Duke Power
A Duke Energy Company

Gary R. Peterson
Vice President
Catawba Nuclear Station

Duke Power
4800 Concord Rd.
York, SC 29710
(803) 831-4251 OFFICE
(803) 831-3221 FAX
grpeters@duke-energy.com

March 26, 2002

U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTENTION: Document Control Desk

SUBJECT: Duke Energy Corporation
Catawba Nuclear Station Unit (s) 1 and 2
Docket Numbers 50-413 and 50-414
Revision to Proposed Amendment for Partial Scope Implementation of the Alternate Source Term and Proposed Amendment to Technical Specifications (TS) 3.7.10, Control Room Area Ventilation System, TS 3.7.11, Control Room Area Chilled Water System, TS 3.7.13, Fuel Handling Ventilation Exhaust System, and TS 3.9.3, Containment Penetrations

REFERENCE: Duke Energy Corporation
Catawba Nuclear Station Unit (s) 1 and 2
Docket Numbers 50-413 and 50-414
Planned Revision to Proposed Amendment for Partial Scope Implementation of the Alternate Source Term, February 14, 2002

Duke Energy Corporation
Catawba Nuclear Station Unit (s) 1 and 2
Docket Numbers 50-413 and 50-414
Proposed Amendment for Partial Scope Implementation of the Alternate Source Term and Proposed Amendment to Technical Specifications (TS) 3.7.10, Control Room Area Ventilation System, TS 3.7.11, Control Room Area Chilled Water System, TS 3.7.13, Fuel Handling Ventilation Exhaust System, and TS 3.9.3, Containment Penetrations, December 20, 2001

A001

On December 20, 2001, Duke Energy Corporation submitted a License Amendment Request for the Catawba Nuclear Station Facility Operating Licenses and Technical Specifications. The changes being proposed in the License Amendment Request were based on a revised radiological dose consequence analysis of a postulated fuel handling accident and weir gate drop accident. Partial implementation of an alternate source term was requested in accordance with the requirements of 10 CFR 50.67 and relevant guidance provided in Regulatory Guide 1.183. Although the scope of this license amendment request has not changed since the original submittal, for your convenience, the package is being resubmitted in its entirety.

In the original submittal, Duke Energy Corporation used separate decontamination factors for elemental and organic species of iodine, based on our interpretation of the regulatory positions in Regulatory Guide 1.183, Appendix B, *Assumptions for Evaluating the Radiological Consequences of a Fuel Handling Accident*. Additionally, Duke Energy Corporation has supported the assumption of an elemental iodine decontamination factor of 500 based on our fuel pool specific evaluation of vendor research results. This approach is consistent with the guidance values specified in Appendix B regarding iodine release fractions from the pool.

However, as a result of subsequent conversations with the NRC Staff, it was concluded that the review of the submittal could be expedited if the analyses used a more conservative overall effective iodine decontamination factor of 200, also described in Appendix B of Regulatory Guide 1.183. This approach would eliminate the need for a detailed review of our supporting calculations and analyses as part of the approval process for this License Amendment Request.

As discussed in the letter dated February 14, 2002, Duke Energy Corporation re-calculated the radiological consequences of the fuel handling accident and the weir gate drop accident using the overall effective decontamination factor of 200. The results of the final calculation are presented Attachment 3 to this letter.

The changes requested in this license amendment are similar to the Industry/TSTF Standard Technical Specification Change Traveler 51, Revision 2. As a result of discussions with the staff on March 20, 2002, it was decided to modify the requested changes to the Technical Specifications to more closely model the approved changes in TSTF-51. Accordingly, the Technical Specification marked-up pages, reprinted pages and description of changes have been revised.

The conclusions in the original No Significant Hazards Consideration Determination (Attachment 4) and Environmental Assessment (Attachment 5) remain valid, and no changes have been made to these documents since the original submittal.

Inquiries on this matter should be directed to M.H. Chernoff at (803) 831-3414.

Very truly yours,

G.R. Peterson

Attachments

xc:

L. A. Reyes
U. S. Nuclear Regulatory Commission
Regional Administrator, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

C. P. Patel (Addressee only)
NRC Senior Project Manager (CNS)
U. S. Nuclear Regulatory Commission
Mail Stop O-8 H12
Washington, DC 20555-0001

D. J. Roberts
Senior Resident Inspector (CNS)
U. S. Nuclear Regulatory Commission
Catawba Nuclear Site

R. Wingard, Director
Division of Radioactive Waste Management
Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29207

AFFIDAVIT

G. R. Peterson, 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(s) 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.

G.R. Peterson, Site Vice President

Subscribed and sworn to me: 3-27-2002
Date

Notary Public

My Commission Expires: 6-26-2002
Date

SEAL

ATTACHMENT 1

Marked-Up

Technical Specification Pages

3.7 PLANT SYSTEMS

3.7.10 Control Room Area Ventilation System (CRAVS)

LCO 3.7.10 Two CRAVS trains shall be OPERABLE.

---NOTE---
The control room pressure boundary may be opened intermittently under administrative controls.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies,
~~During CORE ALTERATIONS.~~

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRAVS train inoperable in MODES 1, 2, 3, 4, 5 and 6.	A.1 Restore CRAVS train to OPERABLE status.	7 days
B. Two CRAVS trains inoperable due to inoperable control room pressure boundary in MODES 1, 2, 3, or 4.	B.1 Restore control room pressure boundary to OPERABLE status.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

(continued)

~~*For each CRAVS train, the Completion Time that one CRAVS train can be inoperable as specified by Required Action A.1 may be extended beyond the 168 hours up to 288 hours as part of the NSWS system upgrades. System upgrades include maintenance and modification activities associated with the NSWS piping, valves, and branch lines, necessary repairs and/or replacement, and replacement of portions of the NSWS piping to the AFW system. Upon completion of the cleaning, upgrades, and system restoration in refueling outage 1 EOC12, this footnote is no longer applicable.~~

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~~ E.1 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)

one or more CRAVS trains inoperable

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

APPLICABILITY (continued)

During movement of irradiated fuel assemblies ~~and in MODE 6, for CORE ALTERATIONS,~~ 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, ~~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, 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

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.
7. 10 CFR 50.67, Accident source term.
8. Regulatory Guide 1.183, Rev. 0.

3.7 PLANT SYSTEMS

3.7.11 Control Room Area Chilled Water System (CRACWS)

LCO 3.7.11 Two CRACWS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies,
~~During CORE ALTERATIONS.~~

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRACWS train inoperable.	A.1 Restore CRACWS train to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours
C. 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~~.	C.1 Place OPERABLE CRACWS train in operation.	Immediately
	OR	
	~~C.2.1 Suspend CORE ALTERATIONS.~~	~~Immediately~~
	~~AND~~	
	C.2.2 Suspend movement of irradiated fuel assemblies.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two CRACWS trains inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies~~, or during CORE ALTERATIONS~~.	~~D.1 Suspend CORE ALTERATIONS.~~	Immediately
	~~AND~~	
	~~D.2~~ Suspend movement of irradiated fuel assemblies.	Immediately
E. Two CRACWS trains inoperable in MODE 1, 2, 3, or 4.	E.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.11.1 Verify the control room temperature is $\leq 90°F$.	12 hours

BASES

LCO

Two independent and redundant trains of the CRACWS are required to be OPERABLE to ensure that at least one is available, assuming a single failure disabling the other train. Total system failure could result in the equipment operating temperature exceeding limits in the event of an accident.

