April 23, 2002

Mr. G. R. Peterson
Site Vice President
Catawba Nuclear Station
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745-9635

SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2 RE: ISSUANCE OF AMENDMENTS (TAC NOS. MB3758 AND MB3759)

Dear Mr. Peterson:

The Nuclear Regulatory Commission has issued the enclosed Amendment No.198 to Facility Operating License NPF-35 and Amendment No.191 to Facility Operating License NPF-52 for the Catawba Nuclear Station (CNS), Units 1 and 2. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated December 20, 2001, as supplemented by letters dated February 14, and March 26, 2002.

The amendments revise CNS, Units 1 and 2, TS to incorporate NRC-approved Technical Specification Task Force (TSTF) Traveler TSTF-51, "Revise containment requirements during handling irradiated fuel and core alterations," Revision 2. The amendments would selectively adopt the alternate source term specifically for a fuel handling accident and a weir gate drop accident.

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,

/RA/

Chandu P. Patel, Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-413 and 50-414

Enclosures:
1. Amendment No. 198 to NPF-35
2. Amendment No. 191 to NPF-52
3. Safety Evaluation

cc w/encls: See next page

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The amendments revise CNS, Units 1 and 2, TS to incorporate NRC-approved Technical Specification Task Force (TSTF) Traveler TSTF-51, "Revise containment requirements during handling irradiated fuel and core alterations," Revision 2. The amendments would selectively adopt the alternate source term specifically for a fuel handling accident and a weir gate drop accident.

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DUKE ENERGY CORPORATION

NORTH CAROLINA ELECTRIC MEMBERSHIP CORPORATION

SALUDA RIVER ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-413

CATAWBA NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 198
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) Facility Operating License No. NPF-35 filed by the Duke Energy Corporation, acting for itself, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative, Inc. (licensees), dated December 20, 2001, as supplemented by letters dated February 14, and March 26, 2002, 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, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-35 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 198, which are attached hereto, are hereby incorporated into this license. Duke Energy Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: April 23, 2002

DUKE ENERGY CORPORATION

NORTH CAROLINA MUNICIPAL POWER AGENCY NO. 1

PIEDMONT MUNICIPAL POWER AGENCY

DOCKET NO. 50-414

CATAWBA NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 191
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) Facility Operating License No. NPF-52 filed by the Duke Energy Corporation, acting for itself, North Carolina Municipal Power Agency No. 1 and Piedmont Municipal Power Agency (licensees), dated December 20, 2001, as supplemented by letters dated February 14, and March 26, 2002, 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, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-52 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 191, which are attached hereto, are hereby incorporated into this license. Duke Energy Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: April 23, 2002

ATTACHMENT TO LICENSE AMENDMENT NO.198

FACILITY OPERATING LICENSE NO. NPF-35

DOCKET NO. 50-413

AND LICENSE AMENDMENT NO. 191

FACILITY OPERATING LICENSE NO. NPF-52

DOCKET NO. 50-414

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	Insert
3.7.10-1	3.7.10-1
3.7.10-2	3.7.10-2
3.7.11-1	3.7.11-1
3.7.11-2	3.7.11-2
3.7.13-1	3.7.13-1
3.9.3-1	3.9.3-1
B 3.7.10-3	B 3.7.10-3
B 3.7.10-4	B 3.7.10-4
B 3.7.10-5	B 3.7.10-5
B 3.7.10-7	B 3.7.10-7
B 3.7.11-2	B 3.7.11-2
B 3.7.11-3	B 3.7.11-3
B 3.7.11-4	B 3.7.11-4
B 3.7.13-1	B 3.7.13-1
B 3.7.13-2	B 3.7.13-2
B 3.7.13-3	B 3.7.13-3
B 3.7.13-5	B 3.7.13-5
B 3.9.3-1	B 3.9.3-1
B 3.9.3-2	B 3.9.3-2
B 3.9.3-3	B 3.9.3-3
B 3.9.3-4	B 3.9.3-4
B 3.9.3-5	B 3.9.3-5

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 198 TO FACILITY OPERATING LICENSE NPF-35

AND AMENDMENT NO.191 TO FACILITY OPERATING LICENSE NPF-52

DUKE ENERGY CORPORATION, ET AL.

