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June 1, 2000

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

Subject: Duke Energy Corporation
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Proposed Technical Specifications and Bases Amendment
Technical Specification Bases 3.6.10
Annulus Ventilation System (AVS)
Technical Specification and Bases 3.6.16
Reactor Building
Technical Specification Bases 3.7.12
Auxiliary Building Filtered Ventilation Exhaust System (ABFVES)
Technical Specification Bases 3.7.13
Fuel Handling Ventilation Exhaust System (FHVES)
Technical Specification 5.5.11
Ventilation Filter Testing Program (VFTP)

Pursuant to 10 CFR 50.90, Duke Energy Corporation is requesting an amendment to the Catawba Nuclear Station Facility Operating License and Technical Specifications (TS). This amendment applies to the subject TS and Bases sections as listed above. The purpose of the amendment is to:

1) Enhance the ability to determine that reactor building annulus outside air inleakage is within the maximum assumed design value used in the dose analyses. Administrative limits are currently imposed at Catawba to limit inleakage in order to ensure that the dose analyses remain conservative. This portion of the amendment also requests changes for the Unit 2 AVS in-place penetration and bypass leakage criteria in TS 5.5.11. This portion of the amendment request affects TS Bases 3.6.10, TS 3.6.16 and Bases, and TS 5.5.11.

A001

NRR-057

2) Describe the alignment the ABFVES filtered exhaust units should be tested in and request appropriate TS 5.5.11 limits in order to ensure that the ABFVES will continue to meet its design basis functions. Similar to Item 1 above, this portion of the amendment also requests changes for the Unit 2 ABFVES in-place penetration and bypass leakage criteria in TS 5.5.11. This portion of the amendment request affects TS Bases 3.7.12 and TS 5.5.11.

3) Modify the TS Bases for the FHVES and similar to Items 1 and 2 above, this portion of the amendment also requests changes for the Unit 2 FHVES in-place penetration and bypass leakage criteria in TS 5.5.11. This portion of the amendment request affects TS Bases 3.7.13 and TS 5.5.11.

While the three requests above technically constitute separate issues, they are nevertheless being submitted as one overall license amendment request because: 1) Items 1 and 2 involve unclear or non-conservative TS requirements for ventilation systems, and 2) for Items 1, 2, and 3, a common section of the TS (TS 5.5.11) is affected for each issue. Therefore, Duke requests that all three portions of this overall license amendment request be reviewed and approved together in order to facilitate the review and subsequent implementation of the amendment.

The contents of this amendment request package are as follows:

Attachment 1 provides a marked copy of the affected TS and Bases pages for Catawba, showing the proposed changes. Attachment 2 contains reprinted pages of the affected TS and Bases pages. Attachment 3 provides a background, description of the proposed changes, and technical justification. Pursuant to 10 CFR 50.92, Attachment 4 documents the determination that the amendment contains No Significant Hazards Considerations. Pursuant to 10 CFR 51.22(c)(9), Attachment 5 provides the basis for the categorical exclusion from performing an Environmental Assessment/Impact Statement.

Implementation of this amendment to the Catawba Facility Operating License and TS will impact the Catawba Updated Final Safety Analysis Report (UFSAR). The affected UFSAR sections are Section 6.2, "Containment Systems," and Chapter 12, "Radiation Protection." Necessary UFSAR changes will be submitted in accordance with 10 CFR 50.71(e).

Duke is requesting NRC review and approval of this proposed amendment at your earliest opportunity so that the described deficiencies in the TS may be corrected as quickly as possible. Duke is requesting a 30-day implementation period in conjunction with this amendment.

In accordance with Duke administrative procedures and the Quality Assurance Program Topical Report, this proposed amendment has been previously reviewed and approved by the Catawba Plant Operations Review Committee and the Duke Corporate Nuclear Safety Review Board.

Pursuant to 10 CFR 50.91, a copy of this proposed amendment is being sent to the appropriate State of South Carolina official.

Inquiries on this matter should be directed to L.J. Rudy at (803) 831-3084.

Very truly yours,

M.S. Tuckman

M.S. Tuckman

Attachments

M.S. Tuckman, being duly sworn, states that he is Executive Vice President of Duke Energy Corporation; that he is authorized on the part of said corporation to sign and file with the Nuclear Regulatory Commission this amendment to the Catawba Nuclear Station Facility Operating Licenses Numbers NPF-35 and NPF-52 and Technical Specifications; and that all statements and matters set forth herein are true and correct to the best of his knowledge.

M.S. Tuckman

M.S. Tuckman, Executive Vice President

Subscribed and sworn to me: June 5, 2000
Date

Mary P. Nelms
Notary Public

My commission expires: JAN 22, 2001
Date

SEAL

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Document Control File 801.01
RGC File
ELL-EC050

ATTACHMENT 1

MARKED-UP TECHNICAL SPECIFICATIONS AND BASES PAGES FOR CATAWBA

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, a prefilter/moisture separator, upstream and downstream high efficiency particulate air (HEPA) filters, 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 moisture separators function to reduce the moisture content of the airstream. 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 safety injection (SI) signal. The system is described in Reference 2.

Carbon

BASES

BACKGROUND (continued)

moisture separators

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 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.

Carbon

adsorbers

, although no credit is taken in the safety analysis

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 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 1 minute. 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

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.

The output from 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

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 charcoal 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.

Carbon

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, charcoal adsorber efficiency, minimum system flow rate, 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.

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

from the control room

The AVS filter cooling electric motor-operated bypass valves are tested to verify OPERABILITY. The valves are normally closed and may need to be manually opened 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.

BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 41.
2. UFSAR, Section 9.4. (5) 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.

- 0.88 inch water gauge at or above elevation 564 feet

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.16.2	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
SR 3.6.16.3 4	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

SR 3.6.16.3	Verify that during the annulus vacuum decay test, the vacuum decay time (the time required for the pressure in the annulus to increase from -3.5 inches water gauge to -0.5 inch water gauge) is greater than or equal to 87 seconds.	18 months

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 steam line break, 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

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 each 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.16.2

Replace with INSERT 1

The ability of a AVS train to produce the required negative pressure ≥ 0.5 inch water gauge during the test operation within 1 minute provides assurance that the building is adequately sealed. The negative pressure prevents leakage from the building, since outside air will be drawn in by the low pressure. The negative pressure must be established within the time limit to ensure that no significant quantity of radioactive material leaks from the reactor building prior to developing the negative pressure.

The AVS trains are tested every 18 months on a STAGGERED TEST BASIS to ensure that in addition to the requirements of LCO 3.6.10, "Annulus Ventilation System," either AVS train will perform this test. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage.

INSERT 2

SR 3.6.16.3 4

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.

INSERT 1 for SR 3.6.16.2

The ability of the AVS train to produce the required negative pressure of at least -0.88 inch water gauge at or above 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 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 -0.88 inch water gauge annulus pressure does not need to be error analyzed because sufficient margin is included in the conservative methodology used to calculate the hydrostatic pressure gradient.

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.

INSERT 2 for SR 3.6.16.3

SR 3.6.16.3

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 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 results of the CANVENT analysis for annulus conditions and AVS response to the LOCA 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.

Neither the annulus vacuum decay time nor test parameters are required to be error analyzed because sufficient margin is included in the conservative methodology used to calculate the annulus vacuum decay time.

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

B 3.7 PLANT SYSTEMS

B 3.7.12 Auxiliary Building Filtered Ventilation Exhaust System (ABFVES)

BASES

BACKGROUND

The ABFVES normally filters air exhausted from all potentially contaminated areas of the auxiliary building, which includes the Emergency Core Cooling System (ECCS) area and non safety portions of the auxiliary building. The ABFVES, in conjunction with other normally operating systems, also provides ventilation for these areas of the auxiliary building.

pump rooms

The ABFVES consists of two independent and redundant trains. Each train consists of a heater demister section and a filter unit section. The heater demister section consists of a prefilter/moisture separator (to remove entrained water droplets and to prevent excessive loading of the carbon adsorber) and an electric heater (to reduce the relative humidity of air entering the filter unit). The filter unit section consists of a prefilter, an upstream HEPA filter, an activated carbon adsorber (for the removal of gaseous activity, principally iodines), a downstream HEPA, and a fan. The downstream HEPA filter is not credited in the accident analysis, but serves to collect carbon fines, and to back up the upstream HEPA filter should it develop a leak. Ductwork, valves or dampers, and instrumentation also form part of the system. Following receipt of a safety injection (SI) signal, the system isolates non safety portions of the ABFVES and exhausts air only from the ECCS pump rooms.

The ABFVES is normally in operation with flow directed through the HEPA filters and carbon adsorbers. During emergency operation, the ABFVES dampers are realigned to isolate the non-safety portions of the system and only draw air from the ECCS pump rooms.

Upon receipt of the actuating Engineered Safety Feature Actuation System signal(s), the ABFVES exhausts air from the ECCS pump rooms while remaining portions of the system are isolated. This exhaust air goes through the pump room heater demister. The pump room heater demister removes both large particles within the air and entrained water droplets present in the air. The heater demister also preheats air and reduces the relative humidity of the air prior to entry into the filter unit. The pump room heater demister prevents excessive loading of the HEPA filters and carbon adsorbers within the filter unit.

The heaters are not required for OPERABILITY, since the laboratory test of the carbon is performed at 95% relative humidity, but have been maintained in the system to provide additional margin (Ref. 9).

The ABFVES is discussed in the UFSAR, Sections 6.5, 9.4, 14.4, and 15.6 (Refs. 1, 2, 3, and 4, respectively) since it may be used for normal, as well as post accident, atmospheric cleanup functions. The primary purpose of the heaters is to maintain the relative humidity at an acceptable level, consistent with iodine removal efficiencies per Regulatory Guide 1.52 (Ref. 5).