The CRACWS is considered to be OPERABLE when the individual components necessary to maintain the control room temperature are OPERABLE in both trains. These components include a chiller package, chilled water pump, and air handling unit. In addition, the CRACWS must be operable to the extent that air circulation can be maintained.

The CRACWS 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 CRACWS component becomes inoperable, or normal or emergency power to a CRACWS 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.

APPLICABILITY

In MODES 1, 2, 3, 4, 5, and 6, and during movement of recently irradiated fuel assemblies ~~and during CORE ALTERATIONS~~, the CRACWS must be OPERABLE to ensure that the control room temperature will not exceed equipment operational requirements following a design basis accident.

The CRACWS is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) due to radioactive decay.

ACTIONS

A.1

With one CRACWS train inoperable, action must be taken to restore OPERABLE status within 30 days. In this Condition, the remaining OPERABLE CRACWS train is adequate to maintain the control room temperature within limits. However, the overall reliability is reduced because a single failure in the OPERABLE CRACWS train could result in loss of CRACWS function. The 30 day Completion Time is based on the low probability of an event, the consideration that the remaining train can provide the required protection, and that alternate safety or nonsafety related cooling means are available.

BASES

ACTIONS (continued)

B.1 and B.2

In MODE 1, 2, 3, or 4, if the inoperable CRACWS train cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes the 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.

C.1, ~~C.2.1~~, and C.2.~~2~~

recently

In MODE 5 or 6, or during movement of irradiated fuel, ~~or during CORE ALTERATIONS~~, if the inoperable CRACWS train cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE CRACWS train must be placed in operation immediately. This action ensures that the remaining train is OPERABLE, and that active failures will be readily detected.

An alternative to Required Action C.1 is to immediately suspend activities that present a potential for releasing radioactivity. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

D.1 ~~and D.2~~

recently

In MODE 5 or 6, or during movement of irradiated fuel assemblies, ~~or during CORE ALTERATIONS~~, with two CRACWS trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

E.1

If both CRACWS trains are inoperable in MODE 1, 2, 3, or 4, the control room CRACWS may not be capable of performing its intended function. Therefore, LCO 3.0.3 must be entered immediately.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.11.1

This SR verifies that the heat removal capability of the system is sufficient to maintain the temperature in the control room at or below 90°F. The 12 hour Frequency is appropriate since significant degradation of the CRACWS is slow and is not expected over this time period.

REFERENCES

1. UFSAR, Section 9.4.
2. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
3. 10 CFR 50.67, Accident Source term
4. Regulatory Guide 1.183, Rev. 0.

3.7 PLANT SYSTEMS

3.7.13 Fuel Handling Ventilation Exhaust System (FHVES)

LCO 3.7.13 One FHVES train shall be OPERABLE and in operation.

APPLICABILITY: During movement of irradiated fuel assemblies in the fuel building.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required FHVES train inoperable.	------------NOTE------------ LCO 3.0.3 is not applicable. ----------------------------------- A.1 Suspend movement of irradiated fuel assemblies in the fuel building.	 Immediately
B. Required FHVES train heater inoperable.	B.1 Restore FHVES train heater to OPERABLE status. OR B.2 Initiate action in accordance with Specification 5.6.6.	7 days 7 days

B 3.7 PLANT SYSTEMS

B 3.7.13 Fuel Handling Ventilation Exhaust System (FHVES)

BASES

BACKGROUND

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

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

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

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

APPLICABLE SAFETY ANALYSES

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

BASES

APPLICABLE SAFETY ANALYSES (continued)

train of the FHVES is ~~OPERABLE and~~ in operation. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 4) and 1.183 (Ref. 10).

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

LCO

~~One train~~ Two trains of the FHVES ~~is~~ 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 100 (Ref. 6) 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 not excessively restricting flow, and are capable of performing their filtration function; and

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

APPLICABILITY

During movement of 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.

With the movement of recently irradiated fuel in the fuel handling building, ~~one~~ two trains of FHVES ~~is~~ are required to be OPERABLE and one in operation. The movement of recently irradiated fuel must be immediately suspended, if ~~the train~~ one or more trains

BASES

ACTIONS (continued)

are one is

of FHVES is inoperable or not in operation. This does not preclude the movement of an irradiated fuel assembly to a safe position. This action ensures that a fuel handling accident could not occur. with unacceptable consequences

B.1 and B.2

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

The heaters do not affect OPERABILITY of the FHVES filter trains because charcoal adsorber efficiency testing is performed at 30°C and 95% relative humidity. The accident analysis shows that site boundary radiation doses are within 10 CFR 100 limits during a DBA LOCA under these conditions.

SURVEILLANCE REQUIREMENTS

SR 3.7.13.1

With the FHVES train in service, a periodic monitoring of the system for proper operation should be checked on a routine basis to ensure that the system is functioning properly. The 12 hour Frequency is sufficient to ensure proper operation through the HEPA and charcoal filters and is based on the known reliability of the equipment.

SR 3.7.13.2

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

Monthly heater operation dries out any moisture accumulated in the carbon from humidity in the ambient air. Systems with heaters must be operated from the control room for ≥ 10 continuous hours with flow through the HEPA filters and charcoal adsorbers and with the heaters energized. The 31 day Frequency is based on the known reliability of the equipment.

BASES

REFERENCES

1. UFSAR, Section 6.5.
2. UFSAR, Section 9.4.
3. UFSAR, Section 15.7.
4. Regulatory Guide 1.25.
5. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
6. 10 CFR 100.
7. Regulatory Guide 1.52 (Rev. 2).
8. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.
9. 10 CFR 50.67, Accident Source term
10. Regulatory Guide 1.183 (Rev. 0).

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 charcoal adsorber.

APPLICABILITY: ~~During CORE ALTERATIONS,~~
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 CORE ALTERATIONS.~~ ~~AND~~ A.1 ~~A.2~~ Suspend movement of recently irradiated fuel assemblies within containment.	~~Immediately~~ Immediately (continued)

B 3.9 REFUELING OPERATIONS

B 3.9.3 Containment Penetrations

BASES

BACKGROUND

During ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel assemblies (i.e., fuel assemblies that have occupied part of a critical reactor core within the previous 72 hours.) within containment, a release of fission product radioactivity within containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In MODE 6, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. Since there is no potential for containment pressurization, the Appendix J leakage criteria and tests are not required.

The containment serves to contain fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained well within the requirements of 10 CFR 100. Additionally, the containment provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment equipment hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of containment. During ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel assemblies within containment, the equipment hatch must be held in place by at least four bolts. Good engineering practice dictates that the bolts required by this LCO be approximately equally spaced.