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-413 AND 50-414

1.0 INTRODUCTION

By letter dated December 20, 2001, as supplemented by letters dated February 14, and March 26, 2002, Duke Energy Corporation, et al. (DEC, the licensee), submitted a request for changes to the Catawba Nuclear Station (CNS), Units 1 and 2, Technical Specifications (TS). The licensee proposed to apply an Alternate Source Term (AST) for CNS, Units 1 and 2, and proposed to incorporate NRC-approved Technical Specification Task Force (TSTF) Traveler TSTF-51, "Revise containment requirements during handling irradiated fuel and core alterations," Revision 2. The amendments would selectively adopt the AST specifically for a fuel handling accident (FHA) and a weir gate drop accident (WGDA) event. The licensee proposed to revise the TS to change the operability requirements for the following engineered safety features (ESF) components during core alterations and fuel handling activities:

Control Room Area Ventilation System (TS 3.7.10),
Control Room Area Chilled Water System (TS 3.7.11),
Fuel Handling Ventilation Exhaust System (TS 3.7.13), and
Containment Penetrations (TS 3.9.3).

In addition, the amendments would incorporate updated atmospheric dispersion factors for the Control Room intake pathway, and make an editorial change in TS 3.7.10.

The supplements dated February 14, and March 26, 2002, provided clarifying information that did not change the scope of the December 20, 2001, application nor the initial no significant hazards consideration determination.

2.0 BACKGROUND

The licensee states that the purpose of this request is to provide flexibility in scheduling outage tasks and to modify unnecessarily restrictive containment closure and fuel handling building ventilation system requirements. The elimination of the selected CNS TS ESF requirements during core alterations and the movement of sufficiently decayed irradiated fuel is proposed using NRC-approved TSTF-51, Revision 2 to NUREG-1431, "Standard Technical Specifications Westinghouse Plants" as a model.

This Safety Evaluation addresses the following issues that are required to implement the TSTF-51 changes:

1. The AST implementation will be limited to the design basis FHA and WGDA radiological consequence analysis performed to show compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.67(b)(2).

2. Updated atmospheric dispersion factors for the Control Room intake pathway associated with the FHA and WGDA.

3. TS revisions of requirements for operability of the Control Room Area Ventilation System (CRAVS), Fuel Handling Ventilation Exhaust System, Control Room Area Chilled Water System, and Containment Penetrations. The TS for these systems establish operability requirements during certain operating modes and activities. The licensee proposes to relax these requirements by eliminating applicability during core alterations and/or movement of irradiated fuel assemblies.

3.0 EVALUATION

3.1 Description of Changes

The TS are being amended in order to revise the operability requirements for the above-mentioned ESF components during fuel handling of sufficiently decayed irradiated fuel and core alterations activities.

Specifically, the following Limiting Conditions for Operation (LCOs) are amended:

Control Room Area Ventilation System (TS 3.7.10),
Control Room Area Chilled Water System (TS 3.7.11),
Fuel Handling Ventilation Exhaust System (TS 3.7.13), and
Containment Penetrations (TS 3.9.3).

3.2 Evaluation for TSTF-51

Following a reactor shutdown, the decay of the short-lived fission products greatly reduces the fission product inventory present in irradiated fuel. The proposed TS changes take advantage of a specific decay period to reduce the radionuclide inventory available for release in the event of an FHA. This specific decay period is calculated to be 72 hours. Following the 72-hour decay period, the primary success path for mitigating the FHA no longer includes the operability of the subject ESF components. The FHA is the bounding accident during fuel handling and core alterations. Fuel that has not decayed for 72 hours or longer is termed “recently irradiated fuel” and the subject ESF features must remain operable when moving such fuel.

Applying the “recently irradiated fuel” concept to these TS provides a mechanism for defining a minimum time for the fission product decay. The decay period of 72 hours has been shown by analysis to provide sufficient decay. Assuming the design basis FHA, the staff ensures that the results of the licensee’s analyses of the radiological consequences are within the acceptance criteria of 10 CFR 50.67, “Accident Source Term” and Regulatory Guide (RG) 1.183,

"Alternative Radiological Source Term for Evaluating Design Basis Accidents at Nuclear Power Reactors."

