Duke Energy®

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May 20, 2010

10 CFR 50.90

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Proposed Technical Specifications (TS) Amendments
TS 3.6.10, "Annulus Ventilation System (AVS)"
TS 3.6.16, "Reactor Building"
License Amendment Request to Enable Opening of the Reactor Building Pressure Boundary with Administrative Controls in Place

Pursuant to 10 CFR 50.90, Duke Energy is requesting amendments to Catawba Facility Operating Licenses NPF-35 and NPF-52 and the subject TS. These amendment requests propose to revise the subject TS to allow the Reactor Building pressure boundary to be opened under administrative controls. Because of the way the current Catawba TS 3.6.10 and 3.6.16 are structured, when the boundary is opened, TS Limiting Condition for Operation (LCO) 3.0.3 is required to be entered. Current TS 3.6.16 for the Reactor Building allows for a 24-hour Completion Time for an inoperable Reactor Building. However, Current TS 3.6.10 includes no comparable allowance, in that an inoperable Reactor Building renders both AVS trains inoperable. Since there is no TS 3.6.10 Condition governing two inoperable AVS trains (irrespective of the cause of the AVS train inoperability), LCO 3.0.3 is required to be immediately entered.

Attachment 1 provides the technical and regulatory evaluations in support of the proposed amendments. Attachment 2 provides a marked-up copy of the proposed TS changes. Attachment 3 provides a marked-up copy of the corresponding proposed TS Bases changes. Attachment 3 is provided to the NRC for information only.

A001
NRR

These proposed amendments have been reviewed and approved by the Catawba Plant Operations Review Committee in accordance with the requirements of the Duke Energy Quality Assurance Program.

Duke Energy requests NRC approval of these proposed amendments within one year from the date of submittal. Once approved, the amendments will be implemented within a standard 30-day implementation period. There are no regulatory commitments contained in this letter or its attachments.

In accordance with 10 CFR 50.91, Duke Energy is notifying the State of South Carolina of this application for license amendment by transmitting a copy of this letter and its attachments to the designated state official.

Should you have any questions concerning this information, please contact L.J. Rudy at (803) 701-3084.

Very truly yours,

James R. Morris

James R. Morris

LJR/s

Attachments

James R. Morris affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

James R. Morris, Vice President

Subscribed and sworn to me: 5/20/10
Date

Notary Public

My commission expires: 7/2/2014
Date

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ATTACHMENT 1

Technical and Regulatory Evaluations

Subject: License Amendment Request to Enable Opening of the Reactor Building Pressure Boundary with Administrative Controls in Place

1. DESCRIPTION

This evaluation supports a request to amend Facility Operating Licenses NPF-35 and NPF-52 (Catawba Nuclear Station Unit 1 and Unit 2, respectively).

This amendment application proposes to revise TS 3.6.10, "Annulus Ventilation System (AVS)" and TS 3.6.16, "Reactor Building" to allow the Reactor Building pressure boundary to be opened under administrative controls. Because of the way the current Catawba TS 3.6.10 and 3.6.16 are structured, when the boundary is opened, TS Limiting Condition for Operation (LCO) 3.0.3 is required to be entered. Current TS 3.6.16 for the Reactor Building allows for a 24-hour Completion Time for an inoperable Reactor Building. However, Current TS 3.6.10 includes no comparable allowance, in that an inoperable Reactor Building renders both AVS trains inoperable. Since there is no TS 3.6.10 Condition governing two inoperable AVS trains (irrespective of the cause of the AVS train inoperability), LCO 3.0.3 is required to be immediately entered.

2. PROPOSED CHANGE

- TS 3.6.10 is being modified by adding a new Condition B which governs two inoperable AVS trains due to an inoperable Reactor Building pressure boundary. New Required Action B.1 requires the immediate entry into the applicable Conditions and Required Actions of TS 3.6.16 for the Reactor Building. For the case of two inoperable AVS trains due to reasons other than an inoperable Reactor Building pressure boundary, the lack of a specific TS 3.6.10 Condition will require entry into LCO 3.0.3. This proposed change is consistent with conventional TS language and rules of usage.
- Existing TS 3.6.10 Conditions B and C are re-lettered as Conditions C and D, respectively.
- TS 3.6.16 is being modified by adding an LCO Note stating that the Reactor Building pressure boundary may be opened intermittently under administrative controls.
- The Bases for TS 3.6.10 and TS 3.6.16 are being modified consistent with the above proposed changes to the TS themselves. Refer to the Bases marked-up pages for details. (As part of this item, the Bases for TS 3.6.16 Action A.1 is being revised to include the impact on the AVS design function and to define administrative controls used to open the Reactor Building pressure boundary.)