The containment air locks, which are also part of the containment pressure boundary, provide a means for personnel access during MODES 1, 2, 3, and 4 unit operation in accordance with LCO 3.6.2, "Containment Air Locks." Each air lock has a door at both ends. The doors are normally interlocked to prevent simultaneous opening when containment OPERABILITY is required. During periods of unit shutdown when containment closure is not required, the door interlock mechanism may be disabled, allowing both doors of an air lock to remain open for

BASES

BACKGROUND (continued)

extended periods when frequent containment entry is necessary. During ~~CORE ALTERATIONS or~~ movement of irradiated fuel assemblies within containment, containment closure is required; therefore, the door interlock mechanism may remain disabled, but one air lock door must always remain closed.

The requirements for containment penetration closure ensure that a release of fission product radioactivity within containment will be restricted from escaping to the environment. The closure restrictions are sufficient to restrict fission product radioactivity release from containment due to a fuel handling accident during refueling.

The Containment Purge Exhaust System includes two trains. Purge air is exhausted from the containment through the Containment Purge Exhaust System to the unit vent where it is monitored for radioactivity level by the unit vent monitor prior to release to the atmosphere. The Containment Purge Exhaust System consists of two 50 percent capacity filter trains and fans. There is one purge exhaust duct penetration through the Reactor Building wall from the annulus area. There are three purge exhaust penetrations through the containment vessel, two from the upper compartment and one from the lower compartment. Two normally closed isolation valves at each penetration through the containment vessel provide containment isolation. One normally closed isolation damper at the Reactor Building wall provides annulus isolation.

The upper compartment purge exhaust ductwork is arranged to draw exhaust air into a plenum around the periphery of the refueling canal, effecting a ventilation sweep of the canal during the refueling process. The lower compartment purge exhaust ductwork is arranged so as to sweep the reactor well during the refueling process.

The other containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be isolated on at least one side. Isolation may be achieved by an OPERABLE automatic isolation valve, or by a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods must be approved and may include use of a material that can provide a temporary, atmospheric pressure, ventilation barrier for the other containment penetrations during fuel movements.

APPLICABLE SAFETY ANALYSES

During ~~CORE ALTERATIONS or movement~~ of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel (Ref. 1). Fuel handling

Insert A

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 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.

BASES

APPLICABLE SAFETY ANALYSES (continued)

accidents, analyzed in Reference 2, include 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 ~~prior to CORE ALTERATIONS~~ 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 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 charcoal adsorber.

APPLICABILITY

The containment penetration requirements are applicable during ~~CORE ALTERATIONS or~~ movement of irradiated fuel assemblies within containment because this is when there is a potential for a 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 ~~CORE ALTERATIONS or~~ movement of irradiated fuel assemblies within containment ~~are~~ not being conducted, the potential for a fuel handling accident does not exist. Therefore, under these conditions no requirements are placed on containment penetration status.

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 ~~CORE ALTERATIONS and~~

BASES

ACTIONS (continued)

movement of 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 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 3.9.3.1

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 charcoal adsorber.

The Surveillance is performed every 7 days during ~~CORE ALTERATIONS or~~ movement of 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 that releases fission product radioactivity within the containment will not result in a release of 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 charcoal from humidity in the ambient air. Systems with heaters must be operated by initiating flow

SURVEILLANCE REQUIREMENTS (continued)

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, charcoal adsorbers efficiency, system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test Frequencies and additional information are discussed in detail in the VFTP.

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.
6. Regulatory Guide 1.183 (Rev. 0).

ATTACHMENT 2

Reprinted

Technical Specification Pages

New Technical Specification and Bases Pages
Page Removal/Insertion Instructions

Remove	Insert
3.7.10-1, Amendment Nos. 189/182	3.7.10-1, Amendment Nos.
3.7.10-2, Amendment Nos. 191/183	3.7.10-2, Amendment Nos.
B 3.7.10-3, Revision 3	B 3.7.10-1, Revision No.
B 3.7.10-4, Revision 2	B 3.7.10-4, Revision No.
B 3.7.10-5, Revision 3	B 3.7.10-5, Revision No.
B 3.7.10-7, Revision 1	B 3.7.10-7, Revision No.
3.7.11-1, Amendment Nos. 173/165	3.7.11-1, Amendment Nos.
3.7.11-2, Amendment Nos. 173/165	3.7.11-2, Amendment Nos.
B 3.7.11-2, Revision 0	B 3.7.11-2, Revision No.
B 3.7.11-3, Revision 0	B 3.7.11-3, Revision No.
B 3.7.11-4, Revision 0	B 3.7.11-4, Revision No.
3.7.13-1, Amendment Nos. 173/165	3.7.13-1, Amendment Nos.
B 3.7.13-1, Revision No. 1	B 3.7.13-1, Revision No.
B 3.7.13-2, Revision No. 1	B 3.7.13-2, Revision No.
B 3.7.13-3, Revision No. 0	B 3.7.13-3, Revision No.
B 3.7.13-5, Revision No. 0	B 3.7.13-5, Revision No.
3.9.3-1, Amendment Nos. 173/165	3.9.3-1, Amendment Nos.
B 3.9.3-1, Revision No. 1	B 3.9.3-1, Revision No.
B 3.9.3-2, Revision No. 0	B 3.9.3-2, Revision No.
B 3.9.3-3, Revision No. 0	B 3.9.3-3, Revision No.
B 3.9.3-4, Revision No. 0	B 3.9.3-4, Revision No.
B 3.9.3-5, Revision No. 0	B 3.9.3-5, Revision No.

3.7 PLANT SYSTEMS

3.7.10 Control Room Area Ventilation System (CRAVS)

LCO 3.7.10 Two CRAVS trains shall be OPERABLE.

-----NOTE-----
The control room pressure boundary may be opened intermittently under administrative controls.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRAVS train inoperable in MODES 1,2,3,4,5, and 6.	A.1 Restore CRAVS train to OPERABLE status.	7 days
B. Two CRAVS trains inoperable due to inoperable control room pressure boundary in MODES 1, 2, 3, or 4.	B.1 Restore control room pressure boundary to OPERABLE status.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6.	D.1 Place OPERABLE CRAVS train in operation.	Immediately
E. Two CRAVS trains inoperable in MODE 5 or 6, or one or more CRAVS trains inoperable during movement of irradiated fuel assemblies.	E.1 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)

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, CRAVS must be OPERABLE to control operator exposure during and following a DBA.

BASES

APPLICABILITY (continued)

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

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.
7. 10 CFR 50.67, Accident Source Term.
8. Regulatory Guide 1.183, Revision 0.

3.7 PLANT SYSTEMS

3.7.11 Control Room Area Chilled Water System (CRACWS)

LCO 3.7.11 Two CRACWS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of recently irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRACWS train inoperable.	A.1 Restore CRACWS train to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 5.	6 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6, or during movement of recently irradiated fuel assemblies.	C.1 Place OPERABLE CRACWS train in operation. <u>OR</u> C.2 Suspend movement of recently irradiated fuel assemblies.	Immediately Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two CRACWS trains inoperable in MODE 5 or 6, or during movement of recently irradiated fuel assemblies.	D.1 Suspend movement of recently irradiated fuel assemblies.	Immediately
E. Two CRACWS trains inoperable in MODE 1, 2, 3, or 4.	E.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.11.1 Verify the control room temperature is ≤ 90°F.	12 hours

BASES

LCO

Two independent and redundant trains of the CRACWS are required to be OPERABLE to ensure that at least one is available, assuming a single failure disabling the other train. Total system failure could result in the equipment operating temperature exceeding limits in the event of an accident.

