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10 CFR 50.90

Serial: RA-16-0043
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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

CATAWBA NUCLEAR STATION, UNITS 1 AND 2
DOCKET NOS. 50-413 AND 50-414 / RENEWED LICENSE NOS. NPF-35 AND NPF-52

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2
DOCKET NOS. 50-369 AND 50-370 / RENEWED LICENSE NOS. NPF-9 AND NPF-17

SUBJECT: SUPPLEMENT 1 - APPLICATION TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-522, REVISION 0, "REVISE VENTILATION SYSTEM SURVEILLANCE REQUIREMENTS TO OPERATE FOR 10 HOURS PER MONTH" USING THE CONSOLIDATED LINE ITEM IMPROVEMENT PROCESS

REFERENCES:

1. Duke Energy letter, *Application to Revise Technical Specifications to Adopt TSTF-522, Revision 0, "Revise Ventilation System Surveillance Requirements to Operate for 10 Hours per Month" Using the Consolidated Line Item Improvement Process*, dated September 27, 2016 (ML16273A042)
2. NRC letter, *Results of Acceptance Review of Requested Licensing Action Regarding Application to Revise Technical Specifications to Adopt TSTF-522, Revision 0, Using the Consolidated Line Item Improvement Process (CAC Nos. MF8422, MF8423, MF8424, MF8425, MF8426, MF8427, MF8428, AND MF8429)*, dated November 7, 2016 (ML16308A370)

In accordance with the provisions of 10 CFR 50.90, Duke Energy Carolinas, LLC, referred to henceforth as "Duke Energy", is providing a supplement to the Reference 1 request for amendments to the Technical Specifications (TS) for Catawba Nuclear Station (CNS), Units 1 and 2; and McGuire Nuclear Station (MNS), Units 1 and 2. This supplement addresses NRC concerns identified in Reference 2 by removing changes proposed to the CNS and MNS TS that are beyond the scope of TSTF-522.

All CNS and MNS information in Reference 1, including TS and TS Bases page markups, is to be disregarded and replaced by the information in this supplement. Information in Reference 1 related to other nuclear stations is unaffected. Attachment 1 provides CNS/MNS revised description and assessment, requested confirmation of applicability, and plant-specific verifications. Attachment 2 provides the CNS/MNS revised existing TS pages marked up to show the proposed changes. Attachment 3 provides the CNS/MNS revised existing TS Bases pages marked up based on the proposed changes (for information only). The retyped TS pages will be provided to the NRC immediately prior to issuance of the approved amendments.

There are no regulatory commitments contained in this letter.

Duke Energy requests approval of the proposed license amendments by September 26, 2017, with the amendment being implemented within 120 days.

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated North Carolina and South Carolina state officials.

If you should have any questions regarding this submittal, or require additional information, please contact Art Zaremba, Manager – Nuclear Fleet Licensing, at 980-373-2062.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on November 22, 2016.

Sincerely,

Ernest J. Kapopoulos, Jr.
Vice President – Operations Support

Supplement 1 Attachments: 1. Description and Assessment
2. Proposed Technical Specification Changes (Mark-Up)
3. Proposed Technical Specification Bases Changes (Mark-Up)

cc (with Attachments):

C. Haney, USNRC Region II – Regional Administrator
A. Klein, USNRC – Chief, TS Branch
G. A. Hutto, III, USNRC Senior Resident Inspector – MNS
J. D. Austin, USNRC Senior Resident Inspector – CNS
M. Orenak, NRR Project Manager – CNS and MNS
W. L. Cox, III, Section Chief, North Carolina Department of Health and Human Services, RP Section (NC)
S. E. Jenkins, Manager, Radioactive and Infectious Waste Management (SC)

Supplement 1
Attachment 1

DESCRIPTION AND ASSESSMENT

Subject: SUPPLEMENT 1 - Application to revise Technical Specifications to adopt TSTF-522, Revision 0, “Revise Ventilation System Surveillance Requirements to Operate for 10 Hours per Month,” using the Consolidated Line Item Improvement Process.

1.0 DESCRIPTION

The proposed changes revise the Surveillance Requirements (SRs) which currently require operating ventilation systems with the heaters operating for a continuous 10 hour period every 31 days. The SRs are revised to require operation of the systems for 15 continuous minutes every 31 days.

