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A Duke Energy Company

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October 20, 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 3.7.10
Control Room Area Ventilation System (CRAVS)

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 request applies to the subject TS and Bases sections as listed above. The primary purpose of the amendment request is to eliminate the requirement for the CRAVS high chlorine protection function. A chlorine detection system with safety related detectors and automatic CRAVS intake isolation capability is no longer needed at Catawba. In addition to the proposed TS and Bases changes, by this letter, Catawba is also requesting NRC approval to allow the use of non-safety related detectors and to delete the automatic intake isolation capability. In NUREG-0954, "Safety Evaluation Report related to the operation of Catawba Nuclear Station, Units 1 and 2," the NRC based its conclusion regarding the overall acceptability of the Catawba CRAVS in part upon the system's automatic intake isolation capability. Finally, the amendment request also revises the Bases for the CRAVS to more clearly describe the system function and to make other clarifying changes.

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

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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 include Section 2.2, "Nearby Industrial, Transportation, and Military Facilities," Section 6.4, "Habitability Systems," Table 6-100, "Comparison of Control Room Protection Against Toxic Gas Hazards With Regulatory Guide 1.95," Table 6-101, "Comparison of Control Room Protection Against Toxic Gas Hazards With Regulatory Guide 1.78," and Section 9.4, "Air Conditioning, Heating, Cooling and Ventilation Systems." Necessary UFSAR changes will be submitted in accordance with 10 CFR 50.71(e). In addition, implementation of this amendment will require changes to the Selected Licensee Commitments (SLC) Manual. The SLC Manual is Chapter 16 of the Catawba UFSAR. Although the SLC Manual is considered part of the UFSAR, changes and updates to the SLC Manual are processed and submitted to the NRC separate from changes and updates to the remainder of the UFSAR. The affected SLC sections include Section 16.6-4, "Chlorine Detection Systems," and Section 16.9-22, "Control Room Area Ventilation System - Intake Alarms."

Duke is requesting NRC review and approval of this proposed amendment by May 1, 2001, so that Catawba can pursue elimination of the automatic CRAVS intake isolation capability and downgrade of the chlorine detectors to non-safety related status. Duke is requesting a 30-day implementation period in conjunction with this amendment. Actual elimination of the automatic CRAVS intake isolation capability and downgrade of the chlorine detectors to non-safety related status will occur subsequent to the 30-day implementation period following amendment approval. Part of the implementation of this amendment requires the construction of a new chlorine cylinder storage facility and the development of administrative controls to allow only 100

lb of chlorine to be in service at each usage location at a time. Engineering work for this facility has already commenced and the facility will be completed prior to the end of the implementation period of the approved amendment. Catawba will consider the approved amendment to be fully implemented when the chlorine cylinders have been relocated to the new storage facility and when the approved TS and administrative controls for allowing only 100 lb of chlorine to be in service at each usage location at a time are in place.

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,

Gary R. Peterson

Attachments

Gary R. Peterson, being duly sworn, states that he is Site 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.

Gary R. Peterson, Site Vice President

Subscribed and sworn to me: 10-20-00
Date

Mary Lou Stordifo
Notary Public

My commission expires: 6-26-2002
Date

SEAL

xc (with attachments):

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ATTACHMENT 1

MARKED-UP TECHNICAL SPECIFICATIONS AND BASES PAGES FOR CATAWBA

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6, or during movement of irradiated fuel assemblies, or during CORE ALTERATIONS.	D.1 ~~----------NOTE---------- Place in high chlorine protection mode if automatic transfer to high chlorine protection mode is inoperable. ----------~~ Place OPERABLE CRAVS train in operation.	Immediately
	OR	
	D.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	D.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
E. Two CRAVS trains inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies, or during CORE ALTERATIONS.	E.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	E.2 Suspend movement of irradiated fuel assemblies.	Immediately
F. Two CRAVS trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	F.1 Enter LCO 3.0.3.	Immediately

(continued)

B 3.7 PLANT SYSTEMS

B 3.7.10 Control Room Area Ventilation System (CRAVS)

BASES

BACKGROUND

The CRAVS provides a protected environment from which operators can control the unit following an uncontrolled release of radioactivity or high chlorine gas.