The licensee indicated that DEC will employ the modified guidelines of draft NUMARC 93-01, Revision 3, Section 11.3.6, "Assessment Methods of Shutdown Conditions," Subheading "Containment - Primary (PWR)." Specifically, the guidelines that will be adopted are:

1. During movement of recently irradiated fuel assemblies, ventilation system and radiation monitor availability (as defined in NUMARC 91-06) should be assessed, with respect to filtration and monitoring of releases from the fuel. Following shutdown, radioactivity in the Reactor Coolant System decays fairly rapidly. The goal of maintaining ventilation system and radiation monitor availability is to reduce doses even further below that provided by the natural decay, and to avoid unmonitored releases.

2. A single normal or contingency method to promptly close primary or secondary containment penetrations exists. Such prompt methods need not completely block the penetration or be capable of resisting pressure. The purpose is to enable ventilation systems to draw the release from a postulated FHA in the proper direction such that it can be treated and monitored.

The proposed TS amendments eliminate the term "during CORE ALTERATIONS" in TS 3.7.10, TS 3.7.11, and TS 3.9.3, and add the term "recently" as a modifier of irradiated fuel ("recently irradiated fuel") in TS 3.7.11, TS 3.7.13, and TS 3.9.3. The amendments result in restricting the OPERABILITY requirement for these systems to the movement of recently irradiated fuel assemblies within the containment and the fuel handling building. This operability restriction envelops the situations that would require these systems to be operable in order to mitigate the consequences of an FHA or a WGDA.

The term, "CORE ALTERATIONS," is defined in the CNS TSs as the movement of fuel, sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel. As described in TSTF-51, Revision 2, accidents postulated to occur during core alterations include inadvertent criticality, fuel handling accident, and the loading of a fuel assembly or a control component in an incorrect location. Generically, it was concluded that of these off normal occurrences, only the fuel handling accident results in cladding damage and potential radiological release. Consequently, to delete the phrase "during core alterations" from TS 3.7.10, TS 3.7.11 and TS 3.9.3 is consistent with TSTF-51, Revision 2.

The proposed amendments would also revise TS 3.7.13 to require immediate suspension of movement of recently irradiated fuel when less than two trains are operable during the movement of the recently irradiated fuel in the fuel handling building. In addition, the proposed amendments would revise TS 3.7.10 to require immediate suspension of the movement of irradiated fuel when there are less than two trains operable. These two changes are conservative. Also, the Footnote associated with LCO 3.7.10 will be deleted as an editorial change. This Footnote is no longer applicable. The licensee has chosen not to change TS 3.7.10 to include the "recently irradiated fuel" concept, since DEC has taken credit for its CRAVS system in its FHA and WGDA evaluation at CNS.

The proposed revisions are consistent with the surveillance requirements contained in NUREG-1431. The changes are consistent with the staff guidance in TSTF-51. Similar changes have been approved by the staff for other pressurized and boiling water reactors.

3.3 Probabilistic Risk Assessment Evaluation

3.3.1 Alternative Source Term

In December 1999, the NRC issued a new regulation, 10 CFR 50.67, "Accident Source Term," that provided a mechanism for licensed power reactors to voluntarily replace the traditional accident source term used in their design basis accident (DBA) analyses with ASTs. Regulatory guidance for the implementation of these ASTs is provided in RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." Under 10 CFR 50.67 a licensee seeking to use the AST is required to apply for a license amendment and the application is required to contain an evaluation of the consequences of DBAs. The licensee's submittal addresses these requirements by proposing to selectively use the AST in evaluating the offsite and control room radiological consequences of an FHA and a WGDA. These re-analyses involved several changes in selected analysis assumptions including revised values for atmospheric dispersion values for the control room outside air intakes.