BASES

APPLICABLE SAFETY ANALYSES

The design basis of the ABFVES is established by the large break LOCA. The system evaluation assumes a passive failure of the ECCS outside containment, such as an SI pump seal failure, during the recirculation mode. In such a case, the system limits radioactive release to within the 10 CFR 100 (Ref. 6) limits, or the NRC staff approved licensing basis (e.g., a specified fraction of Reference 6 limits). The analysis of the effects and consequences of a large break LOCA is presented in Reference 4. The ABFVES also actuates following a small break LOCA, to clean up releases of smaller leaks, such as from valve stem packing.

constant leak rate of 1 gpm in the ECCS pump rooms throughout the accident

Two types of system failures are considered in the accident analysis: complete loss of function, and excessive LEAKAGE. Either type of failure may result in a lower efficiency of removal for any gaseous and particulate activity released to the ECCS pump rooms following a LOCA.

The ABFVES satisfies Criterion 3 of 10 CFR 50.36 (Ref. 7).

LCO

Two independent and redundant trains of the ABFVES are required to be OPERABLE to ensure that at least one is available, assuming that a single failure disables the other train coincident with loss of offsite power. (a) Total system failure could result in the atmospheric release from the ECCS pump room exceeding 10 CFR 100 limits in the event of a Design Basis Accident (DBA).

ABFVES is considered OPERABLE when the individual components necessary to maintain the ECCS pump room filtration are OPERABLE in both trains.

An ABFVES train is considered OPERABLE when its associated:

a. Fan is OPERABLE;

b. HEPA filter and carbon adsorbers are not excessively restricting flow, and are capable of performing their filtration functions; and

c. Ductwork, valves, and dampers are OPERABLE and air circulation can be maintained.

The ABFVES fans power supply is provided by buses which are shared between the two units. If normal or emergency power to the ABFVES becomes inoperable, then the Required Actions of this LCO must be entered independently for each unit that is in the MODE of applicability of the LCO.

BASES

ACTIONS (continued)

Carbon

The heaters do not affect OPERABILITY of the ABFVES filter trains because charcoal 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 100 limits during a DBA LOCA under these conditions.

SURVEILLANCE REQUIREMENTS

SR 3.7.12.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not 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 charcoal adsorbers and with the heaters energized. The 31 day Frequency is based on the known reliability of equipment and the two train redundancy available.

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, minimum 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.

INSERT 3

SR 3.7.12.3

Carbon

This SR verifies that each ABFVES train starts and operates with flow through the HEPA filters and charcoal adsorbers on an actual or simulated actuation signal. The 18 month Frequency is consistent with that specified in Reference 4.

INSERT 3 for SR 3.7.12.2

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The following rooms are considered to be ECCS pump rooms (with respect to the ABFVES): centrifugal charging pump rooms, safety injection pump rooms, residual heat removal pump rooms, and the containment spray pump rooms. Although the containment spray system is not normally considered an ECCS system, it is included in this ventilation boundary because of its accident mitigation function which requires the pumping of post accident containment sump fluid.

SR 3.7.12.4

pressure boundary

at

This SR verifies the integrity of the ECCS pump room enclosure. The ability of the ECCS pump room to maintain a negative pressure, with respect to potentially uncontaminated adjacent areas, is periodically tested to verify proper functioning of the ABFVES. During the post accident mode of operation, the ABFVES is designed to maintain a slight negative pressure in the ECCS pump room, with respect to adjacent areas, to prevent unfiltered LEAKAGE. The Frequency of 18 months is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 8).

system to maintain the

unfiltered

This test is conducted with the tests for filter penetration; thus, an 18 month Frequency on a STAGGERED TEST BASIS is consistent with that specified in Reference 5.

REFERENCES

1. UFSAR, Section 6.5.
2. UFSAR, Section 9.4.
3. UFSAR, Section 14.4.
4. UFSAR, Section 15.6.
5. Regulatory Guide 1.52 (Rev. 2).
6. 10 CFR 100.11.
7. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
8. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.
9. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991.
10. ASTM D3803 – 1989.

B 3.7 PLANT SYSTEMS

B 3.7.13 Fuel Handling Ventilation Exhaust System (FHVES)

BASES

BACKGROUND

The FHVES filters airborne radioactive particulates from the area of the fuel pool following a fuel handling accident. The FHVES, in conjunction with other normally operating systems, also provides environmental control of temperature and humidity in the fuel pool area.

The FHVES consists of two independent and redundant trains with two filter units per train. Each filter unit consists of a heater, a prefilter, high efficiency particulate air (HEPA) filters, an activated carbon adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, and instrumentation also form part of the system. A second bank of HEPA filters follows the adsorber section to collect carbon fines and provide backup in case the main HEPA filter bank fails. The downstream HEPA filter is not credited in the analysis, but serves to collect carbon fines, and to back up the upstream HEPA filter should it develop a leak. The system initiates filtered ventilation of the fuel handling building following receipt of a high radiation signal. Engineered Safety Feature Actuation System

The FHVES train does not actuate on any signal. One train is required to be in operation whenever irradiated fuel is being moved in the fuel handling building. The operation of one train of FHVES ensures, if a fuel handling accident occurs, ventilation exhaust will be filtered before being released to the environment. The prefilters remove any large particles in the air, and any entrained water droplets present, to prevent excessive loading of the HEPA filters and carbon adsorbers.

The heaters are not required for OPERABILITY, since the laboratory test of the carbon is performed at 95% relative humidity, but have been maintained in the system to provide additional margin (Ref. 9).

The FHVES is discussed in the UFSAR, Sections 6.5, 9.4, and 15.7 (Refs. 1, 2, and 3, respectively) because it may be used for normal, as well as atmospheric cleanup functions after a fuel handling accident in the spent fuel pool area.

APPLICABLE SAFETY ANALYSES

The FHVES design basis is established by the consequences of the limiting Design Basis Accident (DBA), which is a fuel handling accident. The analysis of the fuel handling accident, given in Reference 3, assumes that all fuel rods in an assembly are damaged. The DBA analysis of the fuel handling accident assumes that only one

BASES

APPLICABLE SAFETY ANALYSES (continued)

train of the FHVES is OPERABLE and in operation. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 4).

The FHVES satisfies Criterion 3 of 10 CFR 50.36 (Ref. 5).

LCO

One train of the FHVES is required to be OPERABLE and in operation whenever irradiated fuel is being moved in the fuel handling building. Total system failure could result in the atmospheric release from the fuel handling building exceeding the 10 CFR 100 (Ref. 6) limits in the event of a fuel handling accident.

The FHVES is considered OPERABLE when the individual components necessary to control exposure in the fuel handling building are OPERABLE. An FHVES train is considered OPERABLE when its associated:

a. Fans are OPERABLE;

b. HEPA filters and carbon adsorbers are not excessively restricting flow, and are capable of performing their filtration function; and

c. Ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

APPLICABILITY

During movement of irradiated fuel in the fuel handling area, the FHVES is required to be OPERABLE and in operation to alleviate the consequences of a fuel handling accident.

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that LCO 3.0.3 does not apply.

With the movement of irradiated fuel in the fuel handling building, one train of FHVES is required to be OPERABLE and in operation. The movement of irradiated fuel must be immediately suspended, if the train

BASES

ACTIONS (continued)

of FHVES is inoperable or 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 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 charcoal 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 100 limits during a DBA LOCA 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 12 hour Frequency is sufficient to ensure proper operation through the HEPA and charcoal filters and is based on the known reliability of the equipment.

SR 3.7.13.2

Systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system.

Monthly heater operation dries 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 flow through the HEPA filters and charcoal adsorbers and with the heaters energized. The 31 day Frequency is based on the known reliability of the equipment.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.13.3

This SR verifies that the required FHVES testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The FHVES filter tests are in accordance with Regulatory Guide 1.52 (Ref. 7). The VFTP includes testing HEPA filter performance, carbon adsorber efficiency, minimum 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.

SR 3.7.13.4

at a

system to maintain the

atmospheric pressure

This SR verifies the integrity of the fuel building enclosure. The ability of the fuel building to maintain negative pressure with respect to potentially uncontaminated adjacent areas is periodically tested to verify proper function of the FHVES. During operation, the FHVES is designed to maintain a slight negative pressure in the fuel building, to prevent unfiltered LEAKAGE. The FHVES is designed to maintain ≤ -0.25 inches water gauge with respect to atmospheric pressure at a flow rate of ≤ 36,443 cfm. The Frequency of 18 months (on a STAGGERED TEST BASIS) is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 8).

SR 3.7.13.5

Operating the FHVES filter bypass damper is necessary to ensure that the system functions properly. The OPERABILITY of the FHVES filter bypass damper is verified if it can be manually closed. An 18 month Frequency is consistent with Reference 8.

BASES

REFERENCES

1. UFSAR, Section 6.5.
2. UFSAR, Section 9.4.
3. UFSAR, Section 15.7.
4. Regulatory Guide 1.25.
5. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
6. 10 CFR 100.
7. Regulatory Guide 1.52 (Rev. 2).
8. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.
9. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991.

