their resultant committed effective dose equivalents at small percentages of the dose limits specified in 10 CFR 20.1301 and to establish TSs that require compliance with the public dose limits in 10 CFR 20.1301. In addition, 10 CFR 50.36a provides licensees the flexibility of operations that may temporarily result in effluent releases higher than such small percentages of the dose limits and expects that the licensee will exert its best efforts to keep levels of radioactive effluent ALARA (i.e., within the numerical guides established in 10 CFR Part 50, Appendix I).

General Design Criteria 60 of 10 CFR Part 50, Appendix A, requires that the nuclear power unit design shall include means to control suitably the release of radioactive materials in gaseous and liquid effluents and to handle radioactive solid wastes produced during normal reactor operation, including anticipated operational occurrences. Sufficient holdup capacity shall be provided for retention of gaseous and liquid effluents containing radioactive materials, particularly where unfavorable site environmental conditions can be expected to impose unusual operational limitations upon the release of such effluents to the environment.

General Design Criteria 64 of 10 CFR Part 50, Appendix A, requires that means be provided for monitoring of the reactor containment atmosphere, spaces containing components for recirculation of loss-of-coolant accident fluids, effluent discharge paths, and the plant environs

for radioactivity that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents.

On July 22, 1993, the NRC issued a Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors (58 FR 39132). The final policy statement encouraged licensees to implement a voluntary program to update their TSs to be consistent with improved, vendor-specific Standard Technical Specifications (STS) issued by the NRC. In the Final Policy Statement, the NRC developed criteria to determine which of the TS requirements should be retained and which requirements could be relocated to licensee-controlled documents. The four screening criteria contained in the policy statement are used to identify those requirements to be retained in TSs and were subsequently incorporated into the regulations by an amendment to 10 CFR 50.36 (60 FR 36953). The four criteria are as follows:

Criterion 1 – Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary;

Criterion 2 – A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier;

Criterion 3 – A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier;

Criterion 4 – A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

The Final Policy Statement states that limiting conditions for operation that did not meet any of the above four criteria may be proposed for removal from the TSs and relocated to licensee-controlled documents.

NUREG-1431, Revision 4, Section 5.5.12, provides the STS for the “Explosive Gas and Storage Tank Radioactivity Monitoring Program” for Westinghouse Plants.

The NRC staff addressed relocation of explosive gas monitoring TSs to licensee-controlled documents in NRC Generic Letter 95-10, “Relocation of Selected Technical Specifications Requirements Related to Instrumentation,” dated December 15, 1995. In this document, the NRC staff noted that explosive gas monitoring instrumentation requirements address detection of possible precursors to the failure of a waste gas system but do not prevent or mitigate design-basis accidents or transients that assume a failure of, or present a challenge to, a fission product barrier. Therefore, requirements for operation could be transferred to licensee-controlled documents. Subsequent revisions to NUREG-1431 incorporated administrative controls in TS 5.5.12, “Explosive Gas and Storage Tank Radioactivity Monitoring Program,” which, in part, specifies that the program include:

The limits for concentrations of hydrogen and oxygen in the [Waste Gas Holdup System] and a surveillance program to ensure the limits are maintained. Such limits shall be appropriate to the system’s design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion),

Section 16.0, "Technical Specifications," Revision 3 of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," guidance specifies that the NRC staff review whether content and format are consistent with the applicable STS. Where TS provisions depart from the referenced TSs, the NRC staff determines whether proposed differences are justified by uniqueness in plant design or other considerations.

3.0 TECHNICAL EVALUATION

3.1 Deletion of TS Definition 1.16, "GASEOUS RADWASTE TREATMENT SYSTEM"

In its application, the licensee stated deletion of TS Definition 1.16, "GASEOUS RADWASTE TREATMENT SYSTEM," is an administrative change because the term would no longer be used in the Shearon Harris TSs (after deletion of TS 3/4.11.2.5). The term "Gaseous Waste Processing System" is used in the Shearon Harris FSAR and the proposed TS 6.8.4.j to replace "Gaseous Radwaste Treatment System." The NRC staff finds the change acceptable since the terms used in the proposed new TSs and the Shearon Harris FSAR are consistent with each other and the term proposed to be deleted, GASEOUS RADWASTE TREATMENT SYSTEM, is no longer used or relevant.