The CRACWS is considered to be OPERABLE when the individual components necessary to maintain the control room temperature are OPERABLE in both trains. These components include a chiller package, chilled water pump, and air handling unit. In addition, the CRACWS must be operable to the extent that air circulation can be maintained.

The CRACWS 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 CRACWS component becomes inoperable, or normal or emergency power to a CRACWS 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.

APPLICABILITY

In MODES 1, 2, 3, 4, 5, and 6, and during movement of recently irradiated fuel assemblies, the CRACWS must be OPERABLE to ensure that the control room temperature will not exceed equipment operational requirements following a design basis accident. The CRACWS is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 72 hours) due to radioactive decay.

ACTIONS

A.1

With one CRACWS train inoperable, action must be taken to restore OPERABLE status within 30 days. In this Condition, the remaining OPERABLE CRACWS train is adequate to maintain the control room temperature within limits. However, the overall reliability is reduced because a single failure in the OPERABLE CRACWS train could result in loss of CRACWS function. The 30 day Completion Time is based on the low probability of an event, the consideration that the remaining train can provide the required protection, and that alternate safety or nonsafety related cooling means are available.

BASES

ACTIONS (continued)

B.1 and B.2

In MODE 1, 2, 3, or 4, if the inoperable CRACWS train cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes the 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.

C.1 and C.2

In MODE 5 or 6, or during movement of recently irradiated fuel, if the inoperable CRACWS train cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE CRACWS train must be placed in operation immediately. This action ensures that the remaining train is OPERABLE, and that active failures will be readily detected.

An alternative to Required Action C.1 is to immediately suspend activities that present a potential for releasing radioactivity. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

D.1

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

E.1

If both CRACWS trains are inoperable in MODE 1, 2, 3, or 4, the control room CRACWS may not be capable of performing its intended function. Therefore, LCO 3.0.3 must be entered immediately.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.11.1

This SR verifies that the heat removal capability of the system is sufficient to maintain the temperature in the control room at or below 90°F. The 12 hour Frequency is appropriate since significant degradation of the CRACWS is slow and is not expected over this time period.

REFERENCES

1. UFSAR, Section 9.4.
2. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
3. 10 CFR 50.67, Accident source term.
4. Regulatory Guide 1.183, Revision 0.

3.7 PLANT SYSTEMS

3.7.13 Fuel Handling Ventilation Exhaust System (FHVES)

LCO 3.7.13 Two FHVES trains shall be OPERABLE and one train in operation.

APPLICABILITY: During movement of recently irradiated fuel assemblies in the fuel building.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more FHVES trains inoperable.	------------------NOTE------------------ LCO 3.0.3 is not applicable. --	
	A.1 Suspend movement of recently irradiated fuel assemblies in the fuel building.	Immediately
B. Required FHVES train heater inoperable.	B.1 Restore FHVES train heater to OPERABLE status.	7 days
	OR	
	B.2 Initiate action in accordance with Specification 5.6.6.	7 days

B 3.7 PLANT SYSTEMS

B 3.7.13 Fuel Handling Ventilation Exhaust System (FHVES)

BASES

BACKGROUND

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

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

The FHVES train does not actuate on any 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 remove any large particles in the air, and any entrained water droplets present, to prevent excessive loading of the HEPA filters and carbon adsorbers.

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

APPLICABLE SAFETY ANALYSES

The FHVES design basis is established by the consequences of the 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

BASES

APPLICABLE SAFETY ANALYSES (continued)

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 100 (Ref. 6) 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 not excessively restricting flow, and are capable of performing their filtration function; and

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

APPLICABILITY

During movement of 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.

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

BASES

ACTIONS (continued)

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 charcoal adsorber efficiency testing is performed at 30°C and 95% relative humidity. The accident analysis shows that site boundary radiation doses are within 10 CFR 100 limits during a DBA LOCA under these conditions.

SURVEILLANCE REQUIREMENTS

SR 3.7.13.1

With the FHVES train in service, a periodic monitoring of the system for proper operation should be checked on a routine basis to ensure that the system is functioning properly. The 12 hour Frequency is sufficient to ensure proper operation through the HEPA and charcoal filters and is based on the known reliability of the equipment.

SR 3.7.13.2

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

Monthly heater operation dries out any moisture accumulated in the carbon from humidity in the ambient air. Systems with heaters must be operated from the control room for ≥ 10 continuous hours with flow through the HEPA filters and charcoal adsorbers and with the heaters energized. The 31 day Frequency is based on the known reliability of the equipment.

BASES

REFERENCES

1. UFSAR, Section 6.5.
2. UFSAR, Section 9.4.
3. UFSAR, Section 15.7.
4. Regulatory Guide 1.25.
5. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
6. 10 CFR 100.
7. Regulatory Guide 1.52 (Rev. 2).
8. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.
9. 10 CFR 50.67, Accident source term.
10. Regulatory Guide 1.183 (Rev. 0).

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 charcoal 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)

B 3.9 REFUELING OPERATIONS

B 3.9.3 Containment Penetrations

BASES

BACKGROUND

During movement of recently irradiated fuel assemblies (i.e., fuel assemblies that have occupied part of a critical reactor core within the previous 72 hours) within containment, a release of fission product radioactivity within containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In MODE 6, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. Since there is no potential for containment pressurization, the Appendix J leakage criteria and tests are not required.

The containment serves to contain fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained well within the requirements of 10 CFR 100. Additionally, the containment provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment equipment hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of containment. During movement of recently irradiated fuel assemblies within containment, the equipment hatch must be held in place by at least four bolts. Good engineering practice dictates that the bolts required by this LCO be approximately equally spaced.

The containment air locks, which are also part of the containment pressure boundary, provide a means for personnel access during MODES 1, 2, 3, and 4 unit operation in accordance with LCO 3.6.2, "Containment Air Locks." Each air lock has a door at both ends. The doors are normally interlocked to prevent simultaneous opening when containment OPERABILITY is required. During periods of unit shutdown when containment closure is not required, the door interlock mechanism may be disabled, allowing both doors of an air lock to remain open for

BASES

BACKGROUND (continued)

extended periods when frequent containment entry is necessary. During movement of recently irradiated fuel assemblies within containment, containment closure is required; therefore, the door interlock mechanism may remain disabled, but one air lock door must always remain closed.

The requirements for containment penetration closure ensure that a release of fission product radioactivity within containment will be restricted from escaping to the environment. The closure restrictions are sufficient to restrict fission product radioactivity release from containment due to a fuel handling accident involving recently irradiated fuel during refueling.

