SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.10.1	Operate each AVS train for ≥ 10 continuous hours with heaters operating.	31 days
SR 3.6.10.2	Perform required AVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.10.3	Verify each AVS train actuates on an actual or simulated actuation signal.	18 months
SR 3.6.10.4	Verify each AVS filter cooling bypass valve can be opened.	18 months
SR 3.6.10.5	Verify each AVS train flow rate is ≥ 8100 cfm and ≤ 9900 cfm.	18 months
SR 3.6.10.6	Verify each AVS train produces a pressure equal to or more negative than -0.88 inch water gauge when corrected to elevation 564 feet.	18 months

SURVEILLANCE REQUIREMENTS (continued)

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

3.9 REFUELING OPERATIONS

3.9.3 Containment Penetrations

LCO 3.9.3 The containment penetrations shall be in the following status:

a. The equipment hatch closed and held in place by a minimum of four bolts;

b. A minimum of one door in each air lock closed; and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere either:

1. closed by a manual or automatic isolation valve, blind flange, or equivalent, or

2. exhausting through an OPERABLE Containment Purge Exhaust System (CPES) HEPA filter and carbon adsorber.

APPLICABILITY: During movement of recently irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment penetrations not in required status.	A.1 Suspend movement of recently irradiated fuel assemblies within containment.	Immediately

(continued)

5.5 Programs and Manuals

5.5.11 Ventilation Filter Testing Program (VFTP) (continued)

ESF Ventilation System	Penetration and System Bypass	Flowrate
Annulus Ventilation	< 1%	9000 cfm
Control Room Area Ventilation	< 0.05%	6000 cfm
Aux. Bldg. Filtered Exhaust	< 1%	30,000 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 and System Bypass	Flowrate
Annulus Ventilation	< 1%	9000 cfm
Control Room Area Ventilation	< 0.05%	6000 cfm
Aux. Bldg. Filtered Exhaust	< 1%	30,000 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	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)

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

BASES

BACKGROUND (continued)

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

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

APPLICABLE SAFETY ANALYSES

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

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

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

LCO

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

BASES

APPLICABILITY

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

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

ACTIONS

A.1

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

B.1 and B.2

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

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

BASES

ACTIONS (continued)

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.

SR 3.6.10.6

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

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

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

REFERENCES

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

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

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

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

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

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.16.3

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

REFERENCES

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

B 3.7 PLANT SYSTEMS

B 3.7.10 Control Room Area Ventilation System (CRAVS)

BASES

BACKGROUND

The CRAVS ensures that the control room will remain habitable for personnel during and following all credible accident conditions. This function is accomplished by pressurizing the control room to ≥ 1/8 (0.125) inch water gauge with respect to all surrounding areas, filtering the outside air used for pressurization, and filtering a portion of the return air from the control room to clean up the control room environment.

The CRAVS consists of two independent, redundant trains of equipment. Each train consists of:

- a pressurizing filter train fan (1CRA-PFTF-1 or 2CRA-PFTF-1)
- a filter unit (1CRA-PFT-1 or 2CRA-PFT-1) which includes moisture separator/prefilters, HEPA filters, and carbon adsorbers
- the associated ductwork, dampers/valves, and controls

Inherent in the CRAVS ability to pressurize the control room is the control room pressure boundary. This pressure boundary includes: (1) the control room walls, floor, roof, doors, and all penetrations of those, (2) any piping or ductwork which penetrates into the control room, and (3) the control room ventilation system proper consisting of ductwork, filter units, dampers, and fans. These boundaries must be intact or properly isolated for the CRAVS to function properly.

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

BASES

BACKGROUND (continued)

system to provide additional margin (Ref. 9). Continuous operation of each train for at least 10 hours per month, with the heaters on, reduces moisture buildup on the HEPA filters and adsorbers.

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

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

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

The CRAVS is designed to maintain the control room environment for 30 days of continuous occupancy after a Design Basis Accident (DBA) without exceeding a 5 rem whole body dose or its equivalent to any part of the body.

APPLICABLE SAFETY ANALYSES

The CRAVS components are arranged in redundant, safety related ventilation trains. The CRAVS provides airborne radiological protection for the control room operators, as demonstrated by the control room accident dose analyses for the most limiting design basis loss of coolant accident, fission product release presented in the UFSAR, Chapter 15 (Ref. 3).