3. BACKGROUND

The design basis of the AVS and the Reactor Building pressure boundary is to limit both offsite and operator dose within 10 CFR 50.67 and 10 CFR 50 Appendix A, General Design Criterion (GDC) 19 guidelines following a design basis Rod Ejection Accident (REA) or Loss of Coolant Accident (LOCA). The AVS accomplishes this by performing the following functions:

1) Producing and maintaining a negative pressure of at least 0.25 inches water gauge throughout the annulus with respect to the atmosphere,
2) Reducing the concentration of radioactivity in the air within and discharged from the annulus through filtration and recirculation of annulus air, and
3) Providing long term fission product removal capability within the annulus through holdup (i.e., decay) and filtration.

A negative pressure in the annulus ensures that leakage of airborne radioisotopes from the containment to the environment following a REA or a LOCA is filtered prior to release to the environment. The Reactor Building pressure boundary functions in conjunction with the AVS to do this by providing a low leakage pressure boundary from outside the Reactor Building to the annulus. Updated Final Safety Analysis Report (UFSAR) Section 6.2.6.5, "Special Testing Requirements", states that Reactor Building inleakage will be checked periodically as required by TS.

On November 25, 2002, Catawba submitted a license amendment request to allow the adoption of alternate source term methodology for the LOCA dose analysis. This amendment request was supplemented a number of times in response to various NRC Requests for Additional Information and was finally approved by the NRC on September 30, 2005 via Amendments 227 and 222 for Units 1 and 2, respectively. Part of this amendment request involved TS changes necessary to clear an Operable but Degraded condition on the AVS which was documented in Catawba's Corrective Action Program as Problem Investigation Process (PIP) C-98-04404. The Operable but Degraded scenario described was that old TS Surveillance Requirement (SR) 3.6.16.2 was non-conservative with respect to dose analysis assumptions and AVS capability.

Old TS SR 3.6.16.2 was contained in TS 3.6.16 for the Reactor Building and used to read as follows:

"Verify each Annulus Ventilation System train produces a pressure equal to or more negative than -0.5 inch water gauge in the annulus within 1 minute after a start signal.

18 months on a STAGGERED TEST BASIS"

TS SR 3.6.16.2 as revised by Amendments 227 and 222 now reads as follows:

"Verify that during the annulus vacuum decay test, the vacuum decay time is >/= 87 seconds.

18 months"

Old TS SR 3.6.16.2 was relocated to TS 3.6.10 for the AVS as new SR 3.6.10.6. The SR was modified and now reads as follows:

"Verify each AVS train produces a pressure equal to or more negative than -0.88 inch water gauge when corrected to elevation 564 feet.

18 months"

During the Catawba development and review of the alternate source term amendment request, the implications of relocating old SR 3.6.16.2 from TS 3.6.16 to TS 3.6.10 were not fully recognized. It was not recognized at the time that relocating this SR would have unintended consequences concerning the ability to comply with TS 3.6.10 when a Reactor Building annulus door was open. It should be noted, however, that relocating old SR 3.6.16.2 from TS 3.6.16 to TS 3.6.10 was appropriate for technical reasons, since the inability to comply with this SR could also result from equipment problems associated with one or both AVS trains. (In such a case, for one inoperable AVS train, it would have been inappropriate to enter TS 3.6.16 Condition A and appropriate to enter TS 3.6.10 Condition A. Likewise, for two inoperable AVS trains, it would have been inappropriate to enter TS 3.6.16 Condition A and appropriate to enter LCO 3.0.3.)