5.5 Programs and Manuals

5.5.11 Ventilation Filter Testing Program (VFTP) (continued)

ESF Ventilation System	Penetration	Flowrate
Annulus Ventilation (Unit 1)	< 1%	9000 cfm
Annulus Ventilation (Unit 2)	< 0.05%	9000 cfm
Control Room Area Ventilation	< 0.05%	6000 cfm
Aux. Bldg. Filtered Exhaust (Unit 1) (2 fans)	< 1%	(6) 30,000 cfm
Aux. Bldg. Filtered Exhaust (Unit 2)	< 0.05%	30,000 cfm
Containment Purge (non-ESF) (2 fans)	< 1%	25,000 cfm
Fuel Bldg. Ventilation (Unit 1)	< 1%	16,565 cfm
Fuel Bldg. Ventilation (Unit 2)	< 0.05%	16,565 cfm

b. Demonstrate for each of the ESF systems that an inplace test of the charcoal (carbon) adsorber shows the following penetration and system bypass when tested in accordance with Regulatory Guide 1.52, Revision 2, and ANSI N510-1980 at the flowrate specified below ± 10%.

ESF Ventilation System	Penetration	Flowrate
Annulus Ventilation (Unit 1)	< 1%	9000 cfm
Annulus Ventilation (Unit 2)	< 0.05%	9000 cfm
Control Room Area Ventilation	< 0.05%	6000 cfm
Aux. Bldg. Filtered Exhaust (Unit 1) (2 fans)	< 1%	(6) 30,000 cfm
Aux. Bldg. Filtered Exhaust (Unit 2)	< 0.05%	30,000 cfm
Containment Purge (non-ESF) (2 fans)	< 1%	25,000 cfm
Fuel Bldg. Ventilation (Unit 1)	< 1%	16,565 cfm
Fuel Bldg. Ventilation (Unit 2)	< 0.05%	16,565 cfm

c. Demonstrate for each of the ESF systems that a laboratory test of a sample of the charcoal (carbon) adsorber, when obtained as described in Regulatory Guide 1.52, Revision 2, shows the methyl iodide penetration less than the value specified below when tested in accordance with ASTM D3803-1989 at a temperature of ≤ 30°C and greater than or equal to the relative humidity specified below.

ESF Ventilation System	Penetration	RH
Annulus Ventilation	< 4%	95%
Control Room Area Ventilation	< 0.95%	95%
Aux. Bldg. Filtered Exhaust (Note 1)	< 4%	95%
Containment Purge (non-ESF)	< 6%	95%
Fuel Bldg. Ventilation	< 4%	95%

INSERT 4 →

(continued)

INSERT 4 for TS 5.5.11c

Note 1: The Auxiliary Building Filtered Exhaust System carbon adsorber samples shall be tested at a face velocity of 48 ft/min instead of the 40 ft/min specified in ASTM D3803-1989. 48 ft/min is the nominal limiting velocity the carbon adsorber may be exposed to under post accident conditions as a result of certain postulated failures. The results from this test shall then be corrected to a 2.27 inch bed in accordance with the guidance provided in ASTM D3803-1989 prior to comparing them to the Technical Specification criteria. 2.27 inches is the actual bed depth for the filter unit.

5.5 Programs and Manuals

5.5.11 Ventilation Filter Testing Program (VFTP) (continued)

d. Demonstrate for each of the ESF systems that the pressure drop across the combined HEPA filters, the prefilters, and the charcoal adsorbers is less than the value specified below when tested in accordance with Regulatory Guide 1.52, Revision 2, and ANSI N510-1980 at the flowrate specified below ± 10%.

ESF Ventilation System	Delta P	Flowrate
Annulus Ventilation	8.0 in wg	9000 cfm
Control Room Area Ventilation	8.0 in wg	6000 cfm
Aux. Bldg. Filtered Exhaust	8.0 in wg	30,000 cfm
Containment Purge (non-ESF) (2 fans)	8.0 in wg	25,000 cfm
Fuel Bldg. Ventilation	8.0 in wg	16,565 cfm

e. Demonstrate that the heaters for each of the ESF systems dissipate the value specified below when tested in accordance with ANSI N510-1980.

ESF Ventilation System	Wattage @ 600 vac
Annulus Ventilation	45 ± 6.7 kW
Control Room Area Ventilation	25 ± 2.5 kW
Aux. Bldg. Filtered Exhaust	40 ± 4.0 kW
Containment Purge (non-ESF)	120 ± 12.0 kW
Fuel Bldg. Ventilation	80 + 8/-17.3 kW

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the VFTP test frequencies.

5.5.12 Explosive Gas and Storage Tank Radioactivity Monitoring Program

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

(continued)

ATTACHMENT 2

REPRINTED TECHNICAL SPECIFICATIONS AND BASES PAGES FOR CATAWBA

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.

The AVS consists of two separate and redundant trains. Each train includes a heater, a prefilter/moisture separator, 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 moisture separators function to reduce the moisture content of the airstream. A second bank of HEPA filters follows the adsorber section to collect carbon fines. Only the upstream HEPA filter and the carbon 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 safety injection (SI) signal. The system is described in Reference 2.

BASES

BACKGROUND (continued)

The prefilters/moisture separators remove large particles in the air and entrained water droplets to prevent excessive loading of the HEPA filters and carbon adsorbers. Heaters are included to reduce the relative humidity of the airstream, although no credit is taken in the safety analysis. 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 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 output from 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 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.

BASES

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.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.16.2	Verify each Annulus Ventilation System train produces a pressure equal to or more negative than –0.88 inch water gauge at or above elevation 564 feet.	18 months
SR 3.6.16.3	Verify that during the annulus vacuum decay test, the vacuum decay time (the time required for the pressure in the annulus to increase from –3.5 inches water gauge to –0.5 inch water gauge) is greater than or equal to 87 seconds.	18 months
SR 3.6.16.4	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

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

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.16.2

The ability of the AVS train to produce the required negative pressure of at least -0.88 inch water gauge at or above 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 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 –0.88 inch water gauge annulus pressure does not need to be error analyzed because sufficient margin is included in the conservative methodology used to calculate the hydrostatic pressure gradient.

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.

SR 3.6.16.3

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 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 results of the CANVENT analysis for annulus conditions and AVS response to the LOCA 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.

Neither the annulus vacuum decay time nor test parameters are required to be error analyzed because sufficient margin is included in the conservative methodology used to calculate the annulus vacuum decay time.

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

SR 3.6.16.4

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.

B 3.7 PLANT SYSTEMS

B 3.7.12 Auxiliary Building Filtered Ventilation Exhaust System (ABFVES)

BASES

BACKGROUND

The ABFVES normally filters air exhausted from all potentially contaminated areas of the auxiliary building, which includes the Emergency Core Cooling System (ECCS) pump rooms and non safety portions of the auxiliary building. The ABFVES, in conjunction with other normally operating systems, also provides ventilation for these areas of the auxiliary building.

The ABFVES consists of two independent and redundant trains. Each train consists of a heater demister section and a filter unit section. The heater demister section consists of a prefilter/moisture separator (to remove entrained water droplets) and an electric heater (to reduce the relative humidity of air entering the filter unit). The filter unit section consists of a prefilter, an upstream HEPA filter, an activated carbon adsorber (for the removal of gaseous activity, principally iodines), a downstream HEPA, and a fan. The downstream HEPA filter is not credited in the accident analysis, but serves to collect carbon fines. Ductwork, valves or dampers, and instrumentation also form part of the system. Following receipt of a safety injection (SI) signal, the system isolates non safety portions of the ABFVES and exhausts air only from the ECCS pump rooms.

The ABFVES is normally in operation with flow directed through the HEPA filters and carbon adsorbers. During emergency operations, the ABFVES dampers are realigned to isolate the non-safety portions of the system and only draw air from the ECCS pump rooms.

The ABFVES is discussed in the UFSAR, Sections 6.5, 9.4, 14.4, and 15.6 (Refs. 1, 2, 3, and 4, respectively) since it may be used for normal, as well as post accident, atmospheric cleanup functions. The heaters are not required for OPERABILITY, since the laboratory test of the carbon is performed at 95% relative humidity, but have been maintained in the system to provide additional margin (Ref. 9).

BASES

APPLICABLE SAFETY ANALYSES

The design basis of the ABFVES is established by the large break LOCA. The system evaluation assumes a constant leak rate of 1 gpm in the ECCS pump rooms throughout the accident. In such a case, the system limits radioactive release to within the 10 CFR 100 (Ref. 6) limits, or the NRC staff approved licensing basis (e.g., a specified fraction of Reference 6 limits). The analysis of the effects and consequences of a large break LOCA is presented in Reference 4.

The ABFVES satisfies Criterion 3 of 10 CFR 50.36 (Ref. 7).

LCO

Two independent and redundant trains of the ABFVES are required to be OPERABLE to ensure that at least one is available, assuming that a single failure disables the other train coincident with a loss of offsite power. Total system failure could result in the atmospheric release from the ECCS pump rooms exceeding 10 CFR 100 limits in the event of a Design Basis Accident (DBA).

ABFVES is considered OPERABLE when the individual components necessary to maintain the ECCS pump rooms filtration are OPERABLE in both trains.

An ABFVES train is considered OPERABLE when its associated:

a. Fan is OPERABLE;

b. HEPA filters and carbon adsorbers are capable of performing their filtration functions; and

c. Ductwork, valves, and dampers are OPERABLE and air circulation can be maintained.

The ABFVES fans power supply is provided by buses which are shared between the two units. If normal or emergency power to the ABFVES becomes inoperable, then the Required Actions of this LCO must be entered independently for each unit that is in the MODE of applicability of the LCO.

BASES

ACTIONS (continued)

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 100 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 carbon adsorbers and with the heaters energized. The 31 day Frequency is based on the known reliability of equipment and the two train redundancy available.

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

SURVEILLANCE REQUIREMENTS (continued)

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.

SR 3.7.12.3

This SR verifies that each ABFVES train starts and operates with flow through the HEPA filters and carbon adsorbers on an actual or simulated actuation signal. The 18 month Frequency is consistent with that specified in Reference 4.

