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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 145 TO FACILITY OPERATING LICENSE NO. NPF-2

AND AMENDMENT NO. 136 TO FACILITY OPERATING LICENSE NO. NPF-8

SOUTHERN NUCLEAR OPERATING COMPANY, INC., ET AL.

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-348 AND 50-364

1.0 INTRODUCTION

By letter dated June 30 1997, as supplemented by letters dated February 22, March 19, June 30, and October 4, 1999, the Southern Nuclear Operating Company, Inc. (SNC) et al., submitted a request for changes to the Joseph M. Farley Nuclear Plant (FNP), Units 1 and 2, Technical Specifications (TSs) and associated Bases. The requested changes would clarify surveillance requirements (SRs) for the control room emergency filtration system (CREFS), penetration room filtration system (PRFS) and related storage pool ventilation system. The changes would also revise the required number of radiation monitoring instrumentation channels and would delete the containment purge exhaust filter TSs. The February 22, March 19, June 30, and October 4, 1999, letters provided clarifying information that did not change the June 30, 1997, application and the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

FNP's TSs SRs currently refer to American National Standards Institute (ANSI) N510-1980 for performing in-place dioctyl phthalate (DOP) testing, leak testing charcoal adsorbers, and verifying ventilation and filtration system laboratory testing efficiencies. ANSI N510-1980 does not clearly differentiate between initial acceptance testing and periodic surveillance testing. FNP's original system designs did not have to conform with ANSI N509. However, ANSI N510-1980 is predicated on ANSI N509 designs. Thus, SNC would have to modify their systems, disassemble items, or breach pressure boundaries to completely apply the 1980 standard.

SNC-proposed TSs changes include the following:

- Revise testing high-efficiency particulate air (HEPA) filter and charcoal adsorber combined pressure drop at design flow rate since the original system designs did not need to conform with ANSI N509.
- Revise the acceptance criteria for adsorber efficiency laboratory testing to comply with ASME N510-1989.
- Revise the CREFS pressurization system filter heater output to eliminate excess capacity.

- Add an enhanced requirement to verify PRFS capability to maintain a negative pressure in the penetration room boundary in the post-loss-of-coolant accident (LOCA) mode.
- Take credit for radiation monitoring instrumentation initiating protective actions in the event of a fuel handling accident (FHA).
- Require two control room radiation monitoring channels to provide redundant, single failure proof isolation of the normal heating, ventilation, and air conditioning (HVAC) system.
- Require two channels of containment purge and exhaust isolation radiation monitors to provide redundant, single failure proof isolation of the containment for an FHA in containment.
- Require two channels of fuel storage pool area radiation monitors to isolate the normal HVAC system and initiate the PRFS for an FHA in the fuel storage pool area.

3.0 EVALUATION

3.1 Control Room Emergency Filtration System

The TS 3/4.7.7.1 Action Statement has a footnote that states the following:

> A one-time extension to 30 days for each train of the recirculation filtration function of CREFS is granted for implementation of control room cooling design change. The provisions of specification 3.0.4 are not applicable during this 30-day extension. This one-time extension expires on completion of the Unit 1 14th refueling outage (spring '97).

SNC proposed eliminating this footnote. It is acceptable to eliminate this footnote since it expired in 1997.

3.1.1 SRs 4.7.7.1 b.1 (b) and (c)

SR 4.7.7.1 b.1 (b) specifies performing in-place HEPA filter DOP testing in accordance with Section 10 of ANSI N510-1980. SNC proposed performing the test in accordance with American Society of Mechanical Engineers (ASME) N510-1989. SR 4.7.7.1 b.1 (c) stipulates performing charcoal adsorber section leak testing with a gaseous halogenated hydrocarbon refrigerant in accordance with Section 12 of ANSI N510-1980. SNC proposes to perform this testing in accordance with ASME N510-1989.

SNC proposed changing SRs 4.7.7.1 b.1 (b) and 4.7.7.1 b.1 (c) to clarify the requirements associated with FNP filtration system testing and to bring FNP closer to current industry standards. The staff agrees that converting from ANSI N510-1980 to ASME N510-1989 will bring FNP closer to current industry standards. The staff has no objections to this conversion; therefore, it is acceptable.