The CRAVS consists of two independent, redundant trains that recirculate and filter the control room area air. Each train consists of a prefilter, a high efficiency particulate air (HEPA) filter, 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, as well as prefilters to remove water droplets from the air stream. 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 filters.

Replace with INSERT 1

The CRAVS provides both normal and emergency ventilation to the control room and control room area. This system can be operated either manually or automatically. Key operated selector switches located in the control room initiate operation of all equipment in a train. The selected train is in continuous operation. Outside air for pressurization and makeup to both the control room and control room area 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, 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. 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 of the non-selected train is started. This assures control room pressurization, assuming an active failure of one of the pressurizing filter trains.

The outside air for pressurization is continuously monitored for the presence of smoke, radiation, and chlorine. If smoke or radiation is detected in an outside air intake, an alarm is received in the control room,

BASES

BACKGROUND (continued)

Replace with INSERT 1

alerting the operators of this condition. Since the CRAVS can pressurize the control room with only one intake open, and since the pressurizing filter trains (1(2)CRA-PFT-1) filter out smoke and radioactive contaminants prior to supplying air to the control room, it is the operator's prerogative whether or not to close the affected intake on a smoke or radiation alarm. The determination to close or keep open an intake considers issues such as the validity of the alarm and the status of the other intake. The chlorine detection system will automatically isolate the affected outside air intake by closing the corresponding isolation valve.

CRAVS

A single 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 location of components and ducting within the control room area envelope ensures an adequate supply of filtered air to all areas requiring access. 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.

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

LCO

Two independent and redundant CRAVS trains are required to be

INSERT 1 for B 3.7.10 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, to prevent excessive loading of the HEPA filters and carbon adsorbers. Continuous operation of each train for at least 10 hours per month, with the heaters on, reduces moisture buildup on the HEPA filters and adsorbers.

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.

BASES

LCO (continued)

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:

Pressurizing filter train

a. 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.

pressure

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

roof

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.

APPLICABILITY

In MODES 1, 2, 3, 4, 5, and 6, and during movement of irradiated fuel assemblies and during CORE ALTERATIONS, CRAVS must be OPERABLE to control operator exposure during and following a DBA.

BASES

ACTIONS (continued)

D.1, D.2.1, and D.2.2

In MODE 5 or 6, or during movement of irradiated fuel assemblies, or during CORE ALTERATIONS, 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 remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure would be readily detected. operating (or running)

An alternative to Required Action D.1 is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position. enter

Required Action D.1 is modified by a Note indicating to place the system in the chlorine protection mode if automatic transfer to high chlorine protection mode is inoperable.

E.1 and E.2

In MODE 5 or 6, or during movement of irradiated fuel assemblies, or during CORE ALTERATIONS, with two 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

BASES

ACTIONS (continued)

heater to OPERABLE status.

The heaters do not affect OPERABILITY of the CRAVS 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 3.7.10.1

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 charcoal 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, carbon adsorber efficiency, minimum flow rate, and the physical properties of the activated carbon. Specific test Frequencies and additional information are discussed in detail in the VFTP.

efficiencies

and

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).

BASES

SURVEILLANCE REQUIREMENTS (continued)

rate (or makeup rate) assumed in the dose analysis

SR 3.7.10.4

This SR verifies the integrity of the control room enclosure, and the assumed inleakage rates of the potentially contaminated air. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper functioning of the CRAVS. During the emergency mode of operation, 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).

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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.

ATTACHMENT 2

REPRINTED TECHNICAL SPECIFICATIONS AND BASES PAGES FOR CATAWBA

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6, or during movement of irradiated fuel assemblies, or during CORE ALTERATIONS.	D.1 Place OPERABLE CRAVS train in operation. OR D.2.1 Suspend CORE ALTERATIONS. AND D.2.2 Suspend movement of irradiated fuel assemblies.	Immediately Immediately Immediately
E. Two CRAVS trains inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies, or during CORE ALTERATIONS.	E.1 Suspend CORE ALTERATIONS. AND E.2 Suspend movement of irradiated fuel assemblies.	Immediately Immediately
F. Two CRAVS trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	F.1 Enter LCO 3.0.3.	Immediately (continued)

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, to prevent excessive loading of the HEPA filters and carbon adsorbers. Continuous operation of each train for at least 10 hours per month, with the heaters on, reduces moisture buildup on the HEPA filters and adsorbers.