The proposed amendments are consistent with TSTF-522, Revision 0, "Revise Ventilation System Surveillance Requirements to Operate for 10 Hours per Month."

2.0 ASSESSMENT

2.1 Applicability of Published Safety Evaluation

Duke Energy has reviewed the model safety evaluation dated September 20, 2012 (77 FR 58421) as part of Federal Register Notice of Availability. This review included a review of the NRC staff's evaluation, as well as the information provided in TSTF-522, Revision 0. As described in the subsequent paragraphs, Duke Energy has concluded that the justifications presented in the TSTF-522, Revision 0, proposal and the model safety evaluation prepared by the NRC staff are applicable to Catawba Nuclear Station (CNS), Units 1 and 2; and McGuire Nuclear Station (MNS), Units 1 and 2 and justify these amendments for the incorporation of the changes to the technical specifications (TS) of the referenced plants.

2.2 Optional Changes and Variations

Duke Energy is proposing the following variations from the TS changes described in TSTF-522, Revision 0, or the applicable parts of the NRC staff's model safety evaluation dated September 20, 2012 (77 FR 58421):

> (Note: Sections 2.2.1, 2.2.4, and 2.2.5 of Attachment 1 of the September 27, 2016 license amendment application (ML16273A042) are unaffected by this supplement.)

2.2.2 Catawba Nuclear Station, Units 1 and 2

a) The CNS Unit 1 and 2 TS utilize different numbering and titles than the Westinghouse Owner's Group (WOG) STS upon which TSTF-522, Revision 0, was based. The following table summarizes the differences between the STS numbering and titles identified in TSTF-522, Revision 0, and the corresponding CNS TS. These differences are administrative and do not affect the applicability of TSTF-522, Revision 0, to the CNS TS.

TSTF-522 Technical Specification (WOG)	CNS Unit 1 and 2 Technical Specification
STS 3.6.13 – Shield Building Air Cleanup System (SBACS)(Dual and Ice Condenser) • SR 3.6.13.1	TS 3.6.10 – Annulus Ventilation System (AVS) • SR 3.6.10.1
STS 3.7.10 – Control Room Emergency Filtration System (CREFS) • SR 3.7.10.1	TS 3.7.10 – Control Room Area Ventilation System (CRAVS) • SR 3.7.10.1
STS 3.7.12 – Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System (PREACS) • SR 3.7.12.1	TS 3.7.12 – Auxiliary Building Filtered Ventilation Exhaust System (ABFVES) • SR 3.7.12.1
STS 3.7.13 - Fuel Building Air Cleanup System (FBACS) • SR 3.7.13.1	TS 3.7.13 – Fuel Handling Ventilation Exhaust System (FHVES) • SR 3.7.13.2

b) TSTF-522 includes WOG STS markups for STS 3.6.11, “Iodine Cleanup System (ICS)(Atmospheric and Subatmospheric).” This STS is not applicable to CNS, which utilizes an ice containment design.

c) TSTF-522 includes WOG STS markups for STS 3.7.14, “Penetration Room Exhaust Air Cleanup System (PREACS).” For CNS, the functions that are the subject of STS 3.7.14 are performed by the ABFVES. Therefore, this STS markup is not applicable to CNS.

d) (DELETED)

e) (DELETED)

2.2.3 McGuire Nuclear Station, Units 1 and 2

a) The MNS Unit 1 and 2 TS utilize different numbering and titles than the WOG STS upon which TSTF-522, Revision 0, was based. The following table summarizes the differences between the STS numbering and titles identified in TSTF-522, Revision 0, and the corresponding MNS TS. These differences are administrative and do not affect the applicability of TSTF-522, Revision 0, to the MNS TS.

TSTF-522 Technical Specification (WOG)	MNS Unit 1 and 2 Technical Specification
STS 3.6.13 – Shield Building Air Cleanup System (SBACS)(Dual and Ice Condenser) • SR 3.6.13.1	TS 3.6.10 – Annulus Ventilation System (AVS) • SR 3.6.10.1
STS 3.7.10 – Control Room Emergency Filtration System (CREFS) • SR 3.7.10.1	TS 3.7.9 – Control Room Area Ventilation System (CRAVS) • SR 3.7.9.1

b) TSTF-522 includes WOG STS markups for STS 3.6.11, "Iodine Cleanup System (ICS)(Atmospheric and Subatmospheric)." This STS markup is not applicable to MNS, which utilizes an ice containment design.