The staff did confirmatory calculations for the FHA and WGDA and did a confirmatory evaluation of the atmospheric dispersion parameters used in the dose analyses. The licensee stated, and the staff concurs, that these DBAs are limiting events with regard to the proposed TS changes. Since only the FHA and WGDA were revised to use the AST, the CNS implementation of the AST is considered a selective application that applies only to the FHA and WGDA analyses. The following sections of this Safety Evaluation provide the results of the staff's review of the licensee's analyses. Table 1 provides the analysis inputs and assumptions found acceptable to the staff. Although the staff did confirmatory analyses, the staff's approval of the requested changes is based on the information docketed by the licensee and on the staff's finding that the methods, inputs, and assumptions used in the licensee's analyses are acceptable.

3.3.2 Fuel Handling Accident and Weir Gate Drop Accident Radiological Consequences

The licensee evaluated the consequences of these two events. The FHA analysis postulates that a spent fuel assembly is dropped during refueling, damaging all of the rods in the assembly. This accident could happen inside the containment (CNMT) or fuel handling building in either unit. The assumptions chosen for this evaluation bound the consequences at these four locations. The WGDA considers the radiological consequences of dropping a weir gate into the spent fuel pool. The dropped weir gate is assumed to fall on a maximum of seven fuel assemblies.

In either case, all of the gap inventory is assumed to be released from the damaged fuel rods. The licensee assumed that 8 percent of the I-131 inventory of the core was in the fuel rod gap, along with 10 percent of the Kr-85, and 5 percent of all other iodines and noble gases. Since the alkali metals make a negligible contribution to dose for this analysis, the licensee assumed no alkali metals present in the fuel gap. RG 1.183 provides that particulate radionuclides are retained by the water in the fuel pool or reactor cavity. As such, the licensee's gap fraction

assumptions are acceptable for this analysis. The licensee assumed a decay period of 72 hours for the FHA and 468 hours for the WGDA. The core inventory was determined using the NRC-sponsored SCALE computer code using the rated thermal power plus uncertainty. An adjustment was made to the analysis to account for radial peaking.

The licensee assumed the iodine species fractions for the fuel release to be 99.85 percent elemental and 0.15 percent organic. This is consistent with RG 1.183 and is acceptable. The licensee assumed a pool decontamination factor (DF) of 500 for elemental iodine and a DF of 1.0 for noble gases and organic iodides. At the assumed iodine species fractions, the effective DF for the pool is about 285. RG 1.183, while identifying a DF of 500 for elemental iodine, stated that the effective pool DF was 200 (calculated value rounded down). The staff expected licensees to use the effective value in DBA analyses. In response to staff comments, the licensee re-analyzed the two events assuming a pool DF of 200. In the March 26, 2002, submittal the licensee provided analyses assuming a DF of 285 and a DF 200. The staff notes that it relied on only the analyses that used the DF of 200 in making its findings. Consistent with the guidance provided in RG 1.183, the value of 200 for the pool DF should be used by the licensee in future design basis FHA and WGDA analyses.

The inventory released from the damaged assembly is released over a 2-hour period. Releases from an FHA inside the CNMT could be released from (1) the equipment hatch to the environment, (2) the personnel airlock into the auxiliary building and through the unit vent stack to the environment, or (3) through CNMT ventilation to the environment via the unit vent stack. Releases from an FHA or WGDA inside the fuel building could be released from (1) the fuel building ventilation system to the environment via the unit vent stack or, if the ventilation system is inoperable, (2) through louvers and doorway penetrations in the fuel building. Since the licensee has conservatively modeled 100 percent of the fission product release occurring in 2 hours and has not credited building holdup or removal of iodine by filters in the CNMT or fuel building, the transport to the environment is effectively identical for all three pathways at both units. As a result, it was not necessary to perform an analysis for each pathway.

The licensee evaluated the dose to operators in the control room. It was assumed that an equipment failure would require the operators to start the standby train of the CRAVS. Consequently, the licensee assumed that CRAVS would not be operational until 30 minutes post-accident. The standby CRAVS train can be started within the control room with a small number of operator actions. During refueling operations, continuous communications are maintained between the control room and the refueling crew. During an FHA or WGDA, only limited actions are required of the control room operators to contend with these events. As such, the staff finds the assumed 30-minute delay in CRAVS actuation conservative and acceptable.