Catawba maintains an administrative document called the Hazard Barrier Manual. The Hazard Barrier Manual is utilized to govern the opening (breaching) of plant doors, hatches, and other boundaries for the purposes of maintenance or other planned activities. The Hazard Barrier Manual contained control forms for the Reactor Building annulus doors that allowed these doors to be opened in Modes 1, 2, 3, and 4 with the stipulation that when the doors are open, only the Reactor Building envelope is inoperable. This stipulation was appropriate prior to Amendments 227 and 222, since old SR 3.6.16.2 was contained in TS 3.6.16. Failure to meet the SR was not necessarily indicative of an inoperable AVS train, but rather of a degraded Reactor Building envelope. However, now that the comparable SR (SR 3.6.10.6) is contained in TS 3.6.10, failure to meet this SR due to an annulus door being open not only impacts the ability to meet TS 3.6.16, but TS 3.6.10 as well. (SR 3.6.10.6 cannot be satisfied when an annulus door is open.) With an annulus door open, not only is one AVS train incapable of maintaining the required negative pressure, two AVS trains cannot maintain it. Since there is no provision in TS 3.6.10 for two inoperable AVS trains, LCO 3.0.3 must be entered.

4. TECHNICAL EVALUATION

The Reactor Building pressure boundary is an integral part of the AVS pressure boundary. If the Reactor Building pressure boundary is open (i.e., if an annulus door is open), neither AVS train can produce the required negative pressure and the accident analysis assumptions regarding leakage into the Reactor Building pressure boundary cannot be satisfied.

The existing Catawba TS 3.6.16 SRs verify that the Reactor Building, including its pressure boundary, is operable. SR 3.6.16.2 verifies that the Reactor Building integrity (inleakage) is adequate to meet design assumptions within the post-accident dose analyses. TS 3.6.16 Condition A allows the Reactor Building pressure boundary to be inoperable, without any corresponding requirement to implement compensatory measures, for 24 hours.

The existing Catawba TS 3.6.10 SRs verify that the AVS is operable. SR 3.6.10.6 verifies the ability of each AVS train to produce the required negative pressure throughout the annulus, which is necessary to prevent unfiltered leakage from the Reactor Building. The existing Catawba TS 3.6.10 does not have any provision that links the operability of the AVS with the operability of the Reactor Building in TS 3.6.16. Under the existing TS requirements, LCO 3.0.3 must be entered for two inoperable AVS trains when TS 3.6.16 Condition A is entered.

The proposed TS changes will allow intermittent opening of the Reactor Building pressure boundary under administrative controls at Catawba. The proposed administrative controls will establish appropriate compensatory measures to ensure that the consequences of a Design Basis Accident which may occur during this time do not exceed the acceptance criteria for that accident. For example, when the control room envelope or the Emergency Core Cooling System (ECCS) pump rooms pressure boundary is opened for other than normal entry through doors, the TS Bases for these systems require that a dedicated individual is stationed in the area (refer to Catawba TS 3.7.10, "Control Room Area Ventilation System (CRAVS)" and TS 3.7.12, "Auxiliary Building Filtered Ventilation Exhaust System (ABFVES)"). This individual must be in continuous communication with the control room in order to rapidly restore the pressure boundary if needed. Catawba will have approved written administrative controls that describe the compensatory measures to be taken when the Reactor Building pressure boundary is opened (i.e., when an annulus door is held open). The proposed TS changes are consistent with previous industry and NRC approved Standard Technical Specification Change Traveler TSTF-287-A, Revision 5, "Ventilation System Envelope Allowed Outage Time" (Reference 1). They are also consistent with previous NRC approved license amendments for Catawba and McGuire which were based on TSTF-287-A (References 2, 3, and 4).

Conclusion:

The proposed changes to Catawba TS 3.6.10 and TS 3.6.16 that permit the intermittent opening of the Reactor Building pressure boundary have been determined to be consistent with changes previously approved by the NRC for Catawba TS 3.7.10 and TS 3.7.12, as well as with changes previously approved by the NRC for McGuire. In addition, the proposed changes are consistent with TSTF-287-A, Revision 5.