c) TSTF-522 includes WOG STS markups for STS 3.7.12, "Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System (PREACS)." The corresponding MNS TS is TS 3.7.11, "Auxiliary Building Filtered Ventilation Exhaust System (ABFVES)." This TS already includes SR 3.7.11.1, with a provision to operate each ABFVES for 15 minutes. Therefore, no change to TS 3.7.11 is necessary, and TS 3.7.11 is not included in the scope of this license amendment application.

d) TSTF-522 includes WOG STS markups for STS 3.7.13, "Fuel Building Air Cleanup System (FBACS)." The corresponding MNS TS is TS 3.7.12, "Fuel Handling Ventilation Exhaust System (FHVES)." This TS already includes SR 3.7.12.2, with a provision to operate the FHVES for 15 minutes. Therefore, no change to TS 3.7.12 is necessary, and TS 3.7.12 is not included in the scope of this license amendment application.

e) TSTF-522 includes WOG STS markups for STS 3.7.14, "Penetration Room Exhaust Air Cleanup System (PREACS)." For MNS, the functions that are the subject of STS 3.7.14 are performed by the ABFVES. Therefore, this STS markup is not applicable to MNS.

f) (DELETED)

g) (DELETED)

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Determination

Catawba Nuclear Station (CNS), Units 1 and 2, requests adoption of TSTF-522, Revision 0. CNS TS 3.6.10, "Annulus Ventilation System (AVS)," TS 3.7.10, "Control Room Area Ventilation System (CRAVS)," TS 3.7.12, "Auxiliary Building Filtered Ventilation Exhaust System (ABFVES)," and TS 3.7.13, "Fuel Handling Ventilation Exhaust System (FHVES)," include Surveillance Requirements (specifically, SR 3.6.10.1, SR 3.7.10.1, SR 3.7.12.1, and SR 3.7.13.2, respectively) to periodically operate each train/subsystem for 10 continuous hours with heaters operating. The proposed change would revise these SRs to require operation for 15 continuous minutes.

McGuire Nuclear Station (MNS), Units 1 and 2, also requests adoption of TSTF-522, Revision 0. MNS TS 3.6.10, "Annulus Ventilation System (AVS)," and TS 3.7.9, "Control Room Area Ventilation System (CRAVS)," include Surveillance Requirements (specifically, SR 3.6.10.1, and SR 3.7.9.1, respectively) to periodically operate each train for 10 continuous hours with heaters operating. The proposed change would revise these SRs to require operation for 15 continuous minutes.

As required by 10 CFR 50.91(a), an analysis of the issue of no significant hazards consideration is presented below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed change affects various CNS and MNS Surveillance Requirements that currently require ventilation systems to be periodically operated for 10 continuous hours with heaters operating. These SRs would be modified to require operation for 15 continuous minutes.

   These systems are not accident initiators and therefore, these changes do not involve a significant increase in the probability of an accident. The proposed system and filter testing changes are consistent with current regulatory guidance for these systems and will continue to assure that these systems perform their design function, which may include mitigating accidents. Thus the change does not involve a significant increase in the consequences of an accident.

   Therefore, it is concluded that this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   The proposed change affects various CNS and MNS Surveillance Requirements that currently require ventilation systems to be periodically operated for 10 continuous hours with heaters operating. These SRs would be modified to require operation for 15 continuous minutes.

   The change proposed for these ventilation systems does not change any system operations or maintenance activities. Testing requirements will be revised and will continue to demonstrate that the Limiting Conditions for Operation are met and the system components

are capable of performing their intended safety functions. The change does not create new failure modes or mechanisms and no new accident precursors are generated.

Therefore, it is concluded that this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   The proposed change affects various CNS and MNS Surveillance Requirements that currently require ventilation systems to be periodically operated for 10 continuous hours with heaters operating. These SRs would be modified to require operation for 15 continuous minutes.

   The CNS and MNS ventilation systems are tested at 95% relative humidity, and, therefore, do not require heaters to heat the incoming air and reduce the relative humidity.

   These proposed changes are consistent with regulatory guidance, and do not involve a significant reduction in a margin of safety.

Based on the above, Duke Energy concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of no significant hazards consideration is justified.