3.2 Changes to 3/4.11.1.4, "Liquid Holdup Tanks"

Shearon Harris TS 3/4.11.1.4, "Liquid Holdup Tanks," currently states the following:

3.11.1.4 The quantity of radioactive material contained in each of the following unprotected outdoor tanks shall be limited to less than or equal to 10 Curies, excluding tritium and dissolved or entrained noble gases:

- a. Outside temporary tank, excluding demineralizer vessels and liners used to solidify or to dewater radioactive wastes.

APPLICABILITY: At all times.

ACTION:

- a. With the quantity of radioactive material in any of the above listed tanks exceeding the above limit, immediately suspend all additions of radioactive material to the tank, within 48 hours reduce the tank contents to within the limit, and describe the events leading to this condition in the next Annual Radioactive Effluent Release Report, pursuant to Specification 6.9.1.4.
- b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.1.4 The quantity of radioactive material contained in each of the above listed tanks shall be determined to be within the above limit by analyzing a representative sample of the tank's contents within 7 days following any addition of radioactive material to the tank.

*Tanks included in this specification are those outdoor tanks that are not surrounded by liners, dikes, or walls capable of holding the tank contents and that do not have tank overflows and surrounding area drains connected to the Liquid Radwaste Treatment System.

In the license amendment request, the licensee stated that although the footnote to TS 3/4.11.1.4 uses the term "Liquid Radwaste Treatment System," the Shearon Harris FSAR uses the term "Liquid Waste Processing System (LWPS)." According to the licensee, the Liquid Waste Processing System provides for the collection, storing, processing, and controlled release of radioactive and potentially radioactive liquids associated with the operation of Shearon Harris. The licensee proposed to add the term "Liquid Waste Processing System" to the revised TS 6.8.4.j to be consistent with the FSAR.

The tanks within the scope of TS 3/4.11.1.4 include all outdoor radwaste tanks that are not surrounded by liners, dikes, or walls capable of holding the tank contents and that do not have tank overflows and surrounding area drains connected to the Liquid Waste Treatment System. The licensee stated that Shearon Harris does not utilize tanks that are applicable to TS 3/4.11.1.4. The licensee also stated that the outdoor tanks onsite are protected, their potential discharge paths are monitored, and that they can be directed to liquid radwaste tanks.

During the review of the license amendment request, the NRC staff determined the need for additional information. Specifically, the NRC staff requested the licensee's justification for not including a reference to the accepted NRC methodologies for determining the curie content limit of the liquid storage tanks such as that included in the equivalent program TS 5.5.12 of NUREG-1431, Revision 4. The NRC staff also requested the licensee to describe the methodology that will be used to replace the accepted NRC methodology to ensure compliance with the revised TS 6.8.4.j and to determine the curie content limits.

The licensee provided a response dated November 4, 2016 (ADAMS Accession No. ML16309A528), to an NRC request for additional information. The licensee explained that the revised TS 6.8.4.j maintains the provision for a surveillance program to ensure the quantity of radioactivity contained in the tanks within the scope of this TS would result in concentrations less than the limits of 10 CFR 20, Appendix B, Table 2, Column 2, at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tanks' contents. The licensee further described that Shearon Harris does not currently utilize temporary tanks that fall within the scope of this TS, nor does it have plans in the foreseeable future to utilize such tanks. The licensee determined that rather than omit the NRC-approved methodology as previously requested in the June 29, 2016, letter, it would include reference to Standard Review Plan, Section 15.7.3, "Postulated Radioactive Release due to Tank Failures," to be consistent with NUREG-1431, Revision 4.

The NRC staff requested the licensee to demonstrate that using the methodology described in the response to the first question above, the limit of 10 curies would ensure that the limits of 10 CFR Part 20, Appendix B, Table 2, Column 2, would not be exceeded at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tanks' contents. The licensee responded by stating that the 10 curie limit is in alignment with Section 15.7.3 of the Standard Review Plan, the NRC-approved methodology referenced in Section 5.5.12 of NUREG-1431. The licensee stated that per this methodology, the curie content is based on that quantity that would not exceed the concentration limits of 10 CFR Part 20, Appendix B, Table 2, Column 2, at the nearest potable water supply

and the nearest surface water supply in an unrestricted area, if the tank and components should fail, or will be limited to 10 curies in any mobile or portable tank used more than one calendar quarter.