Upon receipt of an Engineered Safety Feature (ESF) signal, the selected CRAVS train continues to operate and the pressurizing filter train fan of

BASES

BACKGROUND (continued)

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.

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

LCO

Two independent and redundant CRAVS trains are required to be

BASES

LCO (continued)

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.

APPLICABILITY

In MODES 1, 2, 3, 4, 5, and 6, and during movement of irradiated fuel assemblies and during CORE ALTERATIONS, CRAVS must be OPERABLE to control operator exposure during and following a DBA.

BASES

ACTIONS (continued)

D.1, D.2.1, and D.2.2

In MODE 5 or 6, or during movement of irradiated fuel assemblies, or during CORE ALTERATIONS, 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.

An alternative to Required Action D.1 is to immediately 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 risk. This does not preclude the movement of fuel to a safe position.

E.1 and E.2

In MODE 5 or 6, or during movement of irradiated fuel assemblies, or during CORE ALTERATIONS, with two 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

BASES

ACTIONS (continued)

heater to OPERABLE status.

The heaters do not affect OPERABILITY of the CRAVS 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 3.7.10.1

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 charcoal 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).

BASES

SURVEILLANCE REQUIREMENTS (continued)

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).

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.

ATTACHMENT 3

BACKGROUND, DESCRIPTION OF PROPOSED CHANGES, AND TECHNICAL JUSTIFICATION

Background

Catawba was originally licensed with redundant, safety related chlorine detectors in each CRAVS outside air intake. These detectors have the capability to automatically isolate the intake if chlorine is detected. The station has undergone several modifications over the years and the probability of an accidental chlorine release affecting control room habitability is insignificant. A review of the relevant Regulatory Guides that address chlorine and control room habitability reveal that the chlorine detection system, in its current configuration, is not necessary. As will be discussed in subsequent pages from a historical perspective, a perspective on the current use of chlorine, and a licensing perspective, the chlorine detection system at Catawba serves a defense-in-depth function and should not constitute a TS-required station feature.

The purpose of this amendment is to delete the reference to the automatic transfer to the high chlorine protection mode function for the CRAVS. As described below in the Technical Justification, the need for a chlorine detection system with safety related detectors and automatic CRAVS intake isolation capability is no longer needed at Catawba. In addition, elimination of the TS requirement will allow Catawba to address reliability issues associated with the chlorine detection system.

Description of Proposed Changes

1. In TS 3.7.10, Required Action D.1, delete the Note pertaining to placing the CRAVS in the high chlorine protection mode if automatic transfer to the high chlorine protection mode is inoperable.
2. In TS Bases 3.7.10, revise the Background section as indicated to more clearly describe the system configuration and operation of the CRAVS.
3. In TS Bases 3.7.10, revise the Applicable Safety Analyses section to delete the second sentence. This sentence is unrelated to a discussion of safety analysis implications.
4. In TS Bases 3.7.10, revise the LCO section as indicated for editorial clarity.
5. In TS Bases 3.7.10, revise the Actions section as indicated for editorial clarity and to reflect the aforementioned deletion of the Note in Required Action D.1.
6. In TS Bases 3.7.10, revise the Surveillance Requirements section as indicated for editorial clarity.

Technical Justification

Historical Perspective

The CRAVS is designed to maintain a suitable environment in the control room for personnel and equipment for safe, long-term occupancy during both normal and emergency operation. In order to ensure that the control room remains habitable, the CRAVS pressurizes the control room to at least 0.125 inches water gauge relative to all adjacent areas. The pressurizing air for the CRAVS is drawn in through outside air intakes and passes through filter units containing prefilters/moisture eliminators, HEPA filters and carbon adsorbers before being discharged into the control room. This pressurization function prevents toxic gases that could affect the operators from "leaking" into the control room through cracks and other openings. If, however, any toxic gas were to get into the CRAVS outside air intakes, they would be discharged into the control room unless they were filtered out by the CRAVS pressurizing air filters. Because of an unlikely possibility that some onsite chemicals could generate chlorine gas and because no credit is taken for the removal of chlorine by the CRAVS filters, chlorine detectors were initially installed in the CRAVS outside air intakes to mitigate problems associated with an accidental chlorine spill.