Once the CRAVS train is started, outside air would be drawn into the control room through charcoal filters at a flow rate of 2000 cfm. Also, air already in the control room would be recirculated through charcoal filters at a flow rate of 1500 cfm (for a total filter flow of 3500 cfm). With CRAVS operational, the licensee assumed an unfiltered inleakage flow rate of 100 cfm. During the initial 30-minute period when CRAVS is not operational, the licensee assumed the unfiltered inleakage flow rate to be 2100 cfm.

Based on control room infiltration testing, the licensee assumed a total unfiltered inleakage of 100 cfm in its analysis. On February 21, 2002, the NRC staff met with licensee personnel to

discuss the control room infiltration testing that had been performed on the CNS control room. The assumed value of unfiltered inleakage includes a measured component infiltration of 40 cfm, an assumed ingress and egress air exchange equivalent to 10 cfm, and air releases from instrument air components of 15 cfm. Results from a tracer gas test indicate that the unfiltered inleakage flow rate is relatively low at CNS. The staff has not completed the evaluation of the licensee's test program. However, the staff has determined that there is adequate assurance that the radiation doses to control room personnel will not impede the response actions necessary to protect the public. The staff bases this decision on (1) the testing results (currently under review by the staff), (2) the margin between the dose postulated using 100 cfm and the control room dose acceptance criteria that would allow much higher infiltration rates, (3) the licensee's exponential modeling of the release that causes much of the activity to enter the control room during the first 30 minutes of the 2-hour release period, and (4) the limited response actions that can be performed inside the control room to mitigate the offsite consequences of an FHA or WGDA. While the staff has determined that the assumed inleakage (100 cfm) is acceptable to support its review of this submittal, the licensee should be aware that the staff has issued, for public comment, four draft regulatory guides on control room habitability issues and is planning to issue a generic communication that will request licensees to provide information related to these issues. The staff's acceptance of the licensee's unfiltered in leakage assumption is limited to this licensing action and does not exempt the licensee from future regulatory actions that may become applicable due to the generic initiative or the staff's disposition of the testing issues.

Details on the assumptions found acceptable to the staff are presented in Table 1. The doses estimated by the licensee for the postulated FHA and WGDA were found to be acceptable in accordance with 10 CFR 50.67.

3.3.3 Atmospheric Relative Concentration Estimates

The licensee calculated new control room relative concentration (X/Q) estimates for the dose assessment described above using onsite meteorological data collected during calendar years 1994 through 1999. Between 1994 and June 1996 these data were measured at 10 and 40 meters above grade. In June 1996 measurements commenced at 10 and 60 meters on a new tower. The licensee confirmed that the meteorological measurement program was maintained to comply with the recommendations in RG 1.23, "Onsite Meteorological Programs." The licensee estimated data recovery to be in excess of 95 percent each year between 1994 and 1998, thus surpassing the recommended minimum of 90 percent cited in RG 1.23. The tower area was free of obstructions that might otherwise influence meteorological measurements. Weekly checks were performed to ensure that systems were within tolerances. Scheduled calibrations were performed on a semi-annual basis when wind and temperature instruments were replaced with newly certified sensors. Prior to archiving, the data were reviewed and approved by an in-house Certified Consulting Meteorologist.

The staff performed a review of the meteorological data submitted by the licensee using the methodology described in NUREG-0917, "Nuclear Regulatory Commission Staff Computer Programs for Use with Meteorological Data." Further review was performed using a computer spreadsheet. Staff could not confirm the licensee's estimates of data recovery since, in addition to data identified as invalid, there appeared to be some occurrence of wind data remaining unchanged for two or more consecutive hours. However, factoring this in, the staff estimated the overall recovery for the 6-year period to still be in excess of 90 percent. The staff

also noted that unstable conditions were reported to occur occasionally during the night and, in some cases, for a longer duration than would be expected due to typical meteorological processes. However, the reported occurrences were judged to have an insignificant effect on the X/Q estimates for the FHA dose assessment described above. The onsite measurements indicate some year-to-year variability in wind speeds, but wind direction frequencies at both lower and upper levels were very similar from year to year. Each of the heights showed distinct bimodal flow, generally from the north and south southwest at the 10 meter level and north northeast and southwest at the 40 and 60 meter levels.