For Catawba TS 3.6.10, the proposed changes add new Condition B. This new Condition links the operability of the AVS to existing TS 3.6.16, which allows 24 hours to restore the operability of the Reactor Building pressure boundary before an orderly shutdown of the reactor is required. For Catawba TS 3.6.16, the proposed changes add a Note, and the corresponding Bases will impose compensatory measures necessary to restore the Reactor Building pressure boundary and will enhance nuclear safety.

5. REGULATORY EVALUATION

5.1 Applicable Regulatory Requirements/Criteria

Duke Energy has reviewed 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants" in conjunction with these amendment requests. The most relevant General Design Criteria (GDCs) include the following:

Criterion 16--Containment design. Reactor containment and associated systems shall be provided to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require.

Criterion 41--Containment atmosphere cleanup. Systems to control fission products, hydrogen, oxygen, and other substances which may be released into the reactor containment shall be provided as necessary to reduce, consistent with the functioning of other associated systems, the concentration and quality of fission products released to the environment following postulated accidents, and to control the concentration of hydrogen or oxygen and other substances in the containment atmosphere following postulated accidents to assure that containment integrity is maintained.

Each system shall have suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) its safety function can be accomplished, assuming a single failure.

Criterion 50--Containment design basis. The reactor containment structure, including access openings, penetrations, and the containment heat removal system shall be designed so that the containment structure and its internal compartments can accommodate, without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from any loss-of-coolant accident. This margin shall reflect consideration of (1) the effects of potential energy sources which have not been included in the determination of the peak conditions, such as energy in steam generators and as required by § 50.44 energy from metal-water and other chemical reactions that may result from degradation but not total failure of emergency core cooling functioning, (2) the limited experience and experimental data available for defining accident phenomena and containment responses, and (3) the conservatism of the calculational model and input parameters.

The changes proposed in this amendment request submittal do not adversely impact the ability of the Containment, Reactor Building, or AVS to perform their design functions. These and all other GDCs will remain satisfied upon implementation of the proposed changes following NRC approval. The proposed changes resolve an inconsistency between TS 3.6.10 and TS 3.6.16 that was inadvertently created as a result of a previous license amendment request.

5.2 Precedent

There are no known direct precedents associated with this amendment request submittal. However, the changes proposed herein are consistent with TSTF-287-A, Revision 5 and with other plant amendments based upon this TSTF.

5.3 No Significant Hazards Consideration

This amendment request submittal proposes to revise TS 3.6.10, "Annulus Ventilation System (AVS)" and TS 3.6.16, "Reactor Building" to permit the intermittent opening of the Reactor Building pressure boundary, consistent with the existing intent of TS 3.6.16. It resolves a conflict that presently exists between these two TS.

Duke Energy has evaluated whether or not a significant hazards consideration is involved with the proposed amendments by analyzing the three standards set forth in 10 CFR 50.92(c) as discussed below:

Criterion 1:

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

Response: No.

The proposed changes to TS 3.6.10 and TS 3.6.16 have no effect upon accident probabilities or consequences. The changes proposed herein will have no impact upon the Reactor Building or AVS relative to the performance of their design functions. These structures/systems will continue to be available and will function as designed during and following all accidents for which their performance is credited in the plant safety analyses. The proposed administrative controls for TS 3.6.16 will ensure the restoration of the Reactor Building pressure boundary when required, thereby enhancing nuclear safety. No design changes are being made to the plant itself; therefore, there will be no impact upon the probability of any accident occurring. Since the performance of these systems will not be adversely impacted, there will be no impact upon accident consequences.

Criterion 2:

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

Response: No.

The proposed changes to TS 3.6.10 and TS 3.6.16 do not introduce any changes or mechanisms that create the possibility of a new or different kind of accident. No design changes are being made to the plant which would result in the introduction of new accident causal mechanisms. The proposed changes do not introduce any new equipment, any change to existing equipment, or any change to the manner in which the plant is operated. No new effects or malfunctions will therefore be created.