The original design of Catawba considered chlorine gas a potential problem because the initial water treatment system (YT system) utilized a large hypochlorite subsystem. The hypochlorite was stored in two tanks located inside the Water Chemistry Building. Near these tanks outside the Water Chemistry Building were two, large sulfuric acid tanks. Because chlorine gas is produced from the mixing of hypochlorite and sulfuric acid, the tank drain valves were procedurally controlled to prevent mixing of the chemicals and the tanks were surrounded by independent catchments. Even with these precautions, the Catawba designers considered the unlikely possibility that both the hypochlorite and sulfuric acid tanks would rupture or simultaneously leak and the two chemicals would combine to form chlorine gas. To mitigate the consequences of such an event, chlorine detectors were installed in the CRAVS outside air intakes. The basis for this original design feature is clearly documented in Section 2.2.2 of the Catawba Safety Evaluation Report (NUREG-0954).

The use of chlorine at Catawba has changed since the original design. Due to corrosion problems within the YT system, Catawba no longer uses the hypochlorite tanks in the

Water Chemistry Building. Hypochlorite tends to be corrosive and the YT system piping and the YT storage tanks were in need of repair. The hypochlorite from the YT system was originally piped to the secondary chemistry area for use in the drinking water system (YD system) and the filtered water system (YF system), and also for use at the cooling towers. Several station modifications were generated to address these water treatment needs with a degrading YT system. Temporary modification #0391CHM was initiated in the mid 1980s to install a chlorine injection system for the YD and YF systems in place of the hypochlorite system. In 1989, Nuclear Station Modification (NSM) CN-50024 was initiated to make that temporary modification a permanent plant feature. However, it wasn't until 1993 that NSM CN-50024 was completed due to tie-in considerations with another modification. This other modification, NSM CN-50434, was generated to connect the station to the York County water system. Completion of CN-50434 allowed the YD system to be changed so that chlorination was not necessary for that system. Thus, the completion of modifications CN-50024 and CN-50434 changed Catawba so that YT was not required for either the YD or YF systems. To complete the disconnection of the YT system, another modification, NSM CN-50428, was initiated to install local hypochlorite systems (one for each unit) at the cooling towers. This modification was also completed in 1993. The YT storage tanks in the Water Chemistry Building were eventually abandoned in place under modification CNCE-60240. The original concern with generating chlorine gas from the mixing of hypochlorite and sulfuric acid has, therefore, been eliminated from Catawba.

Current Use of Chlorine at Catawba

While the possibility of producing chlorine gas from the mixture of hypochlorite and sulfuric acid has been eliminated, Catawba does have other sources of chlorine gas onsite. These other sources are from liquefied chlorine, which is used for water treatment. Chlorine is used at the exterior fire protection system (RY system) chlorination house and, as discussed above, in the secondary chemistry area for use in the YF system. The only other place liquefied chlorine will be located will be at a dedicated chlorine storage facility which will be constructed. The following discussion will address the likelihood that an onsite chlorine spill would impact control room habitability. This analysis addresses the physical barriers and constraints between an intake and the chlorine sources. The discussion assumes that a chlorine accident results in a puff release rather than a slow, long-term leak. A puff

release is more significant in that a large amount of chlorine is released at one time without being dissipated and a gaseous cloud is formed. A slow release is not as significant because, before a significant concentration would form at or near any control room intake, natural air currents would most likely cause dilution of the gas and/or the leak would be detected (nasal detection) by station personnel. Chlorine is presently stored and used at Catawba as a liquid in pressurized 100 lb cylinders.