As a result of the NRC staff's request for additional information, the elements relocated from deleted TS 3/4.11.1.4, "Liquid Holdup Tanks," to revised TS 6.8.4.j, "Explosive Gas and Storage Tank Radioactivity Monitoring Program," are as follows (TS 6.8.4.j is stated, in part):

Explosive Gas and Storage Tank Radioactivity Monitoring Program

This program provides controls for potentially explosive gas mixtures contained in the Gaseous Waste Processing System (GWPS), the quantity of radioactivity contained in gas storage tanks, and the quantity of radioactivity contained in unprotected outdoor liquid storage tanks, ... The liquid radwaste quantities shall be determined in accordance with Standard Review Plan, Section 15.7.3, "Postulated Radioactive Release due to Tank Failures."

The program shall include:

...

- 3) A surveillance program to ensure that the quantity of radioactivity contained in all outdoor liquid radwaste tanks that are not surrounded by liners, dikes, or walls, capable of holding the tanks' contents and that do not have tank overflows and surrounding area drains connected to the Liquid Waste Processing System is less than the amount that would result in concentrations that exceed the limits of 10 CFR 20, Appendix B, Table 2, Column 2, at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tanks' contents.

As explained above in this section of this safety evaluation, the "Liquid Waste Processing System" is the term used in the Shearon Harris FSAR, and the licensee proposed to add "Liquid Waste Processing System" to the revised TS 6.8.4.j to be consistent with the FSAR. The term "Liquid Radwaste Treatment System" will no longer be used in the licensee TSs.

The NRC staff finds that the licensee's proposal to relocate TS 3.11.1.4 and TS 4.11.1.4 to a licensee-controlled procedure does not change the licensee's requirement to limit the quantity of radioactive material to less than or equal to 10 curies, excluding tritium and dissolved or entrained noble gases, such as to ensure that radioactive material released during a tank failure does not exceed the annual average concentration limits of 10 CFR Part 20, Appendix B, Table 2, Column 2, at the nearest public potable water supply and the nearest surface water supply. The numerical limit on the quantity of radioactive material contained in unprotected outdoor liquid holdup tanks does not warrant inclusion in the TSs in accordance with the criteria in 10 CFR 50.36(c)(2) and the guidance contained in NUREG-1431, Revision 4. This numerical limit would be moved to PLP-114, which is part of the Shearon Harris current licensing basis.

The NRC staff finds the licensee's proposal to relocate TS 3/4.11.1.4 to a licensee-controlled procedure acceptable because between the requirements of revised TS 6.8.4.j and the licensee's procedure in PLP-114, the licensee will continue to meet the original intent of TS 3/4.11.1.4 of limiting the quantity of radioactive material to less than or equal to 10 curies,

excluding tritium and dissolved or entrained nobles gases, such as to ensure that radioactive material released during a tank failure does not exceed the annual average concentration limits of 10 CFR Part 20, Appendix B, Table 2, Column 2, at the nearest public potable water supply and the nearest surface water supply.

3.3 Changes to TS 3/4.11.2.5, "Explosive Gas Mixture"

The existing TS 3/4.11.2.5 requires that the concentration of oxygen in the Gaseous Radwaste Treatment System downstream of the hydrogen recombiners be limited to less than or equal to 2 percent by volume whenever the hydrogen concentration exceeds 4 percent by volume. The associated surveillance requirement (SR) specified that the concentrations of hydrogen and oxygen be determined to be within the above limits by monitoring the waste gases at least once every 12 hours. The proposed revision replaces this condition with the following programmatic requirement in proposed TS 6.8.4.j:

The limits for concentrations of hydrogen and oxygen in the GWPS and a surveillance program to ensure the limits are maintained. Such limits shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion).

In addition, the programmatic controls include the following statement addressing surveillance testing:

The provisions of SR 4.0.2 and SR 4.0.3 are applicable to the Explosive Gas and Storage Tank Radioactivity Monitoring Program surveillance frequencies.