The analysis of toxic gas releases demonstrates that the toxicity limits are not exceeded in the control room following a toxic chemical release, as presented in Reference 1.

The worst case single active failure of a component of the CRAVS, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

BASES

APPLICABLE SAFETY ANALYSES (continued)

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

LCO

Two independent and redundant CRAVS trains are required to be OPERABLE to ensure that at least one is available assuming a single failure disables the other train. Total system failure could result in exceeding a dose of 5 rem to the control room operator in the event of a large radioactive release.

The CRAVS is considered OPERABLE when the individual components necessary to limit operator exposure are OPERABLE in both trains. A CRAVS train is OPERABLE when the associated:

a. Pressurizing filter train fan is OPERABLE;

b. HEPA filters 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.

In addition, the control room pressure boundary must be maintained, including the integrity of the walls, floors, roof, ductwork, and access doors.

The CRAVS is shared between the two units. The system must be OPERABLE for each unit when that unit is in the MODE of Applicability. Additionally, both normal and emergency power must also be OPERABLE because the system is shared. If a CRAVS component becomes inoperable, or normal or emergency power to a CRAVS component 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.

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

BASES

APPLICABILITY

In MODES 1, 2, 3, 4, 5, and 6, CRAVS must be OPERABLE to control operator exposure during and following a DBA.

During movement of irradiated fuel assemblies, the CRAVS must be OPERABLE to cope with the release from a fuel handling accident.

ACTIONS

A.1

When one CRAVS train is inoperable in MODES 1,2,3,4,5,or 6, action must be taken to restore OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CRAVS train is adequate to perform the control room protection function. However, the overall reliability is reduced because a single failure in the OPERABLE CRAVS train could result in loss of CRAVS function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

B.1

If the control room pressure boundary is inoperable in MODES 1, 2, 3, or 4 such that the CRAVS trains cannot establish or maintain the required pressure, action must be taken to restore an OPERABLE control room pressure boundary within 24 hours. During the period that the control room pressure boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the control room pressure boundary.

C.1 and C.2

In MODE 1, 2, 3, or 4, if the inoperable CRAVS or control room pressure boundary train cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

BASES

ACTIONS (continued)

D.1

In MODE 5 or 6, if the inoperable CRAVS train cannot be restored to OPERABLE status within the required Completion Time, action must be taken to immediately place the OPERABLE CRAVS train in operation. This action ensures that the operating (or running) train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure would be readily detected.

E.1

In MODE 5 or 6, with two CRAVS trains inoperable, or during movement of irradiated fuel assemblies with one or more CRAVS trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might enter the control room. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

F.1

If both CRAVS trains are inoperable in MODE 1, 2, 3, or 4, for reasons other than Condition B, the CRAVS may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

G.1 and G.2

With one or more CRAVS 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 CRAVS filter trains because carbon adsorber efficiency testing is performed at 30°C and 95% relative humidity. The accident analysis shows that site boundary and control room operator radiation doses are within 10 CFR 50.67 limits during a DBA LOCA under these conditions.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. Monthly heater operations dry out any moisture accumulated in the carbon from humidity in the ambient air. Systems with heaters must be operated from the control room for ≥ 10 continuous hours with the heaters energized and flow through the HEPA filters and carbon adsorbers. The 31 day Frequency is based on the reliability of the equipment and the two train redundancy availability.

SR 3.7.10.2

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

SR 3.7.10.3

This SR verifies that each CRAVS train starts and operates on an actual or simulated actuation signal. The Frequency of 18 months is specified in Regulatory Guide 1.52 (Ref. 5).

SR 3.7.10.4

This SR verifies the integrity of the control room enclosure, and the assumed inleakage rate (or makeup rate) assumed in the dose analysis. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper functioning of the CRAVS. The CRAVS is designed to pressurize the control room ≥ 0.125 inches water gauge positive pressure with respect to adjacent areas in order to prevent unfiltered inleakage. The CRAVS is designed to maintain this positive pressure with one train at a makeup flow rate of ≤ 4000 cfm. The Frequency of 18 months on a STAGGERED TEST BASIS is consistent with the guidance provided in NUREG-0800 (Ref. 6).