SR 3.7.12.4

This SR verifies the pressure boundary integrity of the ECCS pump rooms. The following rooms are considered to be ECCS pump rooms (with respect to the ABFVES): centrifugal charging pump rooms, safety injection pump rooms, residual heat removal pump rooms, and the containment spray pump rooms. Although the containment spray system is not normally considered an ECCS system, it is included in this ventilation boundary because of its accident mitigation function which requires the pumping of post accident containment sump fluid. The ability of the system to maintain the ECCS pump rooms at a negative pressure, with respect to potentially unfiltered adjacent areas, is periodically tested to verify proper functioning of the ABFVES. During the post accident mode of operation, the ABFVES is designed to maintain a slight negative pressure in the ECCS pump rooms, with respect to adjacent areas, to prevent unfiltered LEAKAGE. The Frequency of 18 months is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 8).

This test is conducted with the tests for filter penetration; thus, an 18 month Frequency on a STAGGERED TEST BASIS is consistent with that specified in Reference 5.

BASES

REFERENCES

1. UFSAR, Section 6.5.
2. UFSAR, Section 9.4.
3. UFSAR, Section 14.4.
4. UFSAR, Section 15.6.
5. Regulatory Guide 1.52 (Rev. 2).
6. 10 CFR 100.11.
7. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
8. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.
9. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991.
10. ASTM D3803-1989.

B 3.7 PLANT SYSTEMS

B 3.7.13 Fuel Handling Ventilation Exhaust System (FHVES)

BASES

BACKGROUND

The FHVES filters airborne radioactive particulates from the area of the fuel pool following a fuel handling accident. The FHVES, in conjunction with other normally operating systems, also provides environmental control of temperature and humidity in the fuel pool area.

The FHVES consists of two independent and redundant trains with two filter units per train. Each filter unit consists of a heater, a prefilter, high efficiency particulate air (HEPA) filters, an activated carbon adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, and instrumentation also form part of the system. A second bank of HEPA filters follows the adsorber section to collect carbon fines. The downstream HEPA filter is not credited in the analysis. The system initiates filtered ventilation of the fuel handling building following receipt of a high radiation signal.

The FHVES train does not actuate on any Engineered Safety Feature Actuation System signal. One train is required to be in operation whenever irradiated fuel is being moved in the fuel handling building. The operation of one train of FHVES ensures, if a fuel handling accident occurs, ventilation exhaust will be filtered before being released to the environment. The prefilters remove any large particles in the air, and any entrained water droplets present.

The FHVES is discussed in the UFSAR, Sections 6.5, 9.4, and 15.7 (Refs. 1, 2, and 3, respectively) because it may be used for normal, as well as atmospheric cleanup functions after a fuel handling accident in the spent fuel pool area. The heaters are not required for OPERABILITY, since the laboratory test of the carbon is performed at 95% relative humidity, but have been maintained in the system to provide additional margin (Ref. 9).

APPLICABLE SAFETY ANALYSES

The FHVES design basis is established by the consequences of the limiting Design Basis Accident (DBA), which is a fuel handling accident. The analysis of the fuel handling accident, given in Reference 3, assumes that all fuel rods in an assembly are damaged. The DBA analysis of the fuel handling accident assumes that only one

BASES

APPLICABLE SAFETY ANALYSES (continued)

train of the FHVES is OPERABLE and in operation. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 4).

The FHVES satisfies Criterion 3 of 10 CFR 50.36 (Ref. 5).

LCO

One train of the FHVES is required to be OPERABLE and in operation whenever irradiated fuel is being moved in the fuel handling building. Total system failure could result in the atmospheric release from the fuel handling building exceeding the 10 CFR 100 (Ref. 6) limits in the event of a fuel handling accident.

The FHVES is considered OPERABLE when the individual components necessary to control exposure in the fuel handling building are OPERABLE. An FHVES train is considered OPERABLE when its associated:

a. Fans are OPERABLE;

b. HEPA filters and carbon adsorbers are capable of performing their filtration functions; and

c. Ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

APPLICABILITY

During movement of irradiated fuel in the fuel handling area, the FHVES is required to be OPERABLE and in operation to alleviate the consequences of a fuel handling accident.

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that LCO 3.0.3 does not apply.

With the movement of irradiated fuel in the fuel handling building, one train of FHVES is required to be OPERABLE and in operation. The movement of irradiated fuel must be immediately suspended, if the train

BASES

ACTIONS (continued)

of FHVES is inoperable or 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 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 100 limits during a DBA LOCA 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 12 hour Frequency is sufficient to ensure proper operation through the HEPA and carbon filters and is based on the known reliability of the equipment.

SR 3.7.13.2

Systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system.

Monthly heater operation dries 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 flow through the HEPA filters and carbon adsorbers and with the heaters energized. The 31 day Frequency is based on the known reliability of the equipment.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.13.3

This SR verifies that the required FHVES testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The FHVES filter tests are in accordance with Regulatory Guide 1.52 (Ref. 7). 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.

SR 3.7.13.4

This SR verifies the integrity of the fuel building enclosure. The ability of the system to maintain the fuel building at a negative pressure with respect to atmospheric pressure is periodically tested to verify proper function of the FHVES. During operation, the FHVES is designed to maintain a slight negative pressure in the fuel building, to prevent unfiltered LEAKAGE. The FHVES is designed to maintain $\leq$ -0.25 inches water gauge with respect to atmospheric pressure at a flow rate of $\leq$ 36,443 cfm. The Frequency of 18 months (on a STAGGERED TEST BASIS) is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 8).

SR 3.7.13.5

Operating the FHVES filter bypass damper is necessary to ensure that the system functions properly. The OPERABILITY of the FHVES filter bypass damper is verified if it can be manually closed. An 18 month Frequency is consistent with Reference 8.

BASES

REFERENCES

1. UFSAR, Section 6.5.
2. UFSAR, Section 9.4.
3. UFSAR, Section 15.7.
4. Regulatory Guide 1.25.
5. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
6. 10 CFR 100.
7. Regulatory Guide 1.52 (Rev. 2).
8. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.
9. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991.

5.5 Programs and Manuals

5.5.11 Ventilation Filter Testing Program (VFTP) (continued)

ESF Ventilation System	Penetration	Flowrate
Annulus Ventilation	< 1%	9000 cfm
Control Room Area Ventilation	< 0.05%	6000 cfm
Aux. Bldg. Filtered Exhaust (2 fans)	< 1%	60,000 cfm
Containment Purge (non-ESF) (2 fans)	< 1%	25,000 cfm
Fuel Bldg. Ventilation	< 1%	16,565 cfm

b. Demonstrate for each of the ESF systems that an inplace test of the carbon adsorber shows the following penetration and system bypass when tested in accordance with Regulatory Guide 1.52, Revision 2, and ANSI N510-1980 at the flowrate specified below ± 10%.

ESF Ventilation System	Penetration	Flowrate
Annulus Ventilation	< 1%	9000 cfm
Control Room Area Ventilation	< 0.05%	6000 cfm
Aux. Bldg. Filtered Exhaust (2 fans)	< 1%	60,000 cfm
Containment Purge (non-ESF) (2 fans)	< 1%	25,000 cfm
Fuel Bldg. Ventilation	< 1%	16,565 cfm

c. Demonstrate for each of the ESF systems that a laboratory test of a sample of the carbon adsorber, when obtained as described in Regulatory Guide 1.52, Revision 2, shows the methyl iodide penetration less than the value specified below when tested in accordance with ASTM D3803-1989 at a temperature of ≤ 30°C and greater than or equal to the relative humidity specified below.

ESF Ventilation System	Penetration	RH
Annulus Ventilation	< 4%	95%
Control Room Area Ventilation	< 0.95%	95%
Aux. Bldg. Filtered Exhaust (Note 1)	< 4%	95%
Containment Purge (non-ESF)	< 6%	95%
Fuel Bldg. Ventilation	< 4%	95%

Note 1: The Auxiliary Building Filtered Exhaust System carbon adsorber samples shall be tested at a face velocity of 48 ft/min instead of the 40 ft/min specified in ASTM D3803-1989. 48 ft/min is the nominal limiting velocity the carbon adsorber may be exposed to under post accident conditions as a result of certain postulated failures. The results from this test shall then be corrected to a 2.27 inch bed in accordance with the guidance provided in ASTM D3803-1989 prior to comparing them to the Technical Specification criteria. 2.27 inches is the actual bed depth for the filter unit.

(continued)

5.5 Programs and Manuals

5.5.11 Ventilation Filter Testing Program (VFTP) (continued)

d. Demonstrate for each of the ESF systems that the pressure drop across the combined HEPA filters, the prefilters, and the carbon adsorbers is less than the value specified below when tested in accordance with Regulatory Guide 1.52, Revision 2, and ANSI N510-1980 at the flowrate specified below ± 10%.

ESF Ventilation System	Delta P	Flowrate
Annulus Ventilation	8.0 in wg	9000 cfm
Control Room Area Ventilation	8.0 in wg	6000 cfm
Aux. Bldg. Filtered Exhaust (2 fans)	8.0 in wg	60,000 cfm
Containment Purge (non-ESF) (2 fans)	8.0 in wg	25,000 cfm
Fuel Bldg. Ventilation	8.0 in wg	16,565 cfm

e. Demonstrate that the heaters for each of the ESF systems dissipate the value specified below when tested in accordance with ANSI N510-1980.

ESF Ventilation System	Wattage @ 600 vac
Annulus Ventilation	45 ± 6.7 kW
Control Room Area Ventilation	25 ± 2.5 kW
Aux. Bldg. Filtered Exhaust	40 ± 4.0 kW
Containment Purge (non-ESF)	120 ± 12.0 kW
Fuel Bldg. Ventilation	80 + 8/-17.3 kW

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the VFTP test frequencies.