The NRC staff compared the existing TS 3/4.11.2.5 against the criteria for inclusion as a TS limiting condition for operation provided in 10 CFR 50.36(c)(2)(ii). The staff determined that the condition limiting the oxygen concentration downstream of the hydrogen recombiners did not meet any of the criteria for the following reasons:

- The GWPS monitoring instrumentation does not detect or indicate an abnormal degradation of the reactor coolant pressure boundary.
- The concentration of gases in the GWPS is not a process variable that is an initial condition of a design-basis accident or transient analysis because the hydrogen and oxygen concentrations are controlled to prevent development of potential precursor conditions that could cause failure of the GWPS.
- The GWPS monitoring instrumentation is not part of a primary success path that mitigates a design-basis accident or transient because the instrumentation functions to maintain normal conditions that avoid potential precursors to a GWPS failure.
- The GWPS monitoring instrumentation is not significant to public health and safety because other GWPS components help preclude the development of gas mixtures that would be a potential precursor to GWPS failure, and, if a failure were to occur due to inadequate control of the monitored gases, the consequences would be comparable to the rupture of a single waste gas decay tank.

Therefore, the NRC staff determined that TS 3/4.11.2.5 need not be retained as a limiting condition for operation, and deletion of the limiting condition for operation and transfer of the

information to licensee-controlled documents is acceptable. Furthermore, the transfer to licensee-controlled documents is consistent with NRC guidance provided in NRC Generic Letter 95-10.

The programmatic requirements for limits on hydrogen and oxygen in the GWPS and associated SRs included in proposed TS 6.8.4.j are consistent with the model TS 5.5.12, "Explosive Gas and Storage Tank Radioactivity Monitoring Program," included in NUREG-1431. With the exception of plant-specific nomenclature, the wording of the proposed and model TSs are identical. Therefore, the proposed TS 6.8.4.j satisfies the guidance of Section 16.0 of NUREG-0800, and is acceptable.

3.4 Changes to TS 6.8.4.j, "Gas Storage Tank Radioactivity Monitoring Program"

The current Shearon Harris TS 6.8.4.j requires a program to "be provided for the control of the quantity of radioactivity contained in gas storage tanks" and that "the gaseous radioactivity quantities shall be determined following the methodology in Branch Technical Position (BTP) ETSB 11-5, "Postulated Radioactive Released due to Waste Gas System Leak or Failure." Additionally, the current TS requires that:

The program shall include surveillance provisions to ensure that the quantity of radioactivity contained in each gas storage tank is less than the amount that would result in a whole body exposure of ≥ 0.5 rem to any individual in an unrestricted area in the event of an uncontrolled release of the tanks' contents.

The proposed changes would retitle TS 6.8.4.j to "Explosive Gas and Storage Tank Radioactivity Monitoring Program." The TS 6.8.4.j proposed changes would also combine into one TS program the programmatic controls on explosive gas mixtures, the amount of radioactivity in liquid holdup tanks, and the amount of radioactivity in gas storage tanks. For the control of radioactivity contained in gas storage tanks, the proposed changes retain in TS 6.8.4.j the same radiological criteria of less than 0.5 roentgen equivalent man (rem), and also retain the surveillance program provision to ensure that the quantity of radioactive material is limited accordingly. The proposed change does not impact the TS ALARA criteria or the regulatory dose limits for members of the public because the total amount of gaseous effluent is not increased by this proposed TS change.

In response to the NRC staff's request for additional information, the licensee decided not to deviate from the guidance in NUREG-1431, Revision 4, and instead maintained reference to the accepted NRC methodologies for determining the curie content limit of the liquid storage tanks. This keeps the proposed TS 6.8.4.j consistent with the previously approved NRC guidance in NUREG-1431, Revision 4, and the criteria in 10 CFR 50.36(c)(2). The proposed TS 6.8.4.j would be restructured consistent with NUREG-1431, to state as follows:

This program provides controls for potentially explosive gas mixtures contained in the Gaseous Waste Processing System (GWPS), the quantity of radioactivity contained in gas storage tanks, and the quantity of radioactivity contained in unprotected outdoor liquid storage tanks. The gaseous radioactivity quantities shall be determined following the methodology in Branch Technical Position (BTP) ETSB 11-5, "Postulated Radioactive Release due to Waste Gas System Leak or Failure." The liquid radwaste quantities shall be determined in accordance with Standard Review Plan, Section 15.7.3, "Postulated Radioactive Release due to Tank Failures."