3.1.2 SR 4.7.7.1 b 2

SR 4.7.7.1 b 2 requires verifying that laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the following testing efficiencies when tested with methyl iodide at 80 °C and 70% relative humidity:

Current TSs

(1) control room recirculation filter unit	≥99%
(2) control room filter unit	≥99%
(3) control room pressurization	≥99.825%

SNC proposes to change this to verifying that laboratory analysis of a representative carbon sample obtained in accordance with ASME N510-1989 and tested in accordance with American Society for Testing and Materials (ASTM) D3803-1989 meets the following testing efficiencies when tested with methyl iodide at 30 °C and 70% relative humidity:

Proposed TSs

(1) control room recirculation filter unit	≥97.5%
(2) control room filter unit	≥97.5%
(3) control room pressurization	≥99.5%

These changes are consistent with converting from ANSI N510-1980 to ASME N510-1989 and meet the intent of Generic Letter (GL) 99-02 "Laboratory Testing of Nuclear-Grade Activated Charcoal." Therefore, they are acceptable.

3.1.3 SR 4.7.7.1 c

SR 4.7.7.1 c requires that after every 720 hours of charcoal adsorber operation, SNC is to verify that a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the Current TS testing efficiencies shown above when tested with methyl iodide at 80 °C and 70% relative humidity.

SNC's proposed TS specifies that after every 720 hours of charcoal adsorber operation, SNC is to verify that a laboratory analysis of a representative carbon sample obtained in accordance with ASME N510-1989 and tested in accordance with ASTM D3803-1989 meets the Proposed TS testing efficiencies criteria shown above when tested with methyl iodide at 30 °C and 70% relative humidity.

Proposed TS SR 4.7.7.1 c will acceptably demonstrate methyl iodide penetration. The CREFS has three filter units as follows:

- control room recirculation filter unit with 2-inch deep charcoal beds
- control room filtration filter unit with 2-inch deep charcoal beds
- control room pressurization filter unit with a 6-inch deep charcoal bed

SNC's proposed laboratory test acceptance criteria for the CREFS efficiencies credited in the safety analyses is 95% for the 2-inch deep beds and 99% for the 6-inch deep bed. This results in laboratory test acceptance criteria of 97.5% for the recirculation and filtration units and 99.5% for the pressurization unit. These changes result in a methyl iodide penetration of 2.5% for the 2-inch beds and 0.5% for the 6-inch bed, which represents a safety factor of two. The NRC staff finds that the proposed acceptance criteria provide reasonable assurance that, at the end of the operating cycle, the charcoal will be capable of performing at a level that is consistent with SNC's dose analysis; therefore, the proposed acceptance criteria are acceptable. The safety factor is acceptable based on test result accuracy obtained using the ASTM D3803-1989 standard and on being consistent with GL 99-02.

3.1.4 SR 4.7.7.1 d.1

SR 4.7.7.1 d.1 specifies verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6 inches Water Gauge while operating the system at a flow rate indicated in TS Note 1.

TS Note 1:

a. control room recirculation filter unit	2000 cfm ± 10%
b. control room filter unit	1000 cfm ± 10%
c. control room pressurization filter unit	300 cfm ± 10%

SNC proposes to verify that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than indicated in proposed Note 3 while operating the system at a flow rate indicated in proposed TS Note 1.

Proposed TS Note 1:

a. control room recirculation filter unit	2000 cfm ± 10%
b. control room filter unit	1000 cfm ± 10%
c. control room pressurization filter unit	300 cfm +25%-10%

Proposed TS Note 3:

a. Control room recirculation filter unit	2.3 inches water gauge
b. Control room filter unit	2.9 inches water gauge
c. Control room pressurization filter unit	2.2 inches water gauge

SNC stated that the pressure drop (measured in inches water gauge) across the combined HEPA and charcoal adsorber will be revised to a value consistent with system design (2.3 inches for the CREFS recirculation unit, 2.9 inches for the CREFS filtration unit, 2.2 inches for the CREFS pressurization unit, and 2.6 inches for the PRFS). This change is acceptable because these values are consistent with the system design and are more conservative than the current value of 6 inches water gauge.

3.1.5 SR 4.7.7.1 d.4

SR 4.7.7.1 d.4 requires verifying that the pressurization system heater dissipates 7.5 ± 0.8 kw when tested in accordance with ASME N510-1989. SNC proposes verifying that the heater dissipates 2.5 ± 0.5 kw when tested in accordance with ASME N510-1989.

The staff performed an independent calculation and verified that 2.5 ± 0.5 kw is adequate. Therefore, this change is acceptable.