5.5.12 Explosive Gas and Storage Tank Radioactivity Monitoring Program

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

(continued)

ATTACHMENT 3

BACKGROUND, DESCRIPTION OF PROPOSED CHANGES, AND TECHNICAL JUSTIFICATION

Note: Because this overall amendment request involves three parts, each part will be discussed separately with its own Background and Description of Proposed Changes and Technical Justification. Due to the large number of individual changes to the TS and Bases, each Description of Proposed Change and its corresponding Technical Justification will be addressed separately.

Part 1: Enhance the ability to determine that reactor building annulus outside air inleakage is within the maximum assumed design value used in the dose analyses. Request changes for the Unit 2 AVS in-place penetration and bypass leakage criteria in TS 5.5.11.

Background

The design basis of the AVS and the reactor building pressure boundary is to limit both offsite and operator dose within 10 CFR 100 and 10 CFR 50, Appendix A, GDC 19 guidelines following a design basis LOCA or rod ejection accident. 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 LOCA or rod ejection accident 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. UFSAR Section 6.2.6.5, "Special Testing Requirements," states that reactor building inleakage will be checked periodically as required by TS.

Problem Investigation Process (PIP) C-98-4404 identified that TS Surveillance Requirement (SR) 3.6.16.2 appeared to be non-conservative with respect to dose analysis assumptions and the AVS capability. SR 3.6.16.2 is performed every 18 months on a staggered test basis to verify the reactor building pressure boundary is operable. SR 3.6.16.2 currently reads:

"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."

The subject PIP identified the potential for the AVS pressure drawdown time to be within the SR 3.6.16.2 limit of 1 minute and adversely impact Catawba's offsite and operator dose analyses. Therefore, restrictions were imposed to reduce the annulus pressure drawdown time to 16 seconds. The AVS was declared operable but degraded in PIP C-98-4404.

Calculation CNC-1211.00-00-0086, Revision 0, determined that the normal annulus pressure drawdown time of greater than or equal to -1.19 inches water gauge is normally within 16 seconds. This calculation is based on the assumption that the average annulus outside air inleakage is 2000 cubic feet per minute (cfm) at an annulus differential pressure of -1.0 inch water gauge. The annulus outside air inleakage is an input to the CANVENT computer program used to model the thermal effects of a loss of coolant accident (LOCA). CANVENT also evaluates the capability of the AVS to develop and maintain a negative pressure in the annulus after a LOCA occurs. Thus, verifying annulus outside air inleakage is an important parameter to measure for the dose analyses.

Reactor building annulus outside air inleakage is difficult to verify using the existing annulus pressure drawdown test (SR 3.6.16.2) because exhaust airflow to the unit vent cannot be accurately measured due to the ductwork configuration and the rapid changes in flow rate. Ideally, a measurement of the exhaust airflow to the unit vent would be performed after the system had achieved a stable annulus negative pressure. This would result in a direct measurement of reactor building inleakage. However, the ductwork configuration to the unit vent is inadequate to support accurate flow measurements. Therefore, this amendment request proposes to eliminate the 1-minute drawdown time associated with SR 3.6.16.2 and add a new surveillance to verify annulus outside air inleakage. SR 3.6.16.2 will continue to verify the AVS produces the required negative annulus pressure without any time requirements.

This amendment request also proposes to change the design basis annulus pressure in SR 3.6.16.2 from -0.5 inch water gauge to -0.88 inch water gauge. The design basis -0.88 inch water gauge annulus pressure consists of the NUREG-0800, Rev. 2, July 1981 minimum value of -0.25 inch water gauge and a hydrostatic pressure gradient correction of -0.63 inch water gauge. This proposed annulus pressure change will not adversely impact the dose analyses.

Another test is routinely performed to verify annulus outside air inleakage or leak tightness. This test is referred to as the annulus vacuum decay or annulus pressure decay test. This test is currently used to verify that actual reactor building annulus outside air inleakage is conservatively less than the value used as an input to the CANVENT computer code and dose analyses.

The vacuum decay test is performed by isolating the pressure transmitter and starting the annulus ventilation 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 annulus vacuum or pressure decay test is a better method for verifying outside air inleakage because airflow measurements are unnecessary.

This amendment request proposes to add a new Annulus Vacuum Decay Time SR 3.6.16.3. The annulus vacuum decay time of 87 seconds with 2000 cfm annulus air inleakage at a nominal differential pressure of 1 inch water gauge was determined in Calculation CNC-1240.00-00-0009, Revision 2. This calculation established the annulus pressure test points and minimum acceptable vacuum decay time to ensure that the maximum annulus leakage is consistent with the assumptions used in the dose analyses. This calculation documents the annulus outside air leakage inputs and how they are used in the CANVENT computer code and dose analyses.

The Bases for TS 3.6.10 and 3.6.16 will also be revised to reflect these changes. Several other minor changes are also being made as part of this amendment request. These changes will be discussed in detail within this amendment request, including changes to TS 5.5.11.

Description of Proposed Changes and Technical Justification

1) Change TS 3.6.10 Bases as follows:

- In the Background section, Page B 3.6.10-1, Paragraph 3, delete the second statement regarding reactor building operability. Reactor building operability is discussed in the Bases of TS 3.6.16. This statement is redundant.

- In the Background section, Page B 3.6.10-1, Paragraph 4, change the word "charcoal" to "carbon" (two places). This is a minor change being incorporated. The term "carbon" is the correct terminology for discussing nuclear grade activated carbon filter media. The use of the term "charcoal" in place of "carbon" is a misconception because the carbon is manufactured from a charcoal type porous material. During the manufacturing process, the charcoal material is carbonized and chemically treated to improve its retention of radioactive iodine compounds. The resultant product is referred to as nuclear grade activated carbon.

- In the Background section, Page B 3.6.10-1, Paragraph 4, replace the fifth statement with the following statement: "A second bank of HEPA filters follows the adsorber section to collect carbon fines." No testing of the second bank of HEPA filters is performed and no credit is assumed in any safety analyses for this HEPA filter bank. Therefore, the words pertaining to this filter bank being a backup for the main filter bank should be deleted.

- In the Background section, Page B 3.6.10-2, Paragraph 5, replace the first two statements with the following statements: "The prefilters/moisture separators remove large particles in the air and entrained water droplets to prevent excessive loading of the HEPA filters and carbon adsorbers. Heaters are included to reduce the relative humidity of the airstream, although no credit is taken in the safety analysis." The prefilter/moisture separators are designed to protect the upstream HEPA filters. This change clarifies that the prefilter/moisture separators are one filter bank. Since the adoption of Catawba License Amendments 90/84 for Units 1/2, respectively, the heaters have not been required for system operability. Additional information was added to clarify the role of the heaters in reducing relative humidity and to show that no credit is assumed for their performance in the safety analyses. These minor changes are being made to enhance and clarify the Bases.

- In the Applicable Safety Analyses section, Page B 3.6.10-2, Paragraph 2, change the last two sentences to read as follows: "The output from 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." Catawba is requesting that the Bases for TS 3.6.10 be changed to accurately describe the AVS performance during a design basis accident. This change will enhance and clarify how the AVS is analyzed with the CANVENT computer code.

- In the LCO section, Page B 3.6.10-2, delete the word "particulate." The filter train is designed to remove other radioiodines besides particulate iodine, such as organic and elemental. This is a minor editorial change to enhance the Bases.

- In the Surveillance Requirements section, Page B 3.6.10-4, change the word "charcoal" to "carbon" (three places). Also, delete the word "minimum" prior to "system flow rate" under SR 3.6.10.2. This is a minor change being incorporated. The term "carbon" is the correct terminology for discussing nuclear grade activated carbon filter media (reference the previous identical change). The word "minimum" is incorrect. The surveillance verifies that the flowrate is within an acceptable range in accordance with the VFTP.

- In the Surveillance Requirements section, Page B 3.6.10-5, under SR 3.6.10.4, delete the word "manually" and add the phrase, "from the control room." This change clarifies the intent of the surveillance and accurately describes the way the bypass valves are operated.

- In the References section, Page B 3.6.10-6, change Reference 2 to "UFSAR, Sections 6.2.3 and 9.4.9." This is a minor change being incorporated. The subject references provide additional details regarding reactor building and AVS operability.

2) Revise SR 3.6.16.2 to read as follows: "Verify each Annulus Ventilation System train produces a pressure equal to or more negative than -0.88 inch water gauge at or above elevation 564 feet."