The licensee calculated new X/Q values using site-specific inputs and the ARCON96 computer code (NUREG/CR-6331, Rev. 1, "Atmospheric Relative Concentrations in Building Wakes") for the control room estimates. Releases were postulated to occur from the CNMT equipment hatches, the fuel buildings and the unit vents to each of the two control room intakes. All releases were assumed to be ground level. The licensee stated that conservative minimum distances from the assumed release to receptor locations were used. In the case of the equipment hatch estimates, the releases were assumed to come from the center of the hatch opening. The limiting case was estimated to occur from the plant vent, taking credit for a low flow, although under some infrequent conditions the fans may not be functional. However, the licensee stated, and the staff confirmed, that the assumed flow is so low that it has an insignificant effect on the resultant X/Q calculations. The staff qualitatively reviewed the inputs to the code and found them to be consistent with staff practice and site configuration drawings provided by the licensee.

With respect to the 0- to 2-hour and 0- to 8-hour X/Q values for the exclusion area boundary (EAB) and low population zone (LPZ), respectively, the licensee used values previously approved in Amendment No. 159 and No. 151, dated April 29, 1997. The staff did not directly review the X/Q values as a part of this amendment request since there did not appear to be a need to do so. However, the staff performed a comparison calculation using the 1994 through 1999 meteorological data and the PAVAN methodology that is based upon RG 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants."

Based on this review, the staff finds the X/Q values listed in Table 1 to be acceptable.

3.4 Technical Specification Changes

- The proposed changes to TS 3.7.10, Control Room Area Ventilation System, will require immediate suspension of the movement of irradiated fuel when there are less than two trains of the system operable.

  This change provides additional assurance that at least one train of the control room area ventilation system will be operable, as assumed in the control room habitability analyses. There are no impacts on the previously analyzed control room doses due to this change and, as such, the proposed change is acceptable from an accident radiological consequence perspective.

- The proposed changes to TS 3.7.11, Control Room Area Chilled Water System, will delete applicability of this TS during core alterations and will limit applicability during movement of irradiated fuel to recently irradiated fuel. The Bases were revised to provide

a definition of recently irradiated fuel as fuel that has occupied part of a critical reactor core within the previous 72 hours.

Operability of this system is not credited as a mitigation system for the postulated FHA and WGDA. There are no impacts on the previously analyzed control room doses due to this change and, as such, the proposed change is acceptable from an accident radiological consequence perspective.

- The proposed changes to TS 3.7.13, Fuel Handling Ventilation Exhaust System, include: (1) revising an LCO to require that two trains be operable during the movement of recently irradiated fuel in the fuel building, (2) revising an action statement to require that the movement of recently irradiated fuel in the fuel building be suspended if one train becomes inoperable, and (3) providing a definition in the Bases of recently irradiated fuel as fuel that has occupied part of a critical reactor core within the previous 72 hours.

  These changes provide additional assurance that at least one train of the fuel handling ventilation exhaust system will be operable during movement of recently irradiated fuel. The revised FHA and WGDT analyses discussed in Section 3.3.2 of this Safety Evaluation did not assume credit for collection, filtration, or exhaust via this ventilation system. The analysis did assume a 72-hour decay period, consistent with the definition of recently irradiated fuel. The proposed changes are acceptable from a radiological standpoint since they are consistent with the analysis assumptions used in demonstrating compliance with radiological acceptance criteria.

- The proposed changes to TS 3.9.3, Containment Penetrations, will delete applicability of this TS during core alterations. With this change, current TS requirements regarding closure of the CNMT equipment hatch, the personnel airlock, and CNMT penetrations would only apply during movement of recently irradiated fuel. The Bases were revised to provide a definition of recently irradiated fuel as fuel that has occupied part of a critical reactor core within the previous 72 hours. This requested change is consistent with TSTF-51, Revision 2.

  The revised FHA and WGDA analyses discussed in Section 2.0 of this Safety Evaluation did not assume holdup of the accident releases in CNMT nor did they assume credit for collection, filtration, or exhaust by any ventilation system. The analysis did assume a 72-hour decay period, consistent with the definition of recently irradiated fuel. The proposed changes are acceptable from a radiological standpoint since they are consistent with the analysis assumptions used in demonstrating compliance with radiological acceptance criteria.