The Containment Purge Exhaust System includes two trains. Purge air is exhausted from the containment through the Containment Purge Exhaust System to the unit vent where it is monitored for radioactivity level by the unit vent monitor prior to release to the atmosphere. The Containment Purge Exhaust System consists of two 50 percent capacity filter trains and fans. There is one purge exhaust duct penetration through the Reactor Building wall from the annulus area. There are three purge exhaust penetrations through the containment vessel, two from the upper compartment and one from the lower compartment. Two normally closed isolation valves at each penetration through the containment vessel provide containment isolation. One normally closed isolation damper at the Reactor Building wall provides annulus isolation.

The upper compartment purge exhaust ductwork is arranged to draw exhaust air into a plenum around the periphery of the refueling canal, effecting a ventilation sweep of the canal during the refueling process. The lower compartment purge exhaust ductwork is arranged so as to sweep the reactor well during the refueling process.

The other containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be isolated on at least one side. Isolation may be achieved by an OPERABLE automatic isolation valve, or by a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods must be approved and may include use of a material that can provide a temporary, atmospheric pressure, ventilation barrier for the other containment penetrations during recently irradiated fuel movements.

APPLICABLE SAFETY ANALYSES

During movement of recently irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident involving recently irradiated fuel. The fuel handling accident is a postulated event that involves damage to irradiated fuel (Ref. 1). Fuel handling accidents, analyzed in Reference 2, include

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 charcoal 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 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 3.9.3.1

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 charcoal 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

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 charcoal 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, charcoal adsorbers efficiency, system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test Frequencies and additional information are discussed in detail in the VFTP.

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).

ATTACHMENT 3

Description of Proposed Changes

and

Technical Justification

Overview

Duke Energy Corporation has revised the consequence analysis of postulated fuel handling accidents in containment and in the fuel storage building using alternative source term methodology pursuant to 10 CFR 50.67 and Regulatory Guide 1.183. In the revised analysis for a fuel handling accident within containment, no credit is taken for containment integrity with respect to containment penetration closure, personnel airlock closure, equipment hatch closure or filtration by the Containment Purge Exhaust System prior to release. For a postulated accident within the fuel storage building, both the fuel handling accident and the weir gate drop accident analyses were revised. In the revised analyses, no credit is taken for filtration of the release by the Fuel Handling Ventilation Exhaust System.

The revised analyses confirmed that sufficient radioactive decay has occurred after 72 hours that certain existing controls are no longer necessary to ensure the consequences of a postulated fuel handling accident remain within the limits. The analysis demonstrated that a decay period of 19.5 days was sufficient to ensure the consequences of a weir gate drop accident remain within limits.

Although not required by the accident analysis, administrative controls will be in place during the movement of non-recently irradiated fuel. These controls are described in Attachment 9. If movement of irradiated fuel assemblies occurs prior to the 72 hour decay period, the currently existing Technical Specification controls would apply.

Administrative controls will exist such that the weir gate will not be moved over spent fuel assemblies decayed less than 19.5 days.

This license amendment request employs many of the concepts previously reviewed and approved in Industry/TSTF Standard Technical Specification change Traveler Number 51, Revision 2. As specified in a reviewer's note in TSTF 51, Revision 2, Duke Energy Corporation will employ the following modified guidelines of draft NUMARC 93-01, Revision 3, Section 11.3.6, "Assessment Methods of Shutdown

Conditions", Subheading "Containment - Primary(PWR). Specifically, the guidelines which will be adopted are:

> During movement of recently irradiated fuel assemblies, ventilation system and radiation monitor availability (as defined in 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 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 direction such that it can be treated and monitored.

Description of Changes

1. The Conditions and Required Actions of Technical Specification 3.7.10, Control Room Area Ventilation System (CRAVS), are being revised. The applicability of this specification during core alterations is being deleted.

   Condition A, one CRAVS train inoperable is being revised to be applicable in MODES 1,2,3,4,5 and 6. This Condition will no longer be applicable during core alterations or movement of irradiated fuel assemblies

   Condition D, Required Action and associated Completion Time of Condition A not met in MODE 5 or 6, will no longer apply during movement of irradiated fuel assemblies or during core alterations. The Required Actions D.2.1, suspend core alterations, and D.2.2, suspend movement of irradiated fuel assemblies, are being deleted.

   Condition E is being revised to delete references to core alterations. Condition E is also being modified to apply if one or more trains of the CRAVS are inoperable during movement of irradiated fuel assemblies. Required Action E.1, suspend core alterations, is being deleted.

   The Bases for this specification is being revised to reflect these same changes.

   The Footnote associated with LCO 3.7.10 is no longer applicable and is being deleted as an editorial change. Asterisks referring to the footnote are being deleted.

2. Technical Specification 3.7.11, Control Room Area Chilled Water System (CRACWS) requires two CRACWS trains be operable in MODES 1,2,3,4,5,6, during movement of irradiated fuel assemblies and during core alterations. The Applicability of this specification is being changed to only be applicable during MODES 1,2,3,4,5, and 6 and movement of recently irradiated fuel. The reference to core alterations is being deleted from Condition C, and Required Action C.2.1 and C.2.2 are being revised to require suspension of movement of recently irradiated fuel assemblies. Condition D is being modified to apply

to two CRACWS trains inoperable in MODES 5 and 6 or during movement of recently irradiated fuel assemblies. For this condition the new Required Action is to immediately suspend movement of irradiated fuel assemblies. The Bases for this specification are being revised to reflect these changes.

3. Technical Specification 3.7.13, Fuel Handling Ventilation Exhaust System (FHVES), requires that one FHVES train shall be operable and in operation during movement of irradiated fuel assemblies in the fuel building. The proposed change to the LCO would require that two trains of FHVES be operable with one train in operation when the LCO is applicable. The Applicability for this Technical Specification Limiting Condition for Operation, is being changed from "During movement of irradiated fuel assemblies in the fuel building" to "During movement of recently irradiated fuel assemblies in the fuel building".

   Condition A is being modified to apply when one or more FHVES trains are inoperable, and the associated Required Action is to suspend movement of recently irradiated fuel.

   The Bases is being changed to reflect that two trains are required to be operable with one train in operation whenever recently irradiated fuel is being moved in the fuel handling building and that recently irradiated fuel is defined to be fuel that has occupied part of a critical reactor core within the previous 72 hours. The term "recently" is inserted prior to the term "irradiated fuel" in the remainder of the Bases section. The Applicable Safety Analyses is being revised to reflect that the weir gate drop accident is one of the Design Basis Accidents that establishes the design basis for this system. The Bases for the Action section is revised to reflect that the Actions ensure that a fuel handling accident with unacceptable consequences could not occur.

4. Technical Specification 3.9.3, Containment Penetrations, requires the equipment hatch be closed and held in place by at a minimum of four bolts; a minimum of one air lock door be closed; and each penetration providing direct access from the containment atmosphere to the outside atmosphere either be closed by a manual or automatic isolation valve, blind flange, or equivalent, or exhausting through an operable containment purge exhaust system HEPA filter and charcoal adsorber. This TS is applicable during core alterations and during movement of irradiated fuel assemblies within containment. The Applicability is being changed to "During movement of recently irradiated fuel assemblies within containment". Reference to core alterations is being deleted.