3.1.6 SRs 4.7.7.1 e and f

SR 4.7.7.1 e stipulates that after each complete or partial replacement of a HEPA filter bank, SNC is to verify that the HEPA filter banks remove ≥ 99.5% of the DOP when tested in place in accordance with Section 10 of ANSI N510-1980 while operating the system at a flow rate indicated in TS Note 1 above. SNC proposes that after each complete or partial replacement of a HEPA filter bank, SNC is to verify that the HEPA filter banks remove ≥ 99.5% of the DOP when tested in place in accordance with ASME N510-1989 while operating the system at a flow rate indicated in Proposed TS Note 1.

SR 4.7.7.1 f specifies that after each complete or partial replacement of a charcoal adsorber bank, SNC is to verify that the charcoal absorbers remove ≥ 99.5% of a halogenated hydrocarbon refrigerant test gas when tested in place in accordance with Section 12 of ANSI N510-1980 while operating the system at a flow rate indicated in TS Note 1. SNC proposes that after each complete or partial replacement of a charcoal adsorber bank, it will verify that the charcoal absorbers remove ≥ 99.5% of a halogenated hydrocarbon refrigerant test gas when tested in place in accordance with ASME N510-1989 while operating the system at a flow rate indicated in Proposed TS Note 1.

The staff has no objections to the proposed changes to SRs 4.7.7.1 e and 4.7.7.1 f. The staff concludes that these changes will also help bring FNP closer to the industry standards and, therefore, finds these changes acceptable. In addition, SNC-proposed associated changes to the Basis of TS 4.7.7 clarify the existing Basis. The staff assessed these proposed changes and also finds them acceptable.

3.2 Penetration Room Filtration System

3.2.1 SR 4.7.8 a.

SR 4.7.8 a. requires initiating flow through the HEPA filters and charcoal absorbers and verifying that the system has operated for at least 10 hours with the heaters on during the past 31 days. SNC proposes to initiate flow through the HEPA filters and charcoal absorbers and verify that the system has operated for at least 15 minutes in its post-LOCA alignment.

SNC stated that credit is not taken for the heaters in the PRFS. The staff finds this change acceptable for a system without heaters or when no credit is taken for heaters in a system that has heaters.

3.2.2 SRs 4.7.8 b.1 (b) and (c)

SR 4.7.8 b.1 (b) specifies performing an in-place DOP test on the HEPA filters in accordance with Section 10 of ANSI N510-1980. SNC proposes performing an in-place DOP test on the HEPA filters in accordance with ASME N510-1989.

SR 4.7.8 b.1 (c) requires performing a charcoal adsorber section leak test with a gaseous halogenated hydrocarbon refrigerant in accordance with Section 12 of ANSI N510-1980. SNC proposes performing a charcoal adsorber section leak test with a gaseous halogenated hydrocarbon refrigerant in accordance with ASME N510-1989.

The staff finds the proposed changes to SRs 4.7.8 b.1 (b) and 4.7 8 b.1 (c) acceptable since these changes will bring FNP closer to the industry standards.

3.2.3 SRs 4.7.8 b.2 and c

SR 4.7.8 b.2 stipulates verifying that a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the testing criterion of $\geq$ 95% efficiency when tested with methyl iodide at 80 °C and 70% relative humidity. SNC proposes to verify that a laboratory analysis of a representative carbon sample obtained in accordance with ASME N510-1989 and tested in accordance with ASTM D3803-1989 meets the laboratory testing criterion of $\geq$ 95% efficiency when tested with methyl iodide at 30 °C and 95% relative humidity.

SR 4.7.8 c requires that after every 720 hours of charcoal adsorber operation, a laboratory analysis of a representative carbon sample obtained in accordance with Section 13 of ANSI N510-1980 meets the laboratory testing criterion of $\geq$ 95% efficiency when tested with methyl iodide at 80 °C and 70% relative humidity. SNC proposes that after every 720 hours of charcoal adsorber operation, a laboratory analysis of a representative carbon sample obtained in accordance with ASME N510-1989 and tested in accordance with ASTM D3803-1989 meets the laboratory testing criterion of $\geq$ 95% efficiency when tested with methyl iodide at 30 °C and 95% relative humidity.

The staff finds the proposed changes to SRs 4.7.8 b.2 and 4.7.8 c acceptable. These changes are consistent with later versions of the standards which the industry and the NRC adopted, and the changes are consistent with GL 99-02.