Criterion 3:

Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The proposed changes to TS 3.6.10 and TS 3.6.16 maintain the required design margins of the Reactor Building and AVS for all accidents for which their function is assumed. All required General Design Criteria (GDCs) contained in 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants" will continue to be satisfied following NRC approval of these proposed changes. In addition, margin of safety is related to the confidence in the fission product barriers to function as designed during and following an accident. These barriers include the fuel cladding, the Reactor Coolant System, and the Containment System. The changes proposed in this submittal have no adverse impact upon the performance of any of these barriers to perform their design functions during or following an accident.

Based on the above, Duke Energy concludes that the proposed amendments do not involve a 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.

5.4 Conclusions

In conclusion, based on the considerations discussed above, (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.

6. ENVIRONMENTAL CONSIDERATION

Duke Energy has determined that the proposed amendments change requirements with respect to the installation or use of a facility component located within the restricted area, as defined by 10 CFR 20. They do not represent a change to an inspection or surveillance requirement. Duke Energy has evaluated the proposed amendments and has determined that they do not involve: (1) a significant hazards consideration, (2) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (3) a significant increase in individual or cumulative occupational radiation exposures. Accordingly, the proposed amendments 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 amendments.

7. REFERENCES

1. Technical Specification Change Traveler TSTF-287-A, Revision 5, "Ventilation System Envelope Allowed Outage Time".

2. Catawba Nuclear Station, Units 1 and 2 Re: Issuance of Amendments 187 and 180 (TAC Nos. MA8888 and MA8889), dated September 5, 2000 (ADAMS Accession No. ML003747877).

3. McGuire Nuclear Station, Units 1 and 2 Re: Issuance of Amendments 187 and 168 (TAC Nos. MA6428 and MA6429), dated September 22, 1999 (ADAMS Accession No. ML013240064).

4. McGuire Nuclear Station, Units 1 and 2 Re: Issuance of Amendments 229 and 211 (TAC Nos. MB9525 and MB9526), dated June 2, 2005 (ADAMS Accession No. ML051260184).

ATTACHMENT 2

Marked-Up TS Pages

INSERT 1

B.	Two AVS trains inoperable due to inoperable reactor building pressure boundary.	B.1	Enter applicable Conditions and Required Actions of LCO 3.6.16, "Reactor Building."	Immediately

INSERT 2

--NOTE--

The reactor building pressure boundary may be opened intermittently under administrative controls.

INSERT 3

B.1

With two AVS trains inoperable due to an inoperable reactor building pressure boundary, the applicable Conditions and Required Actions of LCO 3.6.16, "Reactor Building," must be immediately entered to restore the pressure boundary integrity. When the AVS is operating as designed, the establishment and maintenance of the required negative pressure throughout the annulus to prevent unfiltered primary containment leakage cannot be accomplished if the reactor building pressure boundary is not intact.

Since an inoperable reactor building pressure boundary does not necessarily constitute a failure of the Surveillances required to verify AVS OPERABILITY, the AVS should not be considered inoperable.

INSERT 4

The LCO is modified by a Note allowing the reactor building pressure boundary to be opened intermittently under administrative controls. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for reactor building pressure boundary isolation is indicated.

INSERT 5

If the reactor building pressure boundary is inoperable such that the AVS trains cannot establish or maintain the required negative pressure to prevent unfiltered primary containment leakage from the reactor building, action must be taken to restore an OPERABLE reactor building pressure boundary within 24 hours. During the period that the reactor building pressure boundary is inoperable, appropriate compensatory measures (consistent with the intent, as applicable, of GDC 19, 41, and 10 CFR 50.67) should be utilized to protect the plant personnel and boundary from radiological releases. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the Condition. The 24 hour Completion Time is reasonable considering the limited leakage design of the containment, low probability of a Design Basis Accident 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 reactor building pressure boundary.

3.6 CONTAINMENT SYSTEMS

3.6.10 Annulus Ventilation System (AVS)

LCO 3.6.10 Two AVS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

INSERT 1

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AVS train inoperable.	A.1 Restore AVS train to OPERABLE status.	7 days
B C One or more Annulus Ventilation System (AVS) train(s) heater inoperable.	B.1 C Restore AVS train(s) heater to OPERABLE status.	7 days
	OR	
	B.2 C Initiate action in accordance with Specification 5.6.6.	7 days
C D Required Action and associated Completion Time not met.	C.1 D Be in MODE 3.	6 hours
	AND	
	C.2 D Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.10.1	Operate each AVS train for ≥ 10 continuous hours with heaters operating.	31 days
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.	18 months
SR 3.6.10.4	Verify each AVS filter cooling bypass valve can be opened.	18 months
SR 3.6.10.5	Verify each AVS train flow rate is ≥ 8100 cfm and ≤ 9900 cfm.	18 months
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.	18 months

3.6 CONTAINMENT SYSTEMS

3.6.16 Reactor Building

LCO 3.6.16 The reactor building shall be OPERABLE.