4.0 ENVIRONMENTAL EVALUATION

The proposed changes would modify a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed changes do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed changes meet the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

Supplement 1
Attachment 2

PROPOSED TECHNICAL SPECIFICATION CHANGES (Markup)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.6.10.1	Operate each AVS train for ≥ ~~10~~ 15 continuous ~~hours with heaters operating.~~ minutes	In accordance with the Surveillance Frequency Control Program
SR 3.6.10.2	Perform required AVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.10.3	Verify each AVS train actuates on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.10.4	Verify each AVS filter cooling bypass valve can be opened.	In accordance with the Surveillance Frequency Control Program
SR 3.6.10.5	Verify each AVS train flow rate is ≥ 8100 cfm and ≤ 9900 cfm.	In accordance with the Surveillance Frequency Control Program
SR 3.6.10.6	Verify each AVS train produces a pressure equal to or more negative than -0.88 inch water gauge when corrected to elevation 564 feet.	In accordance with the Surveillance Frequency Control Program

REQUIRED ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One or more CRAVS train(s) heater inoperable.	G.1 Restore CRAVS train(s) heater to OPERABLE status. OR G.2 Initiate action in accordance with Specification 5.6.6.	7 days 7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.10.1 Operate each CRAVS train for ≥ ~~10~~ continuous ~~hours with the heaters operating.~~ (15 minutes)	In accordance with the Surveillance Frequency Control Program
SR 3.7.10.2 Perform required CRAVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with VFTP
SR 3.7.10.3 Verify each CRAVS train actuates on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.10.4 Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program.	In accordance with the Control Room Envelope Habitability Program

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.12.1	Operate each ABFVES train for ≥ ~~10~~ continuous ~~hours with the heaters operating.~~	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.2	Perform required ABFVES filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.12.3	Verify each ABFVES train actuates on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.4	Verify one ABFVES train can maintain the ECCS pump rooms at negative pressure relative to adjacent areas.	In accordance with the Surveillance Frequency Control Program

15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.13.1	Verify required FHVES train in operation.	In accordance with the Surveillance Frequency Control Program
SR 3.7.13.2	Operate ~~required~~ FHVES train for ≥ ~~10~~ continuous ~~hours with the heaters operating.~~	In accordance with the Surveillance Frequency Control Program
SR 3.7.13.3	Perform required FHVES filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.13.4	Verify one FHVES train can maintain a pressure ≤ -0.25 inches water gauge with respect to atmospheric pressure during operation at a flow rate ≤ 36,443 cfm.	In accordance with the Surveillance Frequency Control Program
SR 3.7.13.5	Verify each FHVES filter bypass damper can be closed.	In accordance with the Surveillance Frequency Control Program

each

15

minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.10.1	Operate each AVS train for ≥ ~~10~~ 15 continuous ~~hours with heaters operating.~~ minutes	In accordance with the Surveillance Frequency Control Program
SR 3.6.10.2	Perform required AVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.10.3	Verify each AVS train actuates on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.10.4	Verify each AVS filter cooling bypass valve can be opened.	In accordance with the Surveillance Frequency Control Program
SR 3.6.10.5	Verify each AVS train flow rate is ≥ 7200 cfm and ≤ 8800 cfm.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.9.1	Operate each CRAVS train for ≥ ~~10~~ 15 continuous ~~hours~~ minutes ~~with the heaters operating.~~	In accordance with the Surveillance Frequency Control Program
SR 3.7.9.2	Perform required CRAVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.9.3	Verify each CRAVS train actuates on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.9.4	Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program.	In accordance with the Control Room Envelope Habitability Program

Suppplement 1
Attachment 3

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES (Markup)

BASES

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

BACKGROUND (continued)

A heater is included within each filter train to reduce the relative humidity of the airstream, although no credit is taken in the safety analysis. The heaters are not required for OPERABILITY since the carbon laboratory tests are performed at 95% relative humidity, but have been maintained in the system to provide additional margin (Ref. 6). ~~Continuous operation of each train, for at least 10 hours per month, with heaters on, reduces moisture buildup on their HEPA filters and adsorbers.~~

The system initiates and maintains a negative air pressure in the reactor building annulus by means of filtered exhaust ventilation of the reactor building annulus following receipt of a safety injection (SI) signal. The system is described in Reference 2. The AVS reduces the radioactive content in the annulus atmosphere following a DBA. Loss of the AVS could cause site boundary doses, in the event of a DBA, to exceed the values given in the licensing basis.