3.2.4 SR 4.7.8 d.1

SR 4.7.8 d.1 requires verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is < 6 inches of water gauge while operating the system at a flow rate of 5000 cfm ± 10%. SNC proposes to verify that pressure drop across the combined HEPA filters and charcoal adsorber banks is < 2.6 inches of wager gauge while operating the system at a flow rate of 5000 cfm ± 10%.

The staff finds this change acceptable because it is more conservative and because this value is consistent with the system design.

3.2.5 SR 4.7.8 d.3

SR 4.7.8 d.3 indicates that SNC is to verify that the heaters dissipate 25 ± 2.5 kw when tested in accordance with ASME N510-1989. SNC is proposing to delete this requirement.

The staff finds this acceptable because these heaters are no longer credited in the plant accident analysis.

3.2.6 SRs 4.7.8 e and 4.7.8 f

SNC is proposing to add a new SR 4.7.8 e and to re-label and change existing SRs 4.7.8 e and 4.7.8 f to 4.7.8 f and 4.7.8 g, respectively. The new SR 4.7.8 e will read as follows:

> At least once per 36 months on a staggered test basis; by verifying one PRFS train can maintain a pressure ≤ -0.125 inches water gauge relative to adjacent areas during the post LOCA mode of operation at a flow rate of ≤ 5500 cfm.

Adding the new SR 4.7.8 e adds an additional SR and thereby makes system surveillance more conservative. Therefore, the staff finds this addition acceptable. Re-labeling SRs 4.7.8 e and 4.7.8 f to become 4.7.8 f and 4.7.8 g, respectively, is an administrative change and is therefore acceptable.

SR 4.7.8 e (which SNC is proposing to make SR 4.7.8 f) requires verifying after each complete or partial HEPA filter bank replacement that the HEPA filter banks remove ≥ 99.5% of the DOP when tested in place in accordance with Section 10 of ANSI N510-1980 with a system flow rate of 5000 cfm ± 10%. SNC proposes to require verifying that the HEPA filter banks remove ≥ 99.5% of the DOP when tested in place in accordance with ASME N510-1989 with a system flow rate of 5000 cfm ± 10% after each complete or partial HEPA filter bank replacement.

SR 4.7.8 f (which SNC is proposing to make SR 4.7.8 g) requires verifying that the charcoal absorbers remove ≥ 99.5% of a halogenated hydrocarbon refrigerant test gas when tested in place in accordance which Section 12 of ANSI N510-1980 while operating the system at a flow rate of 5000 cfm ± 10% after each complete or partial charcoal bank replacement. SNC proposes to require verifying that the charcoal absorbers remove ≥ 99.5% of a halogenated hydrocarbon refrigerant test gas when tested in place in accordance which ASME N510-1989 while operating the system at a flow rate of 5000 cfm ± 10% after each complete or partial charcoal bank replacement.

The staff finds the proposed changes to SRs 4.7.8 f and 4.7.8 g acceptable since these changes will bring FNP closer to the industry standards. SNC proposed corresponding changes to the Basis of TS 4.7.8 in order to clarify the intent of the proposed changes. The staff reviewed these changes and finds them acceptable.

One of the proposed changes to the TS 4.7.8 SRs involves demonstrating PRFS capability to process all radioactivity released to the areas the PRFS serves. PRFS design bases include the capability to filter radioactivity emanating from a LOCA or an FHA. Specifically, the Farley PRFS design bases assume that the PRFS will filter emergency core cooling system leakage from a LOCA and releases of radioactive material from an FHA in the spent fuel pool (SFP) area without any bypass occurring. To assure that this system filters all radioactive material without bypass necessitates eliminating paths which can bypass the PRFS. SNC has proposed an SR which shows that the areas served by the PRFS in the event of a LOCA are at a negative pressure of 1/8 inch water gauge relative to adjacent areas as a means of demonstrating that no bypass paths exist. However, while SNC proposed this demonstration for the PRFS in the LOCA configuration alignment, SNC did not propose this for the PRFS in the fuel handling system alignment. The NRC's position is that SNC should provide a means for verifying and demonstrating that the PRFS will perform its intended function while in the FHA configuration. Otherwise, the remaining surveillance tests are irrelevant. The PRFS capability to perform its design bases in the FHA mode would be in question absent such a demonstration.