Catawba is requesting that this surveillance be modified to change the design basis annulus pressure and eliminate the 1-minute time restriction. The -0.88 inch water gauge annulus pressure measured at or above elevation 564 feet ensures that the annulus pressure is greater than or equal to -0.25 inch water gauge throughout the annulus. The proposed -0.88 inch water gauge annulus pressure consists of the NUREG-0800, Sections 6.2.3 and 6.5.3 minimum value of -0.25 inch water gauge and an outside air temperature induced hydrostatic pressure gradient correction of -0.63 inch water gauge. The outside air temperature induced hydrostatic pressure gradient of -0.63 inch water gauge is determined in calculation CNC-1211.00-00-0081, Revision 0, "Calculation of VE Damper Setpoint for Resolution of the Concern of NRC IEN 88-76." The negative pressure prevents leakage from the reactor building, since outside air is drawn into the annulus by the negative pressure. Adoption of the -0.88 inch water gauge annulus pressure will reduce the "positive" pressure time period modeled in the dose analyses, thereby allowing credit for the AVS filters to be taken earlier in the dose analyses and effectively reducing calculated offsite and operator doses. The annulus pressure control loop setpoint is -1.5 inches water gauge which includes an allowance for instrument uncertainty. The existing SR 3.6.16.2 1-minute annulus pressure drawdown time requirement is not utilized in any safety analyses. The CANVENT analyses show that the AVS cannot draw the annulus pressure down to -0.88 inch water gauge within 1 minute following a design basis LOCA. Therefore, the 1-minute time requirement is non-conservative with respect to Catawba's dose analyses and the AVS performance. The 1-minute time restriction does not support any 10 CFR 100 offsite or GDC 19 operator dose analyses. Therefore, this amendment request proposes to delete the annulus pressure drawdown time restriction associated with this surveillance. The justification for elimination of this time restriction is also supported by SR 3.6.10.1, which is implemented every 31 days. To satisfy SR 3.6.10.1, each AVS train is continuously operated for ≥ 10 hours with the heater operating. Implementation of this surveillance ensures all associated controls are operating properly and enhances early detection of failed AVS components. A new annulus vacuum decay surveillance described below will be added to the TS to ensure reactor building annulus integrity is maintained. Finally, the STAGGERED TEST BASIS requirement is being deleted from SR 3.6.16.2. The STAGGERED TEST BASIS requirement was originally included in the SR 3.6.16.2 surveillance frequency on the belief that this SR was only a test of the leak tightness capability of the reactor building. As such, either AVS train could be used to perform the SR. Actually, this SR verifies functional capability of the AVS; therefore, a STAGGERED TEST BASIS requirement is not appropriate and each AVS train should be tested every 18 months.

3) Add the following new SR 3.6.16.3: "Verify that during the annulus vacuum decay test, the vacuum decay time (the time required for the pressure in the annulus to increase from -3.5 inches water gauge to -0.5 inch water gauge) is greater than or equal to 87 seconds." This new SR will have a frequency of 18 months.

The purpose of the annulus vacuum decay test is to quantify the reactor building inleakage, which is an input to the dose analyses. The annulus vacuum decay test measures the time for the negative pressure generated in the annulus to increase from -3.5 to -0.5 inches water gauge, which corresponds to a measure of annulus inleakage.

The annulus pressure decay time of 87 seconds is based upon a design outside air annulus inleakage rate of 2000 cfm at a nominal differential pressure of 1 inch water gauge. The reactor building annulus 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 results of the CANVENT analysis for annulus conditions and AVS response to the LOCA are used for the rod ejection accident.

The original design of the AVS had a nominal design setpoint of -1.0 inch water gauge in the annulus. As a result of NRC Information Notice 88-76, "Recent Discovery of a Phenomenon Not Previously Considered in the Design of Secondary Pressure Control," September 19, 1988, the nominal design annulus pressure setpoint was changed to -1.5 inches water gauge. Since the nominal annulus differential pressure was increased, the reactor building inleakage also increased.

In the CANVENT analyses, the 2000 cfm at -1.0 inch water gauge average annulus outside air inleakage is conservatively corrected for an annulus pressure of -1.6567 inches water gauge and a Charlotte, North

Carolina area outside air temperature of 18°F at 14.34 psia. The pressure and temperature corrected air inleakage is then utilized in the CANVENT computer code to model AVS performance during a design basis accident. The CANVENT results are then used as input to the computer codes which calculate the dose rates for Catawba.

Calculation CNC-1240.00-00-0009, Revision 2, "Annulus Pressure Decay After Steady State," determined the annulus pressure decay time of 87 seconds with 2000 cfm annulus inleakage at a nominal differential pressure of 1 inch water gauge. The annulus vacuum decay test verifies the time is greater than or equal to 87 seconds to ensure that the inleakage rate is less than the value used to analyze the AVS performance. A larger annulus vacuum decay time is indicative of a reactor building with better leakage characteristics.

Catawba is requesting the addition of this new surveillance because it is more representative of the reactor building annulus inleakage characteristics and is a direct input to the CANVENT computer code. As seen by the above discussion, this change supports Catawba's methods for performing dose analyses. The change will not adversely impact the dose analyses. The existing SR 3.6.16.3 is renumbered to new SR 3.6.16.4. The renumbering is necessary in order to retain the Improved TS convention of listing SRs in order of increasing surveillance interval.

4) Change the TS 3.6.16 Bases as follows:

- In the Applicability section, Page B 3.6.16-2, delete the phrase, "steam line break" and the comma after the word "LOCA." This minor editorial change is being incorporated to correct the design basis accidents that may result in the release of significant radioactive material to the containment atmosphere. The AVS is not required to mitigate the consequences of a main steam line break. UFSAR Section 6.2.3 and Chapter 15 do not take any credit for the AVS mitigating any steam line break accidents.

- In the Surveillance Requirements section, Page B 3.6.16-3, replace the existing SR 3.6.16.2 paragraphs with the following:

"The ability of the AVS train to produce the required negative pressure of at least -0.88 inch water gauge at or above 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 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 -0.88 inch water gauge annulus pressure does not need to be error analyzed because sufficient margin is included in the conservative methodology used to calculate the hydrostatic pressure gradient.

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."

Catawba is revising the above SR 3.6.16.2 Bases to describe the role of the AVS in minimizing radioactive releases during a design basis LOCA or rod ejection accident.

- In the Surveillance Requirements section, Page B 3.6.16-3, add the following paragraphs for new SR 3.6.16.3:

<u>SR 3.6.16.3</u>

"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 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 results of the CANVENT analysis for annulus conditions and AVS response to the LOCA 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.

Neither the annulus vacuum decay time nor test parameters are required to be error analyzed because sufficient margin is included in the conservative methodology used to calculate the annulus vacuum decay time.

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

Catawba is requesting the addition of the TS SR 3.6.16.3 Bases to accurately describe how reactor building annulus outside air inleakage is used as an input to the dose analyses. Due to the addition of new SR 3.6.16.3, the existing SR 3.6.16.3 Bases is renumbered to new SR 3.6.16.4 Bases, consistent with the renumbering in the TS.

- Add the following two references to the References section, Page B 3.6.16-3:

  "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."

  This is a minor change being incorporated. The subject references provide additional details regarding reactor building operability.

5) Revise TS 5.5.11 for the AVS as follows:

- In paragraphs 5.5.11a and 5.5.11b, change the Unit 2 criteria for the HEPA and carbon filter penetration and system bypass leakage from "<0.05%" to "<1%." Catawba is requesting this change to be consistent with Unit 1 and NRC Generic Letter 83-13. The Unit 1 and Unit 2 AVS filter units are designed for 95% filtration efficiency. The Catawba dose analyses assume 95% filtration efficiency for these filters. Therefore, this change does not impact the dose analyses.

  Regulatory Guide 1.52, Rev. 2, "Design, Testing, and Maintenance Criteria for Post Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants," Subsection C.5.c states:

  "The in-place DOP test for HEPA filters should conform to Section 10 of ANSI N510-1975. HEPA filter sections should be tested in place (1) initially, (2) at least once per 18 months thereafter, and (3) following painting, fire, or chemical release in any ventilation zone communicating with the system to confirm a penetration of less than 0.05% at rated flow. An engineered-safety-feature air filtration system satisfying this condition can be considered to warrant a 99% removal efficiency for particulate in accident dose evaluations."

  Subsection C.5.d states:

  "The activated carbon adsorber section should be leak tested with a gaseous halogenated hydrocarbon refrigerant in accordance with Section 12 of ANSI N510-

1975 to ensure that bypass leakage through the adsorber section is less than 0.05%. After the test is completed, air flow through the unit should be maintained until the residual refrigerant gas in the effluent is less than 0.01 ppm."

As documented in Subsection C.5.c above, the 0.05% criteria clearly applies to a 99% efficient HEPA filter. The intent of the 0.05% criteria in Subsection C.5.d can also be construed to apply to a 99% carbon filter bed. The Catawba dose analyses assume 95% efficiency for the AVS upstream HEPA filters and carbon filter bed.

In March 1983, the NRC published Generic Letter 83-13, "Clarification of Surveillance Requirements for HEPA Filters and Charcoal Adsorber Units in Standard Technical Specifications on ESF Cleanup Systems." In this Generic Letter, the NRC stated that the Standard TS for all power reactors did not clearly reflect the required testing requirements of HEPA filters and charcoal adsorber units and the NRC staff assumptions used in its safety evaluations for the ESF atmospheric cleanup systems. In Generic Letter 83-13, the NRC clarified Regulatory Positions C.5.c and C.5.d of Regulatory Guide 1.52, Rev. 2 by issuing revised Standard TS SRs for testing of HEPA filters and charcoal adsorber units.

The revised penetration and bypass leakage SR stated:

"Verifying that the cleanup system satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than (*)% and uses the test procedure guidance in Regulatory Positions C.5.a, C.5.c, and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is _____ cfm ± 10%.

* 0.05% value applicable when a HEPA filter or charcoal adsorber efficiency of 99% is assumed, or 1% when a HEPA filter or charcoal adsorber efficiency of 95% or less is assumed in the NRC staff's evaluation. (Use the value assumed for the charcoal adsorber efficiency if the value for the HEPA filter is different from the charcoal adsorber efficiency in the NRC staff's safety evaluation)."

As previously stated, the Catawba dose analyses assume 95% efficiency for the AVS upstream HEPA filters and carbon filter bed. The proposed change corresponds with the NRC guidance issued in Generic Letter 83-13. This proposed change does not require any changes to the dose analyses. Since the proposed change does not impact the dose analyses, there will be no adverse safety impact.