INSERT 2

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Reactor building inoperable.	A.1 Restore reactor building to OPERABLE status.	24 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.16.1 Verify the door in each access opening is closed, except when the access opening is being used for normal transit entry and exit.	31 days

(continued)

NO CHANGES THIS PAGE.
FOR INFORMATION ONLY

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.16.2	Verify that during the annulus vacuum decay test, the vacuum decay time is $\geq$ 87 seconds.	18 months
SR 3.6.16.3	Verify reactor building structural integrity by performing a visual inspection of the exposed interior and exterior surfaces of the reactor building.	3 times every 10 years, coinciding with containment visual examinations required by SR 3.6.1.1

ATTACHMENT 3

Marked-Up TS Bases Pages

TS and TS Bases Inserts

INSERT 1

B.	Two AVS trains inoperable due to inoperable reactor building pressure boundary.	B.1	Enter applicable Conditions and Required Actions of LCO 3.6.16, "Reactor Building."	Immediately

INSERT 2

---NOTE---

The reactor building pressure boundary may be opened intermittently under administrative controls.

INSERT 3

<u>B.1</u>

With two AVS trains inoperable due to an inoperable reactor building pressure boundary, the applicable Conditions and Required Actions of LCO 3.6.16, "Reactor Building," must be immediately entered to restore the pressure boundary integrity. When the AVS is operating as designed, the establishment and maintenance of the required negative pressure throughout the annulus to prevent unfiltered primary containment leakage cannot be accomplished if the reactor building pressure boundary is not intact.

Since an inoperable reactor building pressure boundary does not necessarily constitute a failure of the Surveillances required to verify AVS OPERABILITY, the AVS should not be considered inoperable.

INSERT 4

The LCO is modified by a Note allowing the reactor building pressure boundary to be opened intermittently under administrative controls. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for reactor building pressure boundary isolation is indicated.

INSERT 5

If the reactor building pressure boundary is inoperable such that the AVS trains cannot establish or maintain the required negative pressure to prevent unfiltered primary containment leakage from the reactor building, action must be taken to restore an OPERABLE reactor building pressure boundary within 24 hours. During the period that the reactor building pressure boundary is inoperable, appropriate compensatory measures (consistent with the intent, as applicable, of GDC 19, 41, and 10 CFR 50.67) should be utilized to protect the plant personnel and boundary from radiological releases. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the Condition. The 24 hour Completion Time is reasonable considering the limited leakage design of the containment, low probability of a Design Basis Accident 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 reactor building pressure boundary.

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.

Under post-accident conditions

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.

The AVS consists of two separate and redundant trains. Each train includes a heater, prefilter/moisture separators, upstream and downstream high efficiency particulate air (HEPA) filters, an activated carbon adsorber section for removal of radioiodines, and a fan. Ductwork, valves and/or dampers, and instrumentation also form part of the system. The prefilters/moisture separators function to remove large particles and entrained water droplets from the airstream, which reduces the moisture content. A HEPA filter bank upstream of the carbon adsorber filter bank functions to remove particulates and a second bank of HEPA filters follow the adsorber section to collect carbon fines. Only the upstream HEPA filter and the carbon adsorber section are credited in the analysis.

The reactor building is required to be OPERABLE to ensure retention of containment leakage and proper operation of the AVS.

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

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could lead to fission product release to containment that leaks to the reactor building. The large break LOCA, on which this system's design is based, is a full power event. Less severe LOCAs and leakage still require the system to be OPERABLE throughout these MODES. The probability and severity of a LOCA decrease as core power and Reactor Coolant System pressure decrease. With the reactor shut down, the probability of release of radioactivity resulting from such an accident is low.