In response to the NRC's position, SNC indicated that they did not propose such a demonstration due to limited installed instrumentation. SNC would have to make a plant design change in order to accurately measure negative pressure with installed instrumentation, and this is not cost-justified. SNC provided additional details on those areas adjacent to the SFP storage areas. Some areas such as the roof are at atmospheric pressure. SNC keeps the new fuel storage area at a slightly positive pressure relative to the SFP storage area. If the non-safety-related new fuel storage area fan is lost, this area would be at atmospheric pressure. The radwaste area ventilation system treats the motor control center rooms, hallway, and SFP pump, cooling and cleanup rooms. SNC keeps these areas at a negative pressure and discharges are through non-safety-related charcoal. These areas could be a source of bypass from the SFP storage area since they are at a relatively negative pressure.

SNC proposed adding an item c to SR 4.9.12.2 to resolve the staff's concern. Item c specifies verifying at least once per 36 months on a staggered test basis that one PRFS train can maintain a slightly negative pressure relative to adjacent areas during the FHA mode of operation. SNC also proposed to add a discussion to the TS 3.9.12.2 Bases indicating that SNC can use a non-rigorous method to verify that the PRFS will maintain a slightly negative pressure relative to adjacent areas during the FHA mode of operation. Examples of such non-rigorous methods include smoke sticks, hand held differential pressure indicators, or other measurement devices that do not provide for an absolute measurement.

The staff assessed SNC's basis for this non-rigorous method. The NRC concluded that SNC using a non-rigorous method to demonstrate that the PRFS is meeting its design basis while in the SFP storage configuration acceptably demonstrates the intent of the system is fulfilled.

3.3 Storage Pool Ventilation System

3.3.1 SR 4.9.12.2

SR 4.9.12.2 specifies that SNC is to demonstrate that the PRFS is Operable in accordance with the requirements of SR 4.7.8. SR 4.7.8 a. requires SNC to initiate from the control room PRFS flow through the HEPA filters and charcoal absorbers and verify that the system has operated for at least 10 hours with the heaters on during the past 31 days. SR 4.7.8 a. requires SNC to do this at least once every 31 days on a staggered test basis. SNC proposed the following:

- Change the SR 4.7.8 a. requirement for verifying that the system has operated for at least 10 hours with the heaters on during the past 31 days to verifying that the system has operated for at least 15 minutes in its FHA alignment.
- Test the PRFS in accordance with existing SRs 4.7.8 b., c., d.1., f., and g.
- Verify one PRFS train can maintain a slightly negative pressure relative to adjacent areas during the FHA mode of operation at least once every 36 months on a staggered test basis.

In addition to the proposed SR, SNC is proposing to add a discussion to the TS 3.9.12.2 Bases which will indicate that SNC can use a non-rigorous method such as smoke sticks, hand held differential pressure indicators, or other measuring devices that do not provide for absolute differential pressure indicators, or other measuring devices that do not provide for absolute measurement to verify that the PRFS can maintain a slightly negative pressure relative to adjacent areas during the FHA mode of operation. The staff finds these changes acceptable.

3.3.2 SRs 4.9.13.2 and 4.9.13.3

SR 4.9.13.2 specifies that SNC is to demonstrate that the PRFS is operable in accordance with SR 4.7.8. SNC proposes to demonstrate that the PRFS is operable in accordance with SRs 4.9.12.2 and 4.9.12.3.

SR 4.9.13.3 indicates that SNC is to verify that the normal SFP system ventilation system will isolate upon receipt of either of the following:

- the fuel pool ventilation low differential pressure test signal
- a SFP high radiation test signal

SNC is to do this at least once every 18 months. SNC is proposing to delete SR 4.9.13.3.

The staff finds the proposed changes to SRs 4.9.13.2 and deleting 4.9.13.3 acceptable because the proposed changes to SR 4.9.13.2 add all of the Current TS SR 4.9.13.3 requirements. SNC proposed corresponding changes to the TSs 4.9.12 and 4.9.13 Bases. In addition, SNC proposed administrative changes to the TSs 3/4.9.12 and 3/4.9.13 Action Statements. The staff reviewed these changes and found them acceptable.

In addition to the TSs changes discussed in this evaluation, SNC made corresponding changes to their Ventilation Filter Testing Program. The staff reviewed these changes and concluded that they are appropriate and acceptable.