- In paragraphs 5.5.11b, 5.5.11c, and 5.5.11d, change the word "charcoal" to "carbon" (three places). This is a minor change being incorporated. The term "carbon" is the correct terminology for discussing nuclear grade activated carbon filter media (reference the previous identical change).

Part 2: Describe the alignment the ABFVES filtered exhaust units should be tested in and request appropriate TS 5.5.11 limits in order to ensure that the ABFVES will continue to meet its design basis functions. Similar to Item 1 above, request changes for the Unit 2 ABFVES in-place penetration and bypass leakage criteria in TS 5.5.11.

Background

The design basis of the ABFVES is to ensure the ECCS pump rooms are maintained at a negative pressure when in the ECCS alignment and that air exhausted from these rooms is filtered prior to being released to the environment. The ABFVES accomplishes this by performing the following functions:

1) Isolating the filter unit bypass and directing air flow through the filter (currently, this is the alignment due to an original design deficiency).
2) Isolating the non-safety portions of the system on receipt of an ESF signal. This results in each fan being aligned to draw air from only the ECCS pump rooms.
3) The fan inlet vortex damper goes to a throttled position so that the fan will operate in a stable manner at the reduced flow rates (nominal 6500 cfm) in the ESF alignment.
4) Ensuring the ECCS pump rooms are kept at a negative pressure with respect to adjacent non-ECCS areas. This ensures that the airborne radioactive products of leakage within these rooms is filtered and discharged through the unit vent.
5) Ensuring the air from the ECCS pump rooms is filtered in a manner that supports the dose analyses assumption of 95% filter efficiency.

6) Performing the above functions with onsite or offsite power only, assuming a single failure.

The ABFVES normal alignment performs the following functions:

1) Maintains the auxiliary building at a slight negative pressure by drawing more air out of the building than is supplied to it.
2) Maintains air flow direction within the auxiliary building from radiologically "clean" areas to areas which may contain radiological effluents that require filtration.
3) Maintains an auxiliary building environment suitable for reliable long-term operation of the components in the building, and for personnel access for equipment maintenance.

The ABFVES was primarily designed as a non-safety, non-redundant system with a subset of the system being designed as an ESF. The system consists (on a reactor unit basis) primarily of two 50% filtered exhaust fans, two 50% unfiltered exhaust fans, two 50% supply units, and automatic dampers. There are additional fans that ensure proper flow to various rooms and equipment located in the auxiliary building.

The same filtered exhaust fans are used in the normal alignment and in the ESF alignment. In the normal alignment, the fans operate at full flow and exhaust from all areas that contain equipment handling radioactive fluids. In the normal alignment, each filtered exhaust fan is a 50% capacity fan. In the ESF alignment, the fans operate at a reduced flow (throttled back by safety related vortex dampers) and exhaust only from the ECCS pump rooms. In the ESF alignment, each filtered exhaust fan is a 100% capacity fan.

An issue was raised concerning the proper alignment for testing the ABFVES flow rates with respect to station TS SRs. SR 3.7.12.2 states, "Perform required ABFVES filter testing in accordance with the Ventilation Filter Testing Program (VFTP)." The VFTP is described in TS 5.5.11. In order to meet these requirements, the ABFVES has been tested in dual train operation. Dual train operation requires having both the 1A and 1B or 2A and 2B system components operating at the same time.

The ABFVES was flow balanced in accordance with the requirements of ANSI N510-1980. The preoperational and periodic test programs have verified the 30,000 cfm flow rate through the filtered exhaust units with both fans in operation. Both tests were developed and conducted using the guidance provided in the UFSAR, Regulatory Guide 1.52, and ANSI N510-1980. The periodic test program was developed in accordance with requirements of station TS.

PIP C-98-4254 identified concerns associated with the TS limits and the present dual train testing methodology. If only one filtered exhaust train is operating on either or both units, the flow rate could violate the minimum residence time requirement for the carbon bed. This alignment could result from a single failure of an auxiliary building filtered exhaust train to align to the ECCS flow path. As a result of PIP C-98-4254, restrictions were instituted on the TS maximum flow rate and carbon bed penetration values.

Calculation CNC-1211.00-00-0123, "Bases for VA Filter Technical Specification Changes (Resolution to OBD PIP C98-4254)," was prepared to determine what alignment the auxiliary building filtered exhaust units shall be tested in, as well as to determine appropriate TS limits to ensure the system will continue to meet its design basis functions.

The calculation determined that the flow limits for TS 5.5.11a, b, and d shall be established at 60,000 cfm ± 10% with both trains of fans operating in a normal alignment. The normal alignment is defined to be all four filtered exhaust fans in operation, all four unfiltered exhaust fans in operation, and all four supply units in operation. The Fuel Handling Ventilation Exhaust System (FHVES) on both units shall also be in operation as well. The flow through each filter shall be balanced so that each filter operates with a flow of 30,000 cfm ± 10%.

The calculation also determined that the laboratory test of methyl iodide penetration shall remain at 4% in accordance with TS 5.5.11c; however, the test shall be done at a face velocity of 48 feet per minute (fpm) instead of the normal 40 fpm face velocity specified in ASTM D3803-1989. This deviation is to ensure that the laboratory test results appropriately bound the limiting flow alignment that results in a flow rate higher than the test alignment. This deviation is specified in accordance with Generic Letter 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal." The test results shall be adjusted for the actual ABFVES carbon bed depth of 2.27 inches using the methodology of ASTM D3803-1989 prior to comparison to the TS limit.

Changes to TS 3.7.12 Bases and TS 5.5.11 are being submitted to clearly establish the preferred testing alignment for the ABFVES at Catawba.

Description of Proposed Changes and Technical Justification

1) Change TS 3.7.12 Bases as follows:

- In the Background section, Page B 3.7.12-1, paragraph 1, change "(ECCS) area" to "(ECCS) pump rooms." This minor change is being made to clarify that separate rooms exist for each ECCS pump.

- In the Background section, Page B 3.7.12-1, paragraph 2, delete the phrases "and to prevent excessive loading of the carbon adsorber" and ", and to back up the upstream HEPA filter should it develop a leak." This minor change deletes an inaccurate statement about the function of the prefilter/moisture separator section. Its function is to remove entrained water droplets from the air. Also, the deletion is made for clarification of the description of the downstream HEPA filter.

- In the Background section, Page B 3.7.12-1, paragraph 3, replace this entire paragraph with the following: "The ABFVES is normally in operation with flow directed through the HEPA filters and carbon adsorbers. During emergency operations, the ABFVES dampers are realigned to isolate the non-safety portions of the system and only draw air from the ECCS pump rooms." These changes are being made to clearly state the ABFVES alignment during normal and accident operations. The filter units operate in a filtered alignment continuously. The ability of the filter units to operate in bypass had been previously removed via modification. The filter units are not allowed to operate in a bypass alignment due to single failure concerns identified that could allow the bypass damper to fail to the open position during a potential design basis accident. The ESF alignment isolates the safety and non-safety portion of the ABFVES to ensure the ECCS pump rooms are maintained at a negative pressure with respect to adjacent non-ECCS areas.

- In the Background section, Page B 3.7.12-1, paragraph 4, replace the last sentence with the following: "The heaters are not required for OPERABILITY, since the laboratory test of the carbon is performed at 95%

relative humidity, but have been maintained in the system to provide additional margin (Ref. 9)." The description of the heater function is being deleted per License Amendments 90/84, which stated the heaters are not required for operability based on carbon filter testing per ASTM D3803-1989. The carbon is tested at a relative humidity of 95%. The heaters remain in the system to provide additional margin.

- In the Applicable Safety Analyses section, Page B 3.7.12-2, paragraph 1, replace "passive failure of the ECCS outside containment, such as an SI pump seal failure, during the recirculation mode" with "constant leak rate of 1 gpm in the ECCS pump rooms throughout the accident." Also, delete the last sentence in the paragraph. Finally, delete paragraph 2 in its entirety. The changes are made to the design basis system evaluation of the ABFVES which is established by a large break LOCA. Deletion of the reference to a small break LOCA is made and included as an addition to clarify that the system evaluation assumes a constant leak rate of 1 gpm in the ECCS pump rooms throughout the accident.

- In the LCO section, Page B 3.7.12-2, add the word "a" prior to "loss of offsite power." Change "ECCS pump room" to "ECCS pump rooms" (two places). In item b, change "filter" to "filters" and delete the phrase "not excessively restricting flow, and are." These changes are made to clarify the operability statement for an ABFVES train concerning HEPA filters and carbon adsorbers. The other editorial changes are for clarification purposes.

- In the Actions section, Page B 3.7.12-4, change "charcoal" to "carbon." This change is identical to the change made in Part 1 of this amendment request.

- In the Surveillance Requirements section, Page B 3.7.12-4, delete "Standby" in SR 3.7.12.1. Change "charcoal" to "carbon" in this SR (reference the previous identical change).

  In SR 3.7.12.2, delete the word "minimum." Add material as follows:

  "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 $\pm$ 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."

This change requires the filter test be performed in accordance with ASTM D3803-1989 except that it must be done at the limiting flow rate face velocity. In order to minimize the number of carbon bed replacements, it is being proposed that Catawba take credit for the actual filter depth. The actual filter depth is 2.2751 inches. The test results are to be adjusted for a 2.27 inch bed in accordance with the guidance provided in ASTM D3803-1989 prior to comparing them to the TS limit. These recommended changes are in accordance with the guidance provided in Generic Letter 99-02 and ASTM D3803-1989.

In SR 3.7.12.3, change "charcoal" to "carbon" (reference the previous identical change).