BASES

REFERENCES

1. UFSAR, Section 6.4.
2. UFSAR, Section 9.4.1
3. UFSAR, Chapter 15.
4. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
5. Regulatory Guide 1.52, Rev. 2.
6. NUREG-0800, Section 6.4, Rev. 2, July 1981.
7. 10 CFR 50.67, Accident Source Term.
8. Regulatory Guide 1.183, Revision 0.
9. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991.

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, as well as the Elevation 522 pipe chase, and Elevation 543 and 560 mechanical penetration 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 0.5 gpm in the ECCS pump rooms and a constant leak rate of 0.5 gpm outside the ECCS pump rooms throughout the accident. In such a case, the system limits radioactive release to within the 10 CFR 50.67 (Ref. 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 50.67 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

LCO (continued)

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

APPLICABILITY

In MODES 1, 2, 3, and 4, the ABFVES is required to be OPERABLE consistent with the OPERABILITY requirements of the ECCS.

In MODE 5 or 6, the ABFVES is not required to be OPERABLE since the ECCS is not required to be OPERABLE.

ACTIONS

A.1

With one ABFVES train inoperable, action must be taken to restore OPERABLE status within 7 days. During this time, the remaining OPERABLE train is adequate to perform the ABFVES function.

The 7 day Completion Time is appropriate because the risk contribution is less than that for the ECCS (72 hour Completion Time), and this system is not a direct support system for the ECCS. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

Concurrent failure of two ABFVES trains would result in the loss of functional capability; therefore, LCO 3.0.3 must be entered immediately.

B.1

If the ECCS pump rooms pressure boundary is inoperable such that the ABFVES trains cannot establish or maintain the required pressure, action must be taken to restore an OPERABLE ECCS pump rooms pressure boundary within 24 hours. During the period that the ECCS pump rooms pressure boundary is inoperable, appropriate compensatory measures (consistent with the intent, as applicable, of GDC 19, 60, 64, and 10 CFR 50.67) should be utilized to protect plant personnel from potential

BASES

ACTIONS (continued)

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

C.1 and C.2

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

D.1 and D.2

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

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

SURVEILLANCE REQUIREMENTS

SR 3.7.12.1

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

carbon adsorbers and with the heaters energized. The 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 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.

SURVEILLANCE REQUIREMENTS (continued)

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 Elevation 522 pipe chase area is also maintained at a negative pressure by the ABFVES. Since the Elevation 543 and 560 mechanical penetration rooms communicate directly with the Elevation 522 pipe chase area, these penetration rooms are also maintained at a negative pressure by the ABFVES. 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. Upon receipt of a safety injection signal to initiate LOCA 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 ABFVES will continue to operate in this mode until the safety injection signal is reset. The Frequency of 18 months is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 8).

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 50.67.
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, prefilters/moisture separators, 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. The upstream HEPA filter bank functions to remove particulates and is credited in the safety analysis. A second bank of HEPA filters follows the adsorber section to collect carbon fines. The downstream HEPA filters are not credited in the analysis. A heater is included within each filter unit to reduce the relative humidity of the airstream. The heaters are not required for OPERABILITY, since the carbon laboratory tests are performed at 95% relative humidity, but have been maintained in the system to provide additional margin (Ref. 11). 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 recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) 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/moisture separators 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.

BASES

APPLICABLE SAFETY ANALYSES

The FHVES design basis is established by the consequences of the applicable Design Basis Accidents (DBA), which are the fuel handling accident involving handling recently irradiated fuel and the weir gate drop accident. The analysis of the fuel handling accident assumes that all fuel rods in an assembly are damaged. The DBA analysis of the fuel handling accident assumes that only one train of the FHVES is 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) and 1.183 (Ref. 10).

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

LCO

Two trains of the FHVES are required to be OPERABLE and one train in operation whenever recently 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 50.67 (Ref. 9) limits in the event of a fuel handling accident involving handling recently irradiated fuel.

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 recently 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.

BASES

ACTIONS (continued)

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

B.1 and B.2

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

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

SURVEILLANCE REQUIREMENTS

SR 3.7.13.1

With the FHVES train in service, a periodic monitoring of the system for proper operation should be checked on a routine basis to ensure that the system is functioning properly. The 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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.