APPLICABLE SAFETY ANALYSES

The AVS design basis is established by the consequences of the limiting DBA, which is a LOCA. The accident analysis (Ref. 3) assumes that only one train of the AVS is functional due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the remaining one train of this filtration system. The amount of fission products available for release from containment is determined for a LOCA.

The modeled AVS actuation in the safety analyses is based upon a worst case response time following an SI initiated at the limiting setpoint. The CANVENT computer code is used to determine the total time required to achieve a negative pressure in the annulus under accident conditions. The response time considers signal delay, diesel generator startup and sequencing time, system startup time, and the time for the system to attain the required pressure.

The AVS satisfies Criterion 3 of 10 CFR 50.36 (Ref. 4).

LCO

In the event of a DBA, one AVS train is required to provide the minimum iodine removal assumed in the safety analysis. Two trains of the AVS must be OPERABLE to ensure that at least one train will operate, assuming that the other train is disabled by a single active failure.

BASES

ACTIONS (continued)

C.1 and C.2

If the AVS train cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.10.1

Operating each AVS train from the control room with flow through the HEPA filters and carbon adsorbers ensures that all trains are OPERABLE and that all associated controls are functioning properly. ~~It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. Operation with the heaters on for ≥ 10 continuous hours eliminates moisture on the adsorbers and HEPA filters. Experience from filter testing at operating units indicates that the 10 hour period is adequate for moisture elimination on the adsorbers and HEPA filters.~~ The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

SR 3.6.10.2

This SR verifies that the required AVS filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The AVS filter tests are in accordance with Regulatory Guide 1.52 (Ref. 5). The VFTP includes testing HEPA filter performance, carbon adsorber efficiency, system flow rate, and the physical properties of the activated carbon (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the VFTP.

BASES

BACKGROUND (continued)

The CRAVS can be operated either manually or automatically. Key operated selector switches located in the CRE initiate operation of all train related CRAVS equipment. The selected train is in continuous operation. Outside air for pressurization and makeup to the CRE is supplied from two independent intakes. This outside air is mixed with return air from the CRE before being passed through the filter unit. In the filter unit, moisture separator/prefilters remove any large particles in the air, and any entrained water droplets present. A HEPA filter bank upstream of the carbon adsorber filter bank functions to remove particulates and a second bank of HEPA filters follow the carbon adsorber to collect carbon fines. Only the upstream HEPA filters and carbon adsorber bank are credited in the analysis. A heater is included within each filter train to reduce the relative humidity of the airstream, although no credit is taken in the safety analysis. The heaters are not required for OPERABILITY since the carbon laboratory tests are performed at 95% relative humidity, but have been maintained in the system to provide additional margin (Ref. 9). ~~Continuous operation of each train for at least 10 hours per month, with the heaters on, reduces moisture buildup on the HEPA filters and adsorbers.~~

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

Upon receipt of an Engineered Safety Feature (ESF) signal, the selected CRAVS train continues to operate and the pressurizing filter train fan of the non-selected train is started. This assures control room pressurization, assuming an active failure of one of the pressurizing filter train fans.

The outside air for pressurization is continuously monitored for the presence of smoke, radiation, or chlorine by non-safety related detectors. If smoke, radiation, or chlorine is detected in an outside air intake, an alarm is received within the CRE, alerting the operators of this condition. The operator will take the required action to close the affected intake, if necessary, per the guidance of the Annunciator Response Procedures.

A single CRAVS train is capable of pressurizing the CRE to greater than or equal to 0.125 inches water gauge. The CRAVS is designed in accordance with Seismic Category 1 requirements. The CRAVS operation in maintaining the CRE habitable is discussed in the UFSAR, Sections 6.4 and 9.4.1 (Refs. 1 and 2).

The CRAVS is designed to maintain a habitable environment in the CRE for 30 days of continuous occupancy after a DBA without exceeding a 5 rem total effective dose equivalent (TEDE).