On Page B 3.7.12-5, modify the first paragraph of SR 3.7.12.4 so the new paragraph reads as follows: "This SR verifies the pressure boundary integrity of the ECCS pump rooms. The following rooms are considered to be ECCS pump rooms (with respect to the ABFVES): centrifugal charging pump rooms, safety injection pump rooms, residual heat removal pump rooms, and the containment spray pump rooms. Although the containment spray system is not normally considered an ECCS system, it is included in this ventilation boundary because of its accident mitigation function which requires the pumping of post accident containment sump fluid. The ability of the system to maintain the ECCS pump rooms at a negative pressure, with respect to potentially unfiltered adjacent areas, is periodically tested to verify proper functioning of the ABFVES. During the post accident mode of operation, the ABFVES is designed to maintain a slight negative pressure in the ECCS pump rooms, with respect to adjacent areas, to prevent unfiltered LEAKAGE. The Frequency of 18 months is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 8)." This change specifically names the ECCS pump rooms included in the pressure boundary and describes the ABFVES function of maintaining the ECCS pump rooms at a negative pressure with respect to unfiltered adjacent areas.

- In the References section, Page B 3.7.12-5, add "9. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991." and "10. ASTM D3803-1989."

2) Revise TS 5.5.11 for the ABFVES as follows:

- As was done for the AVS in Part 1 of this amendment request, in paragraphs 5.5.11a and 5.5.11b, change the Unit 2 criteria for the HEPA and carbon filter penetration and system bypass leakage from "<0.05%" to "<1%." Catawba is requesting this change to be consistent with Unit 1 and NRC Generic Letter 83-13. The Unit 1 and Unit 2 ABFVES filter units are designed for 95% filtration efficiency. The Catawba dose analyses assume 95% filtration efficiency for these filters. Therefore, this change does not impact the dose analyses. The justification for this change is exactly like that for the corresponding change for the AVS and will not be repeated here.

- In paragraphs 5.5.11a, 5.5.11b, and 5.5.11d, add "(2 fans)" after "Aux. Bldg. Filtered Exhaust" and change the flowrate entry for the system from "3"0,000 cfm to "6"0,000 cfm. These changes clarify that two filtered exhaust fans are operating in parallel with a total flowrate of 60,000 cfm for each unit.

- In paragraph 5.5.11c, add "(Note 1)" after "Aux. Bldg. Filtered Exhaust" and add the following material following the list of ventilation systems:

  "Note 1: The Auxiliary Building Filtered Exhaust System carbon adsorber samples shall be tested at a face velocity of 48 ft/min instead of the 40 ft/min specified in ASTM D3803-1989. 48 ft/min is the nominal limiting velocity the carbon adsorber may be exposed to under post accident conditions as a result of certain postulated failures. The results from this test shall then be corrected to a 2.27 inch bed in accordance with the guidance provided in ASTM D3803-1989 prior to comparing them to the Technical Specification criteria. 2.27 inches is the actual bed depth for the filter unit."

  This change requires the filter test be performed in accordance with ASTM D3803-1989 except that it must be done at the limiting flow rate face velocity. In order to minimize the number of carbon bed replacements, it is being proposed that Catawba take credit for the actual filter depth. The actual filter depth is 2.2751 inches. The test results are to be adjusted for a 2.27 inch bed in accordance with the guidance provided in ASTM D3803-1989 prior to comparing them to the TS limit. These recommended changes are in accordance with the guidance provided in Generic Letter 99-02 and ASTM D3803-1989.

Part 3: Modify the TS Bases for the FHVES and similar to Items 1 and 2 above, request changes for the Unit 2 FHVES in-place penetration and bypass leakage criteria in TS 5.5.11.

<u>Background</u>

The design basis of the FHVES is to filter airborne radioactive particulates from the area of the fuel pool following a fuel handling accident. The FHVES, in conjunction with other normally operating systems, also provides environmental control of temperature and humidity in the fuel pool area.

The FHVES does not actuate on any Engineered Safety Feature Actuation System signal. One train is required to be in operation whenever irradiated fuel is being moved in the fuel handling building. The operation of one train of FHVES ensures, if a fuel handling accident occurs, ventilation exhaust will be filtered before being released to the environment.

Description of Proposed Changes and Technical Justification

1) Change TS 3.7.13 Bases as follows:

- In the Background section, Page B 3.7.13-1, paragraph 2, delete "and provide backup in case the main HEPA filter bank fails." Also, delete ", but serves to collect carbon fines, and to back up the upstream HEPA filter should it develop a leak." These minor changes are made to remove redundant statements and to clarify the function of the second bank of HEPA filters.

- In the Background section, Page B 3.7.13-1, paragraph 3, add the phrase "Engineered Safety Feature Actuation System" to the first sentence. Delete the phrase ", to prevent excessive loading of the HEPA filters and carbon adsorbers" from the last sentence. These minor changes clarify that the FHVES does not automatically actuate on any safety signal. It does, however, initiate filtered ventilation of the fuel handling building following receipt of a high radiation signal. It also clarifies the function of the prefilters.

- In the Background section, Page B 3.7.13-1, paragraph 4, add the following sentence: "The heaters are not required for OPERABILITY, since the laboratory test of the carbon is performed at 95% relative humidity, but have been maintained in the system to provide additional margin (Ref. 9)." This heater discussion is consistent with License Amendments 90/84, which stated the heaters are not required for operability based on carbon filter testing per ASTM D3803-1989. The carbon is tested at a relative humidity of 95%. The heaters remain in the system to provide additional margin.

- In the LCO section, Page B 3.7.13-2, paragraph 2, delete "not excessively restricting flow, and are" and change "function" to "functions." These changes are made to clarify the operability statement for a FHVES train concerning HEPA filters and carbon adsorbers.

- In the Actions section, Page B 3.7.13-3, change "charcoal" to "carbon." This change is identical to the changes made in Parts 1 and 2 of this amendment request.

- In the Surveillance Requirements section, Page B 3.7.13-3, change "charcoal" to "carbon" in SR 3.7.13.1 and SR 3.7.13.2 (reference the previous identical change).

  In SR 3.7.13.3, on Page B 3.7.13-4, delete the word "minimum." The word "minimum" is incorrect. The surveillance verifies that the flowrate is within an acceptable range in accordance with the VFTP.

  In SR 3.7.13.4, on Page B 3.7.13-4, revise the second sentence to read: "The ability of the system to maintain the fuel building at a negative pressure with respect to atmospheric pressure is periodically tested to verify proper function of the FHVES." This change clarifies the surveillance description and makes it consistent with the wording in the surveillance itself.

- In the References section, Page B 3.7.13-5, add "9. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991."

2) Revise TS 5.5.11 for the FHVES as follows:

- As was done for the AVS and ABFVES in Parts 1 and 2 of this amendment request, in paragraphs 5.5.11a and 5.5.11b, change the Unit 2 criteria for the HEPA and carbon filter penetration and system bypass leakage from "<0.05%" to "<1%." Catawba is requesting this change to be consistent with Unit 1 and NRC Generic Letter 83-13. The Unit 1 and Unit 2 FHVES filter units are designed for 95% filtration efficiency. The Catawba dose analyses assume 95% filtration efficiency for these filters. Therefore, this change does not impact the dose analyses. The justification for this change is exactly like that for the corresponding changes for the AVS and the ABFVES and will not be repeated here.

ATTACHMENT 4

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

No Significant Hazards Consideration Determination

The following discussion is a summary of the evaluation of the changes contained in this proposed amendment against the 10 CFR 50.92(c) requirements to demonstrate that all three standards are satisfied. A no significant hazards consideration is indicated if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated, or

2. Create the possibility of a new or different kind of accident from any accident previously evaluated, or

3. Involve a significant reduction in a margin of safety.

First Standard

Implementation of this amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated. Neither the AVS, nor the ABFVES, nor the FHVES is capable of initiating any accident. The AVS, ABFVES, and FHVES, which are responsible for maintaining an acceptable environment in the annulus, the auxiliary building, and the fuel building during normal and accident conditions, will continue to function as designed, and in accordance with all applicable TS. The design and operation of the systems are not being modified by this proposed amendment. Therefore, there will be no impact on any accident probabilities or consequences.

Second Standard

Implementation of this amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated. No new accident causal mechanisms are created as a result of NRC approval of this amendment request. No changes are being made to the plant which will introduce any new accident causal mechanisms. This amendment request does not impact any plant systems that are accident initiators and does not impact any safety analyses.

Third Standard

Implementation of this amendment would not involve a significant reduction in a margin of safety. Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. The performance of these fission product barriers will not be impacted by implementation of this proposed amendment. The performance of the AVS, the ABFVES, and the FHVES in response to normal and accident conditions will not be impacted by this proposed amendment. The changes to the AVS surveillances will provide for a better method to ensure that the assumptions of the dose analyses are met. There is no risk significance to this proposed amendment, as no reduction in system or component availability will be incurred. No safety margins will be impacted.

Based upon the preceding discussion, Duke has concluded that the proposed amendment does not involve a significant hazards consideration.

ATTACHMENT 5

ENVIRONMENTAL ANALYSIS

Environmental Analysis

Pursuant to 10 CFR 51.22(b), an evaluation of this license amendment request has been performed to determine whether or not it meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) of the regulations.

Implementation of this amendment will have no adverse impact upon the Catawba units; neither will it contribute to any additional quantity or type of effluent being available for adverse environmental impact or personnel exposure.

It has been determined there is:

1. No significant hazards consideration,

2. No significant change in the types, or significant increase in the amounts, of any effluents that may be released offsite, and

3. No significant increase in individual or cumulative occupational radiation exposures involved.

Therefore, this amendment to the Catawba TS meets the criteria of 10 CFR 51.22(c)(9) for categorical exclusion from an environmental impact statement.