The program shall include:

- 1) The limits for concentrations of hydrogen and oxygen in the GWPS and a surveillance program to ensure the limits are maintained. Such limits shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion).
- 2) A surveillance program to ensure that the quantity of radioactivity contained in each gas storage tank is less than the amount that would result in a whole body exposure of ≥ 0.5 rem to any individual in an unrestricted area, in the event of an uncontrolled release of the tanks' contents.
- 3) A surveillance program to ensure that the quantity of radioactivity contained in all outdoor liquid radwaste tanks that are not surrounded by liners, dikes, or walls, capable of holding the tanks' contents and that do not have tank overflows and surrounding area drains connected to the Liquid Waste Processing System is less than the amount that would result in concentrations that exceed the limits of 10 CFR 20, Appendix B, Table 2, Column 2, at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tanks' contents.

The provisions of SR 4.0.2 and SR 4.0.3 are applicable to the Explosive Gas and Storage Tank Radioactivity Monitoring Program surveillance frequencies.”

The licensee remains subject to the 10 CFR 50.36a requirement to keep average annual releases of radioactive material in effluents ALARA and their resultant committed effective dose equivalent at small percentages of the dose limits specified in 10 CFR 20.1301 and in the license. The proposed changes do not change any of the Shearon Harris plant systems, structures, or components, or their performance characteristics. Consequently, the licensee maintains the ability to meet the criteria of General Design Criteria 60 and General Design Criteria 64. Additionally, the proposed changes to the TSs will not change the licensee's ability to meet the radiation protection requirements in 10 CFR 20.1101, 10 CFR 20.1301, 10 CFR 50.36a, and 10 CFR, Part 50, Appendix I, because the amount of radioactive material stored and released in effluents remains unchanged under the revised TSs.

The current Shearon Harris TS 6.8.4.j requirements are maintained in the proposed revision of TS 6.8.4.j. Specifically, the first paragraph in current TS 6.8.4.j is still contained in the first paragraph of revised TS 6.8.4.j. The second paragraph in current TS 6.8.4.j, is now item number 2 of revised TS 6.8.4.j. Revised TS 6.8.4.j adds the provisions of SR 4.0.2 and SR 4.0.3 into the Explosive Gas and Storage Tank Radioactivity Monitoring Program. SR 4.0.2 allows an extension of test intervals by up to 25 percent. If it is discovered that a surveillance was not performed within the required interval (i.e., past the extended interval allowed by SR 4.0.2), SR 4.0.3 allows the licensee to delay declaring a TS not met in order to perform the missed test. This addition is consistent with TS 5.5.12, the equivalent program of NUREG-1431, Revision 4. This is acceptable because the allowances provided by SR 4.0.2 and SR 4.0.3 provide flexibility to licensees for performing these types of tests and reduce unnecessary burden. The changes to revised TS 6.8.4.j are acceptable because they continue to provide the same requirements in current TS 6.8.4.j, in addition to incorporating additional relocated requirements.

The NRC staff has concluded, based on the above evaluation, that the licensee will maintain the ability to meet the radiation protection requirements in 10 CFR 20.1101, 10 CFR 20.1301, 10 CFR 50.36a, and 10 CFR, Part 50, Appendix I, because the amount of radioactive material stored and released in effluents remains unchanged. In addition, the proposed changes continue to meet 10 CFR 50.36. Additionally, the proposed amendment is consistent with the NRC Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors and the NUREG-1431, Revision 4, Standard TSs for the radioactive effluent controls program. Therefore, the NRC staff finds the proposed amendment acceptable since the licensee continues to provide reasonable assurance of adequate protection of the public health and safety.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified of the proposed issuance of the amendment on March 20, 2017. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change the SRs. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding (81 FR 73433). Accordingly, the amendment meets 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 amendment.

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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: C. Tilton
S. Jones
M. Smith

Date: May 25, 2017