BASES

ACTIONS (continued)

The heaters do not affect OPERABILITY of the CRAVS filter trains because carbon adsorber efficiency testing is performed at 30°C and 95% relative humidity. The accident analysis shows that site boundary and control room operator radiation doses are within 10 CFR 50.67 limits during a DBA LOCA under these conditions.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. ~~Monthly heater operations dry out any moisture accumulated in the carbon from humidity in the ambient air. Systems with heaters must be operated from the control room for ≥ 10 continuous hours with the heaters energized and flow through the HEPA filters and carbon adsorbers.~~ The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

SR 3.7.10.2

This SR verifies that the required CRAVS testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The CRAVS filter tests are in accordance with Regulatory Guide 1.52 (Ref. 5). The VFTP includes testing the performance of the HEPA filter and carbon adsorber efficiencies and the physical properties of the activated carbon. Specific test Frequencies and additional information are discussed in detail in the VFTP.

SR 3.7.10.3

This SR verifies that each CRAVS train starts and operates on an actual or simulated actuation signal. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

BASES

ACTIONS (continued)

hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the ECCS pump rooms pressure boundary.

C.1 and C.2

If the ABFVES train or ECCS pump rooms pressure boundary cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

D.1 and D.2

With one or more ABFVES heaters inoperable, the heater must be restored to OPERABLE status within 7 days. Alternatively, a report must be initiated per Specification 5.6.6, which details the reason for the heater's inoperability and the corrective action required to return the heater to OPERABLE status.

The heaters do not affect OPERABILITY of the ABFVES filter trains because carbon adsorber efficiency testing is performed at 30°C and 95% relative humidity. The accident analysis shows that site boundary radiation doses are within 10 CFR 50.67 limits during a DBA LOCA under these conditions.

SURVEILLANCE REQUIREMENTS

SR 3.7.12.1

Systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not severe, testing each train once a month provides an adequate check on this system. ~~Monthly heater operations dry out any moisture that may have accumulated in the carbon from humidity in the ambient air. Systems with heaters must be operated from the control room ≥ 10 continuous hours with flow through the HEPA filters and~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~carbon adsorbers and with the heaters energized.~~ The Surveillance Frequency is based on operating ~~experience~~, equipment reliability, and plant risk and is ~~controlled~~ under the Surveillance Frequency Control Program.

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

SR 3.7.12.2

This SR verifies that the required ABFVES testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The ABFVES filter tests are in accordance with Reference 5. The VFTP includes testing HEPA filter performance, carbon adsorbers efficiency, system flow rate, and the physical properties of the activated carbon (general use and following specific operations). The system flow rate determination and in-place testing of the filter unit components is performed in the normal operating alignment with both trains in operation. Flow through each filter unit in this alignment is approximately 30,000 cfm. The normal operating alignment has been chosen to minimize normal radiological protection concerns that occur when the system is operated in an abnormal alignment for an extended period of time. Operation of the system in other alignments may alter flow rates to the extent that the 30,000 cfm ±10% specified in Technical Specification 5.5.11 will not be met. Flow rates outside the specified band under these operating alignments will not require the system to be considered inoperable.

Certain postulated failures and post accident recovery operational alignments may result in post accident system operation with only one train of ABFVES in a “normal” alignment. Under these conditions system flow rate is expected to increase above the normal flow band specified in Technical Specification 5.5.11. An analysis has been performed which conservatively predicts the maximum flow rate under these conditions is approximately 37,000 cfm. 37,000 cfm corresponds to a face velocity of approximately 48 ft/min that is significantly more than the normal 40 ft/min velocity specified in ASTM D3803-1989 (Ref. 10). Therefore, the laboratory test of the carbon penetration is performed in accordance with ASTM D3803-1989 and Generic Letter 99-02 at a face velocity of 48 ft/min. These test results are to be adjusted for a 2.27 inch bed using the methodology presented in ASTM D3803-1989 prior to comparing them to the Technical Specification 5.5.11 limit. Specific test Frequencies and additional information are discussed in detail in the VFTP.

BASES

ACTIONS (continued)

With the movement of recently irradiated fuel in the fuel handling building, two trains of FHVES are required to be OPERABLE and one in operation. The movement of recently irradiated fuel must be immediately suspended, if one or more trains of FHVES are inoperable or one is not in operation. This does not preclude the movement of an irradiated fuel assembly to a safe position. This action ensures that a fuel handling accident with unacceptable consequences could not occur.