   The Actions for Condition A of this TS are being modified to eliminate the requirement to suspend core alterations and to only require suspension of movement of recently irradiated fuel assemblies within containment if one or more containment penetrations are not in the required status.

   The Bases for this TS are being revised to delete reference to Core Alterations and to insert the term "recently" in front of the term "irradiated fuel assemblies". Guidelines for the assessment of systems removed from service during fuel movement are being added.

TECHNICAL JUSTIFICATION

Each containment at Catawba Nuclear Station is equipped with two personnel air locks, an equipment hatch, and a Containment Purge Exhaust System (CPES). Technical Specification (TS) 3.9.3 requires that during core alterations or movement of irradiated fuel assemblies within containment, the associated equipment hatch be closed and secured with at least four bolts and at least one of the two doors in each personnel air lock be closed. TS 3.9.3 also requires that each penetration providing direct access from the containment atmosphere to the environment either be closed by an isolation valve, blind flange, or equivalent or aligned to an operable CPES HEPA filter and charcoal absorber. The germane design basis event is the Fuel Handling Accident Inside Containment (Ref. 2, Section 15.7.4.1). During core alterations or movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. In the current analysis of this design basis event, radioactivity released in the initiating event is assumed to be transported to the environment through the CPES filters.

CORE ALTERATIONS is defined in the Technical Specifications as the movement of fuel, sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel. As described in TSTF-51, Revision 2, accidents postulated to occur during core alterations include inadvertent criticality, fuel handling accident, and the loading of a fuel assembly or control component in an incorrect location. Generically, it was concluded that of these off normal occurrences, only the fuel handling accident results in cladding damage and potential radiological release. Consequently, it is being proposed that the phrase "during core alterations" be deleted from TS 3.7.10, TS 3.7.11 and 3.9.3. This change is consistent with TSTF-51, Revision 2.

The Fuel Building of each nuclear unit at Catawba Nuclear Station is equipped with a Fuel Handling Ventilation Exhaust System (FHVES). TS 3.7.13 requires that one FHVES train be operable and in operation while irradiated fuel is being moved in the Fuel Building. There are two germane design basis events: The Fuel Handling Accident in the Fuel Building (Ref. 2, Section 15.7.4.2) and the Weir Gate Drop (Ref. 3, Section 15.7.4.3). Credit is taken for operation of the FHVES in the current analyses of these design basis events.

For movement of recently irradiated fuel, operation of the FHVES is credited in the analysis of record. The FHVES is required to be able to perform its intended function assuming a single failure. Therefore, the LCO is being revised to require that two trains be operable with one train in operation to accommodate the single failure assumption. If one train of FHVES is inoperable, movement of recently irradiated fuel assemblies is to be immediately suspended.

Revised analyses of these Fuel Handling Accidents and the Weir Gate Drop have been performed in support of this License Amendment Request. The analyses were performed pursuant to Regulatory Guide 1.183 (Ref. 3) using the

Alternative Source Term (AST) methodology. The design basis scenarios were defined based on an evaluation of the event sequence and the Class 1E systems available to mitigate the consequences of these design basis events. The source terms were calculated pursuant to R.G. 1.183. Release of radioactivity from the reactor cavity or spent fuel pool was modeled pursuant to R.G. 1.183. Transport of the radioactivity to the control room outside air intakes was simulated in conformance to the guidelines of NEI 99-03 (Ref. 5) Appendix D. The radiation dose coefficients were taken from Federal Guidance Reports 11 and 12 (Ref. 8, 9). Additional details of the analyses are presented below.

The Design Basis Scenarios

The Fuel Handling Accident begins with the drop of a spent fuel assembly into either the reactor cavity or the spent fuel pool. All rods in the dropped fuel assemblies are assumed to be damaged so that all of the gap activity within them escapes to either the reactor cavity or the spent fuel pool. The Weir Gate Drop accident begins with the drop of a weir gate into the spent fuel pool. The dropped weir gate is assumed to fall on a maximum of seven fuel assemblies. All the contents of the gaps of the rods of the impacted fuel assemblies are assumed to escape into the spent fuel pool. This represents no change from the earlier analysis of the Weir Gate Drop (Ref. 10).

As analyzed in support of this LAR, the accident sequence consist of the following events:

1) Drop of a Fuel Assembly into either the reactor cavity or the spent fuel pool.

2) Release of radioactivity from the reactor cavity or spent fuel pool with absorption of much of the iodine radioisotope therein.

3) Transport with dispersion to the Exclusion Area Boundary (EAB), boundary of the Low Population Zone (denoted as the LPZ), and the control room outside air intakes.

4) Transport to the control room with pressurizing filter flow (with filtration) and with unfiltered inleakage.

No credit is taken either for the CPES or the FHVES in the analyses of these design basis events. No credit is taken for any system to mitigate radiation doses at either the Exclusion Area Boundary (EAB) or the boundary of the Low Population Zone (denoted as the LPZ). Credit is taken for the Class 1E Control Room Area Ventilation System (CRAVS) to mitigate radiation doses to the control room operators.

As discussed below, credit is taken for absorption of much of the iodine radioisotopes released into the reactor cavity or the spent fuel pool.

The CRAVS is equipped with two redundant, separate, and independent Class 1E filter trains. Each filter train is equipped with its own high-pressure filter fan. Normally, one filter train is in operation at all times. If the on-line filter train fails to run, the redundant filter train is available. Equipment such as the CRAVS that is credited with post accident functions is Class 1E and capable of performing these functions with a single active failure.

The CRAVS filter trains are aligned to two outside air intakes, each equipped with two independent and redundant Class 1E isolation valves. These valves are open during normal operations. Previously, one of these intakes could be isolated by a signal from an installed chlorine detector. The interfaces between the CRAVS chlorine detectors and the control room outside air intake valves were removed following issuance of Amendments 191 and 183 to Licenses NPF-52 and NPF-35, respectively (Ref. 11). There is no longer a single failure that will close a control room outside air intake valve. However, there are some conditions - e.g., during a maintenance activity, in which one of the intakes would need to be closed. Therefore, the fuel handling accident and weir gate drop accident analyses assume that one intake is closed, which is a conservative assumption. However, administrative controls will be implemented as described in Attachment 9 if one intake is closed.

The CRAVS filter trains are designed to start automatically either on a Safety Injection (SI) signal or on a "blackout" signal (undervoltage on the Class 1E power train to which the filter train is aligned). The Fuel Handling Accidents and Weir Gate Drop are not followed by a SI signal. This leaves only the blackout signal to auto-start the redundant CRAVS filter train following these design basis accidents.

If offsite power is available (no loss of offsite power) and the on-line CRAVS filter train fails, operator action would be required to start the redundant CRAVS filter train. The response time for operator action exceeds that of the auto-start on the blackout signal. In addition, the status of offsite power does not affect the control room outside air intake isolation valves as they are open during normal unit operations. Therefore, offsite power is assumed to be available for the design basis Fuel Handling Accidents and Weir Gate drop.