3.5 Summary

The staff has reviewed the AST implementation proposed by DEC for the CNS, Units 1 and 2. The staff also reviewed the proposed changes to the TS associated with this license amendments request. In doing this review, the staff relied upon information placed on the docket by licensee, staff experience in doing similar reviews and, where deemed necessary, on staff confirmatory calculations.

This amendments request is considered a selective implementation of the AST. While the licensee adopted all characteristics of the AST, its assessment was limited to the consequences of an FHA and a WGDA. With the approval of these amendments, the AST, the total effective dose equivalent (TEDE) criteria, and the analysis methods, assumptions and inputs become the licensing basis for the assessment of radiological consequences of FHA and WGDA design basis accidents. All future radiological analyses done to show compliance with DBA dose acceptance criteria must use this approved licensing basis. This approval is limited to this specific application. The AST and TEDE criteria may not be extended to other aspects of plant design or operation without prior NRC review pursuant to 10 CFR 50.67.

The staff reviewed the assumptions, inputs, and methods used by the licensee to assess the radiological impacts of the proposed changes. The staff finds that the licensee used analysis methods and assumptions consistent with the conservative guidance of RG 1.183, with the exceptions discussed and accepted earlier in this Safety Evaluation. The staff compared the radiation doses estimated by the licensee to the applicable acceptance criteria and to the results estimated by the staff in its confirmatory calculations. The licensee estimated a radiation dose of 2.3 rem TEDE due to an FHA and 3.6 rem TEDE due to WGDA to control room occupants. Similarly, the licensee estimated a radiation dose of 1.6 rem TEDE due to an FHA and 2.9 rem TEDE due to a WGDA to an individual at the exclusion area boundary. The staff finds, with reasonable assurance, that the licensee's estimates of the TEDE due to fuel handling and weir gate drop accidents comply with the requirements of 10 CFR 50.67 and the guidance of RG 1.183.

The staff finds, with reasonable assurance, that the CNS, Units 1 and 2, will continue to provide sufficient safety margins with adequate defense in depth to address unanticipated events and to compensate for uncertainties in accident progression and in analysis assumptions and parameters. The staff concludes that the proposed AST implementation and the associated TS changes are acceptable from the standpoint of radiological consequences. These changes are also consistent with the staff's guidance in TSTF-51. The staff finds these changes acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the South Carolina State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. 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 such finding (67 FR 7415). 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) 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: April 23, 2002

TABLE 1

ANALYSIS ASSUMPTIONS

Core power (includes 2% uncertainty penalty), MWt	3479
Radial peaking factor	included
Number of damaged fuel assemblies	
FHA	1
Weir gate drop	7
Decay time, days	
FHA,	3
Weir gate drop	19.5
Fuel rod gap fractions	
I-131	0.08
Kr-85	0.10
All other noble gases, iodines	0.05
Alkali metals	0.0
Iodine species fractions	
Elemental	0.9985
Organic	0.0015
Particulates	none
Water depth, ft	23
Pool scrubbing factor, effective	200
Release modeling	
Immediate release from fuel through pool to building / CNMT	
100% release from building / CNMT within 2 hours	
No credit for building holdup or filtration prior to release	
Control Room Volume, ft^3	117,920
CRAVS start delay time, minutes	30
Unfiltered inleakage, cfm	
Before CRAVS start	2100
After CRAVS start	100
CRAVS filter flow, cfm	
Recirculation	1500
Outside air makeup	2000
Total	3500

TABLE 1 (Continued)

CRAVS filter efficiency, %	
Elemental iodine	99
Organic iodine	95
Control room occupancy factors	
0-24 hr	1.0
24-96 hr	0.6
96-720 hr	0.4
Control room breathing rate, m^3/s	3.5E-4
Offsite breathing rate, m^3/s	
0-8 hrs	3.5E-4
Atmospheric dispersion factors, s/m^3	
EAB 0-2 hours	4.78E-4
LPZ 0-8 hours	6.85E-5
Control Room 0-2 hours	1.74E-3

Catawba Nuclear Station

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