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 ≤ -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. Not used.
7. Regulatory Guide 1.52 (Rev. 2).
8. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.
9. 10 CFR 50.67, Accident source term.
10. Regulatory Guide 1.183 (Rev. 0).
11. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991.

BASES

APPLICABLE SAFETY ANALYSES (continued)

dropping a single irradiated fuel assembly and handling tool or a heavy object onto other irradiated fuel assemblies. The requirements of LCO 3.9.6, "Refueling Cavity Water Level," and the minimum decay time of 72 hours without containment closure capability ensure that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are well within the guideline values specified in 10 CFR 100. Standard Review Plan, Section 15.7.4, Rev. 1 (Ref. 2), defines "well within" 10 CFR 100 to be 25% or less of the 10 CFR 100 values. The acceptance limits for offsite radiation exposure will be 25% of 10 CFR 100 values or the NRC staff approved licensing basis (e.g., a specified fraction of 10 CFR 100 limits).

Containment penetrations satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3).

LCO

This LCO limits the consequences of a fuel handling accident involving handling recently irradiated fuel in containment by limiting the potential escape paths for fission product radioactivity released within containment. The LCO requires any penetration providing direct access from the containment atmosphere to the outside atmosphere to be closed except for penetrations exhausting through an OPERABLE Containment Purge Exhaust System HEPA filter and carbon adsorber during movement of recently irradiated fuel assemblies.

APPLICABILITY

The containment penetration requirements are applicable during movement of recently irradiated fuel assemblies within containment because this is when there is a potential for the limiting fuel handling accident. In MODES 1, 2, 3, and 4, containment penetration requirements are addressed by LCO 3.6.1. In MODES 5 and 6, when movement of recently irradiated fuel assemblies within containment is not being conducted, the potential for a limiting fuel handling accident does not exist. Therefore, under these conditions no requirements are placed on containment penetration status.

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

A single normal or contingency method to promptly close primary or secondary containment penetrations exists. Such prompt methods need

BASES

APPLICABILITY (continued)

not completely block the penetration or be capable of resisting pressure. The purpose is to enable ventilation systems to draw the release from a postulated fuel handling accident in the proper directions such that it can be treated and monitored.

ACTIONS

A.1 and A.2

If the containment equipment hatch, air locks, or any containment penetration that provides direct access from the containment atmosphere to the outside atmosphere is not in the required status, the unit must be placed in a condition where the isolation function is not needed. This is accomplished by immediately suspending movement of recently irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

B.1 and B.2

With one or more Containment Purge Exhaust System 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 Containment Purge Exhaust System 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 3.9.3.1

This Surveillance demonstrates that each of the containment penetrations required to be in its closed position is in that position. The Surveillance on the open purge and exhaust valves will demonstrate that the valves are exhausting through an OPERABLE Containment Purge Exhaust System HEPA Filter and carbon adsorber.

The Surveillance is performed every 7 days during movement of recently irradiated fuel assemblies within containment. The Surveillance interval is selected to be commensurate with the normal duration of time to complete fuel handling operations. As such, this Surveillance ensures that a postulated fuel handling accident involving recently irradiated fuel that

BASES

SURVEILLANCE REQUIREMENTS (continued)

releases fission product radioactivity within the containment will not result in a release of significant fission product radioactivity to the environment.

SR 3.9.3.2

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 by initiating flow through the HEPA filters and activated carbon adsorbers for ≥ 10 continuous hours with the heaters energized. The 31 day Frequency is based on the known reliability of equipment and the two train redundance available.

SR 3.9.3.3

This SR verifies that the required testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The Containment Purge Exhaust System filter tests are in accordance with Reference 4. 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). Specific test Frequencies and additional information are discussed in detail in the VFTP.

REFERENCES

1. UFSAR, Section 15.7.4.
2. NUREG-0800, Section 15.7.4, Rev. 1, July 1981.
3. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
4. Regulatory Guide 1.52 (Rev. 2).
5. 10 CFR 50.67, Accident source term.
6. Regulatory Guide 1.183 (Rev. 0).
7. Catawba Nuclear Station License Amendments 90/84 for Units 1/2, August 23, 1991.