TS 3.7.10, Control Room Area Ventilation System, Limiting Condition for Operation requires two CRAVS trains to be Operable during movement of irradiated fuel assemblies and during core alterations. The Applicability of this LCO is being revised to delete the applicability during core alterations for the reasons previously described. For Condition A of this LCO, one CRAVS train inoperable, the required action is to restore the CRAVS train to operable status with a Completion Time of seven days. This Allowed Outage Time appears to be inappropriate for the case of movement of irradiated fuel assemblies. During refueling outages, reactor core unloading and reloading typically require two to three days each. The current TS LCO would permit one train of CRAVS to be inoperable during these fuel handling operations. Consequently, changes to the Conditions and Required Actions associated with this LCO are being proposed. In the proposed new Conditions and Required Actions, movement of irradiated fuel would be immediately suspended if one or more trains of CRAVS become inoperable.

The CRACWS provides temperature control for the control room and the control room area. Operation of this system is not credited in the analysis of the fuel handling accident or the weir gate drop accident. Therefore, this specification is being modified to no longer be applicable during core alterations. The applicability of this specification is being modified from during movement of irradiated fuel assemblies to during movement of recently irradiated fuel assemblies.

In summary, the design basis Fuel Handling Accidents and Weir Gate drop are taken to share the following characteristics.

1) Initiating event.
2) Offsite power available.
3) No credit taken for the CPES or FHVES.
4) Credit taken for the CRAVS with single failure of the on-line CRAVS filter train and subsequent operator recovery action.

Fuel Assembly Source Term Available for Release

In general, the source terms were calculated pursuant to R.G. 1.183 Positions 3.2 (Table 2), and Appendix B Position 1. The details are presented below and in Attachments 6 and 8. As noted above, the limiting scenario for the Fuel Handling Accidents involves the breach of all fuel rods in one fuel assembly. The limiting scenario for the Weir Gate Drop involves the breach of all fuel rods in seven fuel assemblies.

The source terms for release from the spent fuel pool or reactor cavity consist of radioisotopes of krypton, xenon, and iodine. The source term does not include cesium or rubidium radioisotopes. Position 1.2 of R.G. 1.183 Appendix B states that cesium and rubidium radiosotopes should be included in the source term in the fuel cladding gap. However, it is acceptable to assume that these radioisotopes are retained in the spent fuel pool or reactor cavity (R.G. 1.183 Appendix B Position 3). This is equivalent to neglecting the cesium and rubidium radioisotopes.

Bromine radioisotopes also are not included in the isotopic inventory available for the Fuel Handling Accident and Weir Gate Drop. The half life of the bromine radioisotopes are small compared to the lower bound value (3 days) for the decay time prior to the initiating event. With one exception, this is true of the daughter radioisotopes. The exception is Kr-85 the daughter of Br-85 with a half-life of 10.756 years. However, the activity of Kr-85 produced from decay of Br-85 and Br-85m is very small compared to the activity of Kr-85.

The design basis isotopic inventory for a single fuel assembly is presented in Attachment 6. This calculation conforms to Regulatory Position 3.1 of Regulatory Guide 1.183. The computer code SCALE 4.4 was used to perform the calculations. Enveloping values of burnup, enrichment, irradiation and power level (including the ECCS evaluation uncertainty) were identified and used in the calculation. Radial peaking factors used in the analysis were obtained as follows. A generic calculation was performed to determine fuel temperatures for Westinghouse Robust fuel as a function of axial and radial position and burnup. This analysis used a bounding pin power history that envelops the power for all pins in a core. Following procedures, the power history used in the generic analysis is verified to bound the history for all pins in the core.

The initiating event was assumed to occur 3 days (72 hours) after shutdown for the Fuel Handling Accidents and 19.5 days (468 hours) after shutdown for the Weir Gate Drop. The gap fractions for the fission products are shown in Attachment 8. They match with the corresponding position of R.G. 1.183 Table 3. The maximum burnup is less than 62 GWD/MTU. Furthermore, for burnups exceeding 54 GWD/MTU, the linear heat rate is less than 6.3 kW/ft. This justifies use of the gap fractions cited in R.G. 1.183.

The water in the spent fuel pool contains boric acid and therefore has a low pH. Therefore, the iodine radioisotopes in the source terms were assumed to be in the form of elemental (diatomic) iodine (99.85%) and organic iodine compounds (0.15%). This conforms to R.G. 1.183 Appendix B Position 1.3.

Release to the Environment

The fission product inventory in the fuel rod gaps of the damaged fuel assembly (7 fuel assemblies for the Weir Gate Drop) was assumed to be released to the environment in the following manner. All noble gas isotopes were assumed to be released to the environment. Credit was taken for absorption of elemental iodine in the reactor cavity or spent fuel pool with a decontamination factor of 500 (99.8% of the elemental iodine is absorbed). No credit was taken for absorption of organic iodine compounds in the reactor cavity or spent fuel pool (the decontamination factor was set to 1). Therefore, the form of the iodine escaping from the reactor cavity or spent fuel pool was 57% elemental or diatomic iodine and 43% organic iodine compounds. This conforms to Regulatory Position 2 R.G. 1.183 Appendix B.

The approach outlined above corresponds to the use of an effective pool decontamination factor of 286. To demonstrate the analysis margin that exists, an additional set of analyses was performed using an effective pool decontamination factor of 200. This option is also provided in R.G. 1.183 Appendix B. The results of these analyses are provided below..

The radioisotopes released from the reactor cavity or spent fuel pool were assumed to escape to the environment over a 2-hour time span. For the analysis of the Fuel Handling Accident in Containment, the containment was assumed to be open to the environment for the entire duration of the release. This conforms to Positions 4.1 and 5.3 in R.G. 1.183 Appendix B. In keeping with this license amendment request, no credit was taken either for the CPES or the FHVES. No credit was taken for holdup of radioactivity in the containment or the Fuel Building following either Fuel Handling Accident or the Weir Gate Drop.

Control Room Atmospheric Dispersion Factors

Values of the control room atmospheric dispersion factors (χ/Q's) for transport of radioactivity from the unit vent stack, equipment hatch, and Fuel Building have been calculated. These control room χ/Q's were computed with the computer code ARCON96 (Ref. 1). For fuel handling accidents either in the containment or fuel storage building (the latter includes the weir gate drop), the most restrictive release location is the unit vent stack. The values are reported in Attachment 8. The data used to calculate the control room χ/Q's for releases from the unit vent stack are reported in Attachment 7.

The calculations conform to the guidelines of NEI 99-03 (Ref. 5) Appendix D. In particular, ground releases of radioactivity were simulated for all release points. The meteorological data used in the calculations were collected hourly over five years. For each scenario, the most restrictive control room χ/Q for the different release receptor combinations was used. Of the release points identified above for the Fuel Handling Accidents and Weir Gate drop, the highest values of control room χ/Q's are found to be associated with releases from the unit vent stack. These values were used in the calculation of radiation doses to the control room operators for these design basis accidents.

Control Room and CRAVS Characteristics

Parameters associated with the control room and CRAVS are given in Attachment 8.