Chlorination of the RY system is done only during warm weather. The chlorination system presently consists of chlorine cylinders, a regulator, and interconnection tubing. The system uses vacuum injection and an eductor to inject chlorine into the RY system header. Any failure of the regulator would most likely result in stopping the flow of chlorine. However, it is possible for a regulator failure to occur without halting chlorine flow. If this occurs, a chlorine cloud could form from the in-service chlorine cylinders. This event would have the same impact on the control room as an outright failure of the cylinders or chlorine gas tubing. In any case, the chlorine release would occur at the chlorination house that is located near the low pressure service water intake structure. This is approximately 825 feet (251.5 meters) from the nearest control room outside air intake (the Unit 2 intake). Chlorine gas released at this location would have to travel approximately 850 feet southwest, then 50 feet south, then 40 feet east to get to the nearest intake. In addition, the gas cloud would have to travel uphill from the source location and then flow around the Low Level Waste Staging Building, the Reactor Makeup Water Storage Tank (RMWST), and the Unit 2 Diesel Building exhaust and intake structures. Based on the torturous path a gas plume would have to travel, it is non-credible to assume that an accidental chlorine release at this location would have any impact on control room habitability.

The chlorine used in the YF system is located in the Unit 1 transformer yard outside the Unit 1 Turbine Building. The chlorination system presently consists of chlorine cylinders, a regulator, and interconnecting tubing. The chlorine is drawn through tubing in the Turbine and Service Buildings to the YF system by a vacuum injection system. Failure of a regulator or the tubing connecting the chlorine cylinders to the YF system would most likely result in a chlorine release within the Turbine or Service Buildings. A release in one of these buildings would prevent the gas from getting to a control room intake since both of these buildings have basements lower than the control room intakes

and roof exhaust systems. Heavier-than-air gases, such as chlorine, would either fall to the building basements or be drawn into the exhaust system, mixed with other building air, and then exhausted out the building roof. If the release occurred outside the Turbine Building, the gas cloud would form in the Unit 1 transformer yard. This location is approximately 520 feet (158.5 meters) from the nearest control room outside air intake (the Unit 1 intake). However, the Turbine Building lies between the chlorine source and the intake. Since chlorine is heavier than air, any gas released would not go over the Turbine Building but would have to go around it. This would require that the gas plume travel approximately 230 feet south, then 400 feet east, then 140 feet northeast to get to the intake. Additionally, the gas plume would have to pass several Turbine Building ventilation system (VO system) intake louvers and the condenser circulating water system (RC system) suction valve pit. Some portion of the VO system is typically running year round and any gas cloud passing these louvers would tend to be pulled into the Turbine Building. The gas would then either fall into the Turbine Building basement or be discharged out the Turbine Building roof (not near any control room intake). The RC system suction valve pit is below grade and chlorine gas passing this point would tend to either fall into the pit or be dissipated by the typical air currents surrounding this area. Even if the Turbine Building were to collapse (e.g., due to a seismic event), the chlorine gas would still be unable to flow straight to the Unit 1 intake. This is because parts of the building would still be in the way, since it is non-credible to believe that the Turbine Building would collapse completely flat, providing a straight path to the intake. Additionally, the collapse of the Turbine Building would not be accompanied by calm conditions and atmospheric dissipation of the gas cloud would most likely occur. Thus, it is non-credible to assume that an accidental chlorine release associated with the YF chlorination system would have any impact on control room habitability.

Modification CNCE-61575 has been generated to erect a dedicated chlorine cylinder storage facility. Upon completion of this modification, chlorine cylinders awaiting installation at either the RY chlorination house or the Unit 1 transformer yard will be stored approximately 2200 feet from the nearest (Unit 2) control room outside air intake. All chlorine cylinders presently stored in the existing storage facility will be moved to the new storage location prior to implementation of the approved amendment. The new facility is for the storage of chlorine cylinders only. No chlorine will be used at this location and, therefore, all

cylinders at this location will have their protective valve caps installed. A puff release at this location would only occur due to a handling accident and would most likely be associated with damage to the cylinder valve. However, all cylinders used onsite are equipped with protective valve caps and are approved for transportation in commerce. This means that they must meet the applicable Department of Transportation (DOT) requirements of 49 CFR Chapter 1, including a seven-foot drop test onto a concrete floor. This drop test is more severe than any postulated onsite accident. Additionally, even if a spill were to occur at this location, there are several buildings and obstructions between this chlorine source and the Unit 2 intake. This would tend to break up any gaseous plume that would form and move toward the intake. Thus, an accidental release at the storage facility is not considered a credible control room habitability concern.