3.4 Radiation Monitoring Instrumentation

SNC proposed to modify Items 2.a., 2.b.i.a), and 2.c. of TS Table 3.3-6, *Radiation Monitoring Instrumentation*. SNC modified these items to require having a minimum of two Operable radiation monitors to assure system isolation at a given setpoint under the following three conditions:

1. In the fuel storage pool area during movements of heavy loads over irradiated fuel in the SFP area or during movement of irradiated fuel in the fuel storage pool area.

2. During mini-purge, slow-speed main purge or fast-speed main purge operating modes while moving heavy loads over irradiated fuel in the containment or during movement of irradiated fuel in containment.

3. For the control room during movements of heavy loads over irradiated fuel in the containment or in the SFP storage area, or during movement of irradiated fuel in containment or in the SFP storage area.

In addition, SNC proposed to modify Action Statements 25 and 27 and to add footnotes g and h to the Table. In Action Statement 27, SNC added the term "emergency" to the words "recirculation mode of operation." SNC modified Action statement 25 to indicate that with no channels Operable, all movement of irradiated fuel and crane operation with heavy loads over the SFP were to be suspended until SNC restored at least one channel to the Operable status. With one channel inoperable, SNC must return both channels to Operable status within 7 days or suspend all movement of irradiated fuel and crane operation with heavy loads over the SFP.

SNC added footnotes g and h to Table 3.3-6 for the fuel storage pool area, containment, and control room process radiation monitors. These footnotes address those situations requiring two monitor channels while moving heavy loads over irradiated fuel or moving irradiated fuel in either the SFP storage or containment areas.

SNC proposed the Table 3.3-6 changes to take credit for radiation monitoring instrumentation initiating protective actions in the event of an FHA. Two control room radiation monitoring channels are required to provide redundant, single failure proof isolation of the normal HVAC system. For an FHA inside containment, two channels of containment purge and exhaust isolation radiation monitors are required to provide redundant, single failure proof isolation of the containment with no credit for filtration. For an FHA in the fuel storage pool area, two channels of fuel storage pool area radiation monitors will be required to isolate the normal HVAC system and initiate the PRFS. Because these requirements for two channels are in response to an FHA, they apply only when moving irradiated fuel or moving heavy loads over irradiated fuel.

The staff has reviewed the proposed changes to the Table 3.3-6 monitoring requirements and finds the proposed changes acceptable.

3.5 Containment Purge Emergency Filtration System

SNC proposed eliminating the containment purge emergency filtration system from the TSs. This system is designed to mitigate the consequences of an FHA inside containment. SNC based their proposal to eliminate this system upon a change in approach for mitigating the consequences of an FHA inside containment. The new approach is based upon the purge exhaust radiation monitors rapidly isolating containment. Therefore, any release from an FHA inside containment would be limited to the release which would occur prior to isolating containment.

SNC submitted a revised radiological dose analysis for an FHA to support their proposed change. SNC assumed the following in their analysis:

- All of the fuel rods in the peak burnup assembly were damaged.
- The fuel rod gap activity from these assemblies was released and mixed with 1/3 of the containment free volume.
- The activity was released to the environment via the maxi-purge line at a flow rate of 53,500 cfm.

SNC stated that the containment would isolate in 11 seconds on a high radiation signal, but they assumed an isolation time of 45 seconds in their dose calculations. Based upon a 45-second isolation time, SNC calculated thyroid doses of 12.1 rem and 4.5 rem at the exclusion area boundary (EAB) and low-population zone (LPZ), respectively and whole body doses of 0.4 rem and 0.1 rem at these same locations, respectively. SNC did not provide any control room operator doses.

The NRC staff asked SNC if the radiation monitors would isolate containment quickly enough during an FHA to meet appropriate dose criteria. In response to this inquiry, SNC indicated that the containment purge radiation monitor setpoint is set at 10^{-4} µCi/cc of ^{85}Kr. They also indicated that a design-basis accident FHA would result in an airborne activity level of 0.1 µCi/cc based upon the activity released from the fuel assembly being diluted with 1/3 of the containment free volume. SNC expected rapid containment isolation based on the radiation monitor setpoint. TS Table 3.3-6 had a monitor setpoint of 2.27×10^{-2} µCi/cc for the mini-purge, 2.27×10^{-3} µCi/cc for the slow speed main purge, and 4.54×10^{-3} µCi/cc for the fast speed main purge. The disparity between these values and 10^{-4} µCi/cc raised questions as to the actual monitor setpoints. SNC provided additional information to clarify this issue. SNC indicated that the actual setpoint is 1.80×10^{-3} µCi/cc but may be as low as ½ decade above background. The Table 3.3-6 values are the maximum allowed setpoint values. SNC further noted that radiation monitor response time varies from less than 1 second at the maximum allowable setpoint to about 1 minute at approximately 10^{-7} µCi/cc. In SNC's calculations for FHA consequences, SNC assumed a lower setpoint value (1.0×10^{-4} µCi/cc) because this lower setpoint value results in a slower monitor response time. The slower monitor response time creates a longer containment isolation time and increases dose consequences in the event of an FHA inside containment.