B.1 and B.2

With one or more FHVES heaters inoperable, the heater must be restored to OPERABLE status within 7 days. Alternatively, a report must be initiated per Specification 5.6.6, which details the reason for the heater's inoperability and the corrective action required to return the heater to OPERABLE status.

The heaters do not affect OPERABILITY of the FHVES filter trains because carbon adsorber efficiency testing is performed at 30°C and 95% relative humidity. The accident analysis shows that site boundary radiation doses are within 10 CFR 50.67 limits during a fuel handling accident under these conditions.

SURVEILLANCE REQUIREMENTS

SR 3.7.13.1

With the FHVES train in service, a periodic monitoring of the system for proper operation should be checked on a routine basis to ensure that the system is functioning properly. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

SR 3.7.13.2

Systems should be checked periodically to ensure that they function properly. ~~Systems with heaters must be operated from the control room for ≥ 10 continuous hours with flow through the HEPA filters and carbon adsorbers and with the heaters energized.~~ The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

No changes. Page included for information only.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.10 Annulus Ventilation System (AVS)

BASES

BACKGROUND

The AVS is required by 10 CFR 50, Appendix A, GDC 41, "Containment Atmosphere Cleanup" (Ref. 1), to ensure that radioactive materials that leak from the primary containment into the reactor building (secondary containment) following a Design Basis Accident (DBA) are filtered and adsorbed prior to exhausting to the environment.

The containment has a secondary containment called the reactor building, which is a concrete structure that surrounds the steel primary containment vessel. Between the containment vessel and the reactor building inner wall is an annulus that collects any containment leakage that may occur following a loss of coolant accident (LOCA) or rod ejection accident. This space also allows for periodic inspection of the outer surface of the steel containment vessel.

The AVS establishes a negative pressure in the annulus between the reactor building and the steel containment vessel. Filters in the system then control the release of radioactive contaminants to the environment. Reactor building OPERABILITY is required to ensure retention of primary containment leakage and proper operation of the AVS.

The AVS consists of two separate and redundant trains. Each train includes a heater, mechanical demister, a prefilter/ moisture separator, upstream and downstream high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of radioiodines, and a fan. Ductwork, valves and/or dampers, and instrumentation also form part of the system. The heaters and mechanical demisters function to reduce the moisture content of the airstream to less than 70% relative humidity. A second bank of HEPA filters follows the adsorber section to collect carbon fines and provide backup in case of failure of the main HEPA filter bank. Only the upstream HEPA filter and the charcoal adsorber section are credited in the analysis. The system initiates and maintains a negative air pressure in the reactor building annulus by means of filtered exhaust ventilation of the reactor building annulus following receipt of a Phase B isolation signal. The system is described in Reference 2.

The prefilters remove large particles in the air, and the moisture separators remove entrained water droplets present, to prevent excessive loading of the HEPA filters and charcoal absorbers. Heaters are included

BASES

BACKGROUND (continued)

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

to reduce the relative humidity of the airstream. ~~Continuous operation of each train, for at least 10 hours per month, with heaters on, reduces moisture buildup on their HEPA filters and adsorbers.~~ The mechanical demisters cool the air to keep the charcoal beds from becoming too hot due to absorption of fission product.

The AVS reduces the radioactive content in the annulus atmosphere following a DBA. Loss of the AVS could cause site boundary doses, in the event of a DBA, to exceed the values given in the licensing basis.

APPLICABLE SAFETY ANALYSES

The AVS design basis is established by the consequences of the limiting DBA, which is a LOCA. The accident analysis (Ref. 3) assumes that only one train of the AVS is functional due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the remaining one train of this filtration system. The amount of fission products available for release from containment is determined for a LOCA.

The modeled AVS actuation in the safety analyses is based upon a worst case response time following a Phase B isolation signal initiated at the limiting setpoint. The total response time, from exceeding the signal setpoint to attaining the negative pressure of 0.5 inch water gauge in the reactor building annulus, is 22 seconds. The pressure then goes to -3.5 inches water within 48 seconds after the start signal is initiated. At this point the system switches into its recirculation mode of operation and pressure may increase to -0.5 inches water within 278 seconds but will not go above -0.5 inches water. This response time is composed of signal delay, diesel generator startup and sequencing time, system startup time, and time for the system to attain the required pressure after starting.

The AVS satisfies Criterion 3 of 10 CFR 50.36 (Ref. 4).