Travel paths between the storage location and the usage points (RY chlorination house or Unit 1 transformer yard) were also evaluated for a potential release due to a handling accident. Again, credit can be taken for the DOT rating of the cylinders. This provides a level of assurance that even if a cylinder were dropped, it would not result in a chlorine release. Additionally, all points of usage are at grade level. There is no lifting or lowering required for any chlorine cylinder except when being off-loaded from the manufacturer's delivery truck at the chlorine storage facility. At that time, all protective valve caps will be in place. Thus, the likelihood of dropping or damaging a chlorine cylinder is minimal. For these various reasons, accidental releases from onsite transportation accidents are not considered credible concerns.

Even though the onsite chlorine cylinders are not seismically restrained, the structural integrity of the cylinders can be credited to prevent a chlorine release. A seismic event could cause the cylinders to fall and knock into other cylinders or other objects but this would most likely not be as severe as the seven-foot drop test. Thus, the worst problem would be from the in-service cylinder(s) at the RY chlorination house or the Unit 1 transformer yard. As part of the implementation of the approved license amendment, administrative controls will be developed to limit the in-service inventory at each usage location to 100 lb of chlorine (i.e., one 100 lb cylinder or its equivalent in smaller cylinders). The cylinders are physically located on opposite sides of the plant and on opposite sides of the control room outside air intakes. Even if cylinders at both locations were to experience an accidental release, there is

no possibility of wind blowing the contents of cylinders at both locations toward the intakes simultaneously. Thus, the effect on Catawba from an earthquake that releases chlorine from both locations is that only one location's inventory of chlorine needs to be evaluated for its effect on control room habitability. Based on this, there are no credible single failures that would release more than 100 lb of chlorine. And as discussed previously, a release or spill at these locations would not impact control room habitability.

Licensing Perspective

A review of various regulatory documents was conducted to determine the licensing basis for the chlorine detection system at Catawba. The TS describe a system that has the ability to automatically close the CRAVS outside air intakes but it does not describe the basis for such a system. Other licensing documents reveal more of the background and basis for the chlorine detection system. It can be seen from NUREG-0954, "Safety Evaluation Report related to the operation of Catawba Nuclear Station," that the original design considered chlorine gas a potential problem because of the large quantities of chemicals associated with the YT system. As described above, this potential source of chlorine is no longer applicable to Catawba. Chlorine is also addressed in two regulatory documents, Regulatory Guides 1.78, "Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," and 1.95, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release." These Regulatory Guides and their application to Catawba are discussed below.

Regulatory Guide 1.78 was written to provide guidance for the identification of chemicals that, if accidentally released, could impact control room habitability. The Regulatory Guide considers chemicals from offsite sources up to five miles away. As documented in UFSAR Section 2.2, no significant quantities of hazardous chemicals are used or stored within a five-mile radius of Catawba. The guide also considers chemicals stored onsite. Chlorine is one chemical used onsite that should be evaluated for its impact on control room habitability. Section C.3 of the Regulatory Guide states, "the release of any hazardous chemical to be stored on the nuclear plant site in a quantity greater than 100 lb. should be considered." At Catawba, chlorine is stored in quantities of 100 lb or less in individual cylinders. When the cylinders are in use they are connected to vacuum injection systems. Each in-service cylinder has

its own independent regulator mounted directly to the cylinder that contains a spring-loaded valve to stop flow unless a vacuum is present. As discussed previously, any single failure would only release a maximum of 100 lb of chlorine that would need to be considered for its impact on control room habitability. Since this is less than the quantity required to be evaluated by the guide, the chlorine used at Catawba is not required to meet the design and accident evaluation criteria of Regulatory Guide 1.78. Additionally, Regulatory Guide 1.78 states that a "separate guide" will be issued to specifically address chlorine gas concerns. This "separate guide" is Regulatory Guide 1.95, which is discussed next.