The NRC staff assessed the effects of removing the containment purge emergency filtration system. The staff independently calculated the amount of ^{85}Kr that might be released in the event of an FHA to determine if enough radioactivity is released to reach an alarm setpoint. The staff determined that the maximum activity level of ^{85}Kr would be 2.11 µCi/cc. This activity level is a factor of 21 above SNC's calculated activity level. The staff concluded that enough radioactivity would be released to reach the monitor alarm setpoint and isolate containment even if the entire free air volume of the containment diluted the radioactivity. Assuming less containment dilution results in a higher concentration and a faster isolation time. The impact upon dose consequences would depend on the actual dilution amount.

NRC staff calculated the results of the FHA inside containment. The staff calculated doses of 0.069 rem whole body and 9.4 rem thyroid at the EAB and 0.011 rem whole body and 1.5 rem thyroid at the LPZ. The staff calculated the control room operator doses to be 0.026 rem whole body and 28.7 rem thyroid. Table 1 contains the assumptions the staff used in their evaluations.

For the fuel handling accident in the SFP area inside the auxiliary building, SNC's dose analyses credited holdup of the part of the accident releases in the building volume. SNC did not provide information to support this assumption; therefore, the assumption is not acceptable and SNC should not use it in future amendment submittals without technical justification. If SNC's analyses were corrected to exclude this assumption, the doses would still meet the acceptance criteria. The staff's assessment of the dose consequences of an accident in the SFP area (1) did not credit this holdup and (2) used the assumptions of Table 1 along with a PRFS filter efficiency of 89.5% for iodine. The staff evaluated thyroid doses only since the inside containment analysis showed that the thyroid doses were bounding. The results of the staff's assessment were 24 rem at the EAB, 3.7 rem at the LPZ, and 3.6 rem in the control room.

Table 1 — Fuel Handling Accident Inside Containment Assumptions

Core power (MWt)	2831
Number of assemblies	157
Highest power discharged assembly	
Axial peak to average ratio	1.7
Radial peak to average ratio	1.7
Occurrence of accident (hours after shutdown)	100
Damaged fuel rods	314
Activity released from the gap	
noble gases except ^{85}Kr	0.10
^{85}Kr	0.30
iodine except ^{131}I	0.10
^{131}I	0.12
Iodine gap inventory	
organic(%)	0.25
inorganic(%)	99.75
Pool DF	
organic(%)	1
inorganic(%)	133
Purge isolation time (seconds)	45
<u>Atmospheric Dispersion Factors (sec/m^3)</u>	
EAB	4.08E-4
LPZ 0-8 hours	4.1E-5
Control room 0-8 hours	2.6E-3
<u>Breathing Rates (m^3/sec)</u>	
Offsite 0-8 hours	3.47E-4
Control room	3.47E-4
<u>Control Room Parameters</u>	
Free volume (ft3)	1.14E5
Filtered recirculation flow (cfm) @ t= 10 minutes following accident	2.7E3
Recirculation efficiency (%) for all forms of Iodine	95
Pre-isolation normal outside air supply flow (cfm)	1360
Control room isolation	@ 1 min. following accident
Post-isolation unfiltered outside air supply flow (cfm)	460
Outside air filtered flow at t = 10 minutes following accident (cfm)*	450
Filtered flow filter removal efficiency for all forms of iodine (%)	99
Unfiltered air infiltration rate (cfm)	10
Occupancy factors 0-1 day	1.0

*Analysis operator action @ 10 minutes following the start of the accident. Assumed that outside air is filtered as is the recirculation air in the control room.

Finding Summary

Our assessments concluded that SNC's proposed changes are within regulatory guidelines, do not result in doses which exceed the guidelines of NRC Standard Review Plan Section 15.7.4 or General Design Criterion 19 of Appendix A to 10 CFR Part 50 and are therefore acceptable.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 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 (64 FR 47870, dated September 1, 1999). 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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