LCO

In the event of a DBA, one AVS train is required to provide the minimum particulate iodine removal assumed in the safety analysis. Two trains of the AVS must be OPERABLE to ensure that at least one train will operate, assuming that the other train is disabled by a single active failure.

ACTIONS (continued)

36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.10.1

Operating each AVS train from the control room with flow through the HEPA filters and activated carbon adsorbers ensures that all trains are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. ~~Operation with the heaters on for ≥ 10 continuous hours eliminates moisture on the adsorbers and HEPA filters. Experience from filter testing at operating units indicates that the 10 hour period is adequate for moisture elimination on the adsorbers and HEPA filters.~~

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

Inoperable heaters are addressed by Required Actions B.1 and B.2. The inoperability of heaters between required performances of this surveillance does not affect OPERABILITY of each AVS train. Operability of the heaters is demonstrated by the heater power dissipation test per SR 3.6.10.2.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.6.10.2

This SR verifies that the required AVS filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The AVS filter tests are in accordance with Regulatory Guide 1.52 (Ref. 5) with exceptions as noted in the UFSAR. The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, heater power dissipation, and the physical properties of the activated charcoal (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the VFTP.

SR 3.6.10.3

The automatic startup on a Containment Phase B Isolation signal ensures that each AVS train responds properly. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

B 3.7 PLANT SYSTEMS

B 3.7.9 Control Room Area Ventilation System (CRAVS)

BASES

BACKGROUND

The CRAVS provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke.

The CRAVS consists of two independent, redundant trains that draw in filtered outside air and mix this air with conditioned air recirculating through the Control Room Envelope (CRE). Each outside air pressure filter train consists of a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal absorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, doors, barriers, and instrumentation also form part of the system, as well as prefilters to remove water droplets from the air stream. A second bank of HEPA filters follows the absorber section to collect carbon fines and provides backup in case of failure of the main HEPA filter bank.

The CRE is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. The CRE is protected during normal operation, natural events, and accident conditions. The CRE boundary is the combination of walls, floor, roof, ducting, doors, penetrations, and equipment that physically form the CRE. The OPERABILITY of the CRE boundary must be maintained to ensure that the inleakage of unfltered air into the CRE will not exceed the inleakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to CRE occupants. The CRE and its boundary are defined in the Control Room Envelope Habitability Program.

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

The CRAVS is an emergency system. During normal operation the CRE is provided with 100% recirculated air and the outside air pressure filter train is in the standby mode. Upon receipt of the actuating signal(s), the CRE is provided with fresh air through outside air intakes and is circulated through the system filter trains. The prefilters remove any large particles in the air, and any entrained water droplets present, to prevent excessive loading of the HEPA filters and charcoal adsorbers. ~~Continuous operation of each train for at least 10 hours per month, with the heaters on, reduces moisture buildup on the HEPA filters and adsorbers.~~ The heater is important to the effectiveness of the charcoal adsorbers.

ACTIONS (Continued)

radiation doses are within 10 CFR 50.67 (Ref. 8) limits during a DBA LOCA under these conditions.

SURVEILLANCE REQUIREMENTS

SR 3.7.9.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. ~~Monthly heater operations dry out any moisture accumulated in the charcoal from humidity in the ambient air. Systems with heaters must be operated from the control room for ≥ 10 continuous hours with the heaters energized and flow through the HEPA filters and charcoal adsorbers.~~

Operation for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action.

Inoperable heaters are addressed by Required Actions G.1 and G.2. The inoperability of heaters between required performances of this surveillance does not affect OPERABILITY of each CRAVS train. Operability of the heaters is demonstrated by the heater power dissipation test per SR 3.7.9.2.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.7.9.2

This SR verifies that the required CRAVS testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The CRAVS filter tests are in accordance with Regulatory Guide 1.52 (Ref. 4). The VFTP includes testing the performance of the HEPA filter, charcoal adsorber efficiency, minimum flow rate, heater power dissipation, and the physical properties of the activated charcoal. Specific test Frequencies and additional information are discussed in detail in the VFTP.

SR 3.7.9.3

This SR verifies that each CRAVS train starts and operates with flow through the HEPA filters and charcoal adsorbers on an actual or simulated actuation signal. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.7.9.4

This SR verifies the OPERABILITY of the CRE boundary by testing for unfiltered air inleakage past the CRE boundary and into the CRE.