Regulatory Guide 1.95 was written to describe acceptable design features and procedures that can be credited to mitigate hazards to control room operators from an accidental chlorine release. The guidance provided applies to both offsite and onsite sources of chlorine. Based on the five-mile guidance described in Regulatory Guide 1.78, offsite sources up to five miles away should be considered. No significant quantities of chlorine are used or stored within a five-mile radius of Catawba. In addition, no significant quantities of chlorine are transported in the vicinity of Catawba. One statement in the guide, which is assumed to be an underlying assumption behind the guide, is that chlorine located onsite is normally stored in large quantities ("one-ton tanks or large railroad cars"). The guide also establishes a quantity of 150 lb stored at least 100 meters from a control room outside air intake as the limit of chlorine needed for broader consideration under the guide. Upon development of the administrative controls to limit the chlorine inventory at each usage location, Catawba will have no single source of chlorine in quantities greater than 100 lb onsite. All of the potential chlorine sources are located at least 100 meters from the nearest control room outside air intake. Catawba does provide the capability for manual isolation of the control room outside air intakes per Section C.2 of the guide. Thus, Catawba meets all applicable guidelines listed in this Regulatory Guide.

From the above discussion, it can be seen that the only licensing document that requires a safety related chlorine detection system with automatic closure function is the TS. Other regulatory documents indicate that the Catawba chlorine detection system does not need to be safety related and only requires the ability for manual closure of an intake. The change requested in this TS amendment does not affect the ability of Catawba to continue to meet all

applicable guidelines in both Regulatory Guides 1.78 and 1.95.

Conclusion

The chlorine detection system at Catawba was originally installed to mitigate an accidental chlorine release resulting from the mixing of hypochlorite and sulfuric acid. The mixing of these two chemicals produces chlorine gas and both chemicals were stored at the Water Chemistry Building in bulk quantities. Hypochlorite is no longer stored at the Water Chemistry Building and there are no credible scenarios in which hypochlorite and sulfuric acid can mix. Thus, the original purposes and need for the chlorine detectors are no longer applicable to Catawba.

An assessment was completed to determine if the present use of gaseous chlorine at Catawba created a control room habitability concern. Based on the guidance in Regulatory Guides 1.78 and 1.95, the quantities used onsite will be small enough following the development of suitable administrative controls so that control room habitability issues are not a concern. Additionally, an evaluation (independent from the exclusions of Regulatory Guides 1.78 and 1.95) of the likelihood of a chlorine release at the usage or storage locations showed that there are no credible accident scenarios that would allow a gaseous chlorine release to flow to and enter a control room outside air intake.

Therefore, the chlorine detection system currently installed at Catawba is not a required system, but fulfills a defense-in-depth function. It is, therefore, acceptable to downgrade the existing chlorine detectors to non-safety related instruments and to delete the automatic intake isolation function of the chlorine detection system. Chlorine detection will still be maintained in the CRAVS (albeit as non-safety components) and manual closure of an intake will still be available. The chlorine detection system will be controlled in the SLC Manual and will be maintained in a comparable manner to the way it is presently maintained. Deletion of the reference to a "high chlorine protection mode" in the TS and making the Bases changes described are consistent with this proposed change to the chlorine detection system.

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 CRAVS, nor its automatic control room intake isolation function on a high chlorine condition is capable of initiating any accident. The CRAVS is responsible for maintaining an acceptable environment in the control room during normal operation and accident conditions. The CRAVS will continue to function as designed to provide this environment in accordance with all applicable TS. Following implementation of this amendment, Catawba plans to pursue elimination of the automatic intake isolation capability. This will not affect the system's ability to maintain an acceptable control room environment during and following an accident. No other design changes to the system are being made. It has been shown that the quantity of gaseous chlorine used at Catawba is less than the threshold stated in applicable Regulatory Guides. Hence, there is no control room habitability issue due to chlorine. 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. The elimination of the automatic intake isolation capability will not 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 amendment. The performance of the CRAVS in response to normal and accident conditions will not be impacted. 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.