In MODES 5 and 6, the probability and consequences of a DBA are low due to the pressure and temperature limitations in these MODES. Under these conditions, the AVS is not required to be OPERABLE.

ACTIONS

A.1

With one AVS train inoperable, the inoperable train must be restored to OPERABLE status within 7 days. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant AVS train and the low probability of a DBA occurring during this period. The Completion Time is adequate to make most repairs.

INSERT 3

C ~~B~~.1 and C ~~B~~.2

With one or more AVS heaters inoperable, the heater must be restored to OPERABLE status within 7 days. Alternatively, a report must be initiated within 7 days 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 AVS 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.

BASES

ACTIONS (continued)

D.1 and D.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 31 day Frequency was developed in consideration of the known reliability of fan motors and controls, the two train redundancy available, and the iodine removal capability of the Containment Spray System and Ice Condenser.

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

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.10.3

The automatic startup on a safety injection signal ensures that each AVS train responds properly. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore the Frequency was concluded to be acceptable from a reliability standpoint. Furthermore, the SR interval was developed considering that the AVS equipment OPERABILITY is demonstrated at a 31 day Frequency by SR 3.6.10.1.

SR 3.6.10.4

The AVS filter cooling electric motor-operated bypass valves are tested to verify OPERABILITY. The valves are normally closed and may need to be opened from the control room to initiate miniflow cooling through a filter unit that has been shutdown following a DBA LOCA. Miniflow cooling may be necessary to limit temperature increases in the idle filter train due to decay heat from captured fission products. The 18 month Frequency is considered to be acceptable based on valve reliability and design, and the fact that operating experience has shown that the valves usually pass the Surveillance when performed at the 18 month Frequency.

SR 3.6.10.5

The proper functioning of the fans, dampers, filters, adsorbers, etc., as a system is verified by the ability of each train to produce the required system flow rate. The 18 month Frequency is consistent with Regulatory Guide 1.52 (Ref. 5) guidance for functional testing.

SR 3.6.10.6

The ability of the AVS train to produce the required negative pressure of at least -0.88 inch water gauge when corrected to elevation 564 feet ensures that the annulus negative pressure is at least -0.25 inch water gauge everywhere in the annulus. The -0.88 inch water gauge annulus pressure includes a correction for an outside air temperature induced hydrostatic pressure gradient of -0.63 inch water gauge. The negative

SURVEILLANCE REQUIREMENTS (continued)

pressure prevents unfiltered leakage from the reactor building, since outside air will be drawn into the annulus by the negative pressure differential.

The CANVENT computer code is used to model the thermal effects of a LOCA on the annulus and the ability of the AVS to develop and maintain a negative pressure in the annulus after a design basis accident. The annulus pressure drawdown time during normal plant conditions is not an input to any dose analyses. Therefore, the annulus pressure drawdown time during normal plant conditions is insignificant.

The AVS trains are tested every 18 months to ensure each train will function as required. Operating experience has shown that each train usually passes the surveillance when performed at the 18 month Frequency. Furthermore, the SR interval was developed considering that the AVS equipment OPERABILITY is demonstrated at a 31 day Frequency by SR 3.6.10.1. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 41.
2. UFSAR, Sections 6.2.3 and 9.4.9.
3. UFSAR, Chapter 15.
4. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
5. Regulatory Guide 1.52, Revision 2.
6. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991.
7. NUREG-0800, Sections 6.2.3 and 6.5.3, Rev. 2, July 1981.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.16 Reactor Building

BASES

BACKGROUND

The reactor building is a concrete structure that surrounds the steel containment vessel. Between the containment vessel and the reactor building inner wall is an annular space that collects containment leakage that may occur following a loss of coolant accident (LOCA). This space also allows for periodic inspection of the outer surface of the steel containment vessel.

The Annulus Ventilation System (AVS) establishes a negative pressure in the annulus between the reactor building and the steel containment vessel under post-accident conditions. Filters in the system then control the release of radioactive contaminants to the environment. The reactor building is required to be OPERABLE to ensure retention of containment leakage and proper operation of the AVS. To ensure the retention of containment leakage within the reactor building:

a. The door in each access opening is closed except when the access opening is being used for normal transit entry and exit, and

b. The sealing mechanism associated with each penetration (e.g., welds, bellows, or O-rings) is OPERABLE.

APPLICABLE SAFETY ANALYSES

The design basis for reactor building OPERABILITY is a LOCA. Maintaining reactor building OPERABILITY ensures that the release of radioactive material from the containment atmosphere is restricted to those leakage paths and associated leakage rates assumed in the accident analyses.

The reactor building satisfies Criterion 3 of 10 CFR 50.36 (Ref. 1).

LCO

Reactor building OPERABILITY must be maintained to ensure proper operation of the AVS and to limit radioactive leakage from the containment to those paths and associated leakage rates assumed in the accident analyses.

INSERT 4

BASES

APPLICABILITY

Maintaining reactor building OPERABILITY prevents leakage of radioactive material from the reactor building. Radioactive material may enter the reactor building from the containment following a LOCA. Therefore, reactor building OPERABILITY is required in MODES 1, 2, 3, and 4 when a LOCA or rod ejection accident could release radioactive material to the containment atmosphere.

In MODES 5 and 6, the probability and consequences of these events are low due to the Reactor Coolant System temperature and pressure limitations in these MODES. Therefore, reactor building OPERABILITY is not required in MODE 5 or 6.

ACTIONS

A.1

INSERT 5

~~In the event reactor building OPERABILITY is not maintained, reactor building OPERABILITY must be restored within 24 hours. Twenty-four hours is a reasonable Completion Time considering the limited leakage design of containment and the low probability of a Design Basis Accident occurring during this time period.~~

B.1 and B.2

If the reactor building 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 3.6.16.1

Maintaining reactor building OPERABILITY requires maintaining the door in the access opening closed, except when the access opening is being used for normal transit entry and exit. The 31 day Frequency of this SR is based on engineering judgment and is considered adequate in view of the other indications of door status that are available.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.16.2

The annulus vacuum decay test is performed to verify the reactor building is OPERABLE. A minimum annulus vacuum decay time of 87 seconds ensures that the reactor building design outside air inleakage rate is ≤ 2000 cfm at an annulus differential pressure of -1.0 inch water gauge. Higher reactor building annulus outside air inleakage rates correlate to less holdup, mixing, and filtration of radiological effluents which increase offsite and operator doses.

The vacuum decay test is performed by isolating the pressure transmitter and starting the AVS fan to draw down the annulus pressure to a significant vacuum. Isolating the transmitter enables the fan to reduce the annulus pressure below the normal setpoint. The fan is then secured and the time it takes for the annulus pressure to decay or increase from -3.5 inches water gauge to -0.5 inch water gauge is measured. The time required for the pressure in the annulus to increase from -3.5 inches water gauge to -0.5 inch water gauge is known as the vacuum decay time.

The reactor building annulus outside air inleakage is an input to the CANVENT computer code, which provides input to the dose analyses. The CANVENT computer code is used to model the thermal effects of a LOCA on the annulus and the ability of the AVS to develop and maintain a negative pressure in the annulus after a design basis accident. The code also determines AVS exhaust and recirculation airflow rates following a LOCA. The results of the CANVENT analysis for annulus conditions and AVS response to the LOCA also are used for the rod ejection accident.

The 2000 cfm at -1.0 inch water gauge reactor building annulus outside air inleakage rate is conservatively corrected for ambient temperature and pressure as well as annulus differential pressure conditions prior to use as an input to the CANVENT computer code. The CANVENT results are then used as an input to the dose analyses.

The reactor building pressure boundary is tested every 18 months. The 18 month Frequency is consistent with the guidance provided in NUREG-0800.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.16.3

This SR would give advance indication of gross deterioration of the concrete structural integrity of the reactor building. The Frequency is based on engineering judgment, and is the same as that for containment visual inspections performed in accordance with SR 3.6.1.1.

REFERENCES

1. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
2. UFSAR, Sections 6.2.3 and 6.2.6.5.
3. NUREG-0800, Sections 6.2.3 and 6.5.3, Rev. 2, July 1981.