The rate of unfiltered inleakage to the control room was set to 100 CFM. This includes 10 CFM for use of the access doors to enter and leave the control room during the design basis event. The value also includes a margin over the results of the component testing performed to date on the CRAVS ductwork. Catawba Nuclear Station has initiated a comprehensive Control Room testing program, which includes both tracer gas testing and component testing, to determine the measured unfiltered air inleakage rate. The methodology and results of this program were discussed with NRC staff on February 21, 2002.

In the event of failure of the on-line CRAVS train, it is assumed that the control room operators will start the redundant filter train with a response time of 30 minutes.

Dose Coefficients and Other Considerations

10 CFR 50.67 specifies a limit on Total Effective Dose Equivalent. To calculate the TEDE for each design basis accident, one must calculate the deep dose equivalent (DDE) and the germane organ doses. For the fuel handling accident and weir gate drop, the organ dose is primarily the radiation dose to the thyroid gland. DDE coefficients are taken from Federal Guidance Report No. 12 (Ref. 8). Thyroid radiation dose coefficients are taken from Federal Guidance Report No. 11 (Ref. 9). The factors for exposure to Committed Effective Dose Equivalent (CEDE) were taken from Federal Guidance Report No. 12.

Parent-daughter decay was included in the analyses. The analyses conform to R.G. 1.183, Position 4. Additional details may be found in Attachment 8.

Radiological Consequences

Analyses of the radiological consequences of the fuel handling accidents and the Weir Gate were performed with the Bechtel Computer Code LOCADOSE. The assumptions and input values used are presented above and in Attachments 6 and 8. The upper bounds to the TEDE values for these design basis events are presented below:

Table 1
TEDE Values Following the
Fuel Handling Accident in Containment
Fuel Handling Accident in the Fuel Building
Weir Gate Drop

Design Basis Event Scenario	TEDE, (Rem) CR	EAB
Fuel Handling Accident in Containment	1.6	1.1
Fuel Handling Accident in the Fuel Building	1.6	1.1
Weir Gate Drop	2.5	1.7
Guideline Values of R.G. 1.183	5	6.3

The releases of radioactivity are simulated to be completed over a 2 hour time span. This is the time span associated with the TEDE. Therefore, the TEDE radiation doses at the LPZ and EAB are in proportion to their χ/Q's. Since the LPZ χ/Q is less than the EAB χ/Q, the LPZ TEDE radiation doses are less than the EAB radiation doses for these design basis events. They are not reported.

Whether in containment or in the fuel storage building, the fuel handling accident consists of the initiating event (dropped spent fuel assembly), release of the gap activity into the reactor cavity or spent fuel pool, and release to the environment over a 2 hour span, and buildup in the control room. The decontamination factors are the same for these design basis events. The limiting control room χ/Q for each of the fuel handling accidents is the same. For these reasons, the radiation doses are the same regardless of the location of the fuel handling accident.

The analyses demonstrate that the TEDE radiation doses for the fuel handling accidents and the weir gate drop are within the corresponding limits of R.G. 1.183 and thus 10 CFR 50.67.

R.G. 1.183 provides guidelines for comparing radiation doses to the whole body, thyroid gland, and skin (for control room radiation dose only) to the single TEDE value radiation dose associated with the alternative source term methodology. In particular, Footnote 7 gives instructions to add 0.03 times the thyroid dose to whole body dose to acquire a "TEDE" associated with analyses performed pursuant to R.G. 1.25 (the "previous analyses"). This "TEDE value" may be compared to the TEDE calculated in the new analyses with the Alternative Source Term methodology. This method was employed as follows: "TEDE values were calculated for the previous analyses of the fuel handling accident in the fuel storage building and the weir gate drop. (Note: From the previous analyses, the radiation doses for the fuel handling accident in the fuel storage building were found to be greater than the radiation doses for the fuel handling accident in containment.) These TEDE equivalent TEDE values were compared to the TEDE radiation dose values calculated in support of this license amendment request (the "new analyses") and presented in Table 1. The comparison is presented as follows:

Table 2
Comparison of TEDE Radiation Doses
For the Fuel Handling Accidents
And Weir Gate Drop

Design Basis	Control Room TEDE		EAB TEDE	
Accident	Previous	New	Previous	New
FHA in the Fuel Building (Limiting)	3.07	1.6	2.57	1.1
Weir Gate Drop	2.41	2.5	2.2	1.7

From the above it is apparent that the new values of TEDE radiation doses are comparable to the equivalent TEDE that may be predicted from the previous analyses.

The analysis was also performed using an effective pool decontamination factor of 200. The results are provided in Table 3 below.

Table 3
TEDE Values Following the
Fuel Handling Accident in the Fuel Building
Weir Gate Drop
Using a Pool DF of 200

Design Basis Event Scenario	TEDE, (Rem) CR	EAB
Fuel Handling Accident in the Fuel Building	2.3	1.6
Weir Gate Drop	3.6	2.9
Guideline Values of R.G. 1.183	5	6.3

These analysis results confirm that the doses would remain below the guideline values of Regulatory Guide 1.183 and 10 CFR 50.67.

Table 4 contains a comparison of TEDE radiation doses for the Fuel Handling Accident and Weir Gate Drop that were calculated using an effective pool DF of 200 with the previous analysis results for the analyses that were performed pursuant to Regulatory Guide 1.25.

Table 4
Comparison of TEDE Radiation Doses
For the Fuel Handling Accidents
And Weir Gate Drop
Using a Pool DF of 200

Design Basis	Control Room TEDE		EAB TEDE	
Accident	Previous	New	Previous	New
FHA in the Fuel Building (Limiting)	3.07	2.3	2.57	1.6
Weir Gate Drop	2.41	3.6	2.2	2.9

These new values of TEDE radiation doses are comparable to the equivalent TEDE that may be predicted from the previous analyses.

REFERENCES

1) Catawba Nuclear Station Technical Specifications with Amendments Through 191/183.

2) Catawba Nuclear Station Updated Final Safety Analysis Report, 2000 Update.

3) USNRC, Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors, Regulatory Guide 1.183.

4) NUREG-6331 (Rev 1), Atmospheric Relative Concentrations in Building Wakes (ARCON96), May 1997.

5) Nuclear Energy Institute, Control Room Habitability Assessment Guidelines, NEI 99-03 June 2001.

6) Licensee Event Report (LER) 413/414 91-08.

7) USNRC, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, NUREG-0800 (Rev 2).

8) Federal Guidance Report No. 12 External Exposure to Radionuclides in Air, Water, and Soil.

9) Federal Guidance Report No. 11 Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation Submersion and Ingestion.

10) Peter S. Tam (USNRC) to Gary R. Peterson (Catawba Nuclear Station) Catawba Nuclear Station - Supplement to the Catawba Safety Evaluation Report (NUREG-0954), Postulated Weir Gate Drop Accident (TAC MA0135 and MA0136)," May 21, 1998.

11) Chandu P. Patel (USNRC) to G.R. Peterson, "Catawba Nuclear Station, Units 1 and 2 Re: Issuance of Amendments (TAC Nos. MB0357 and MB0359)" June 28, 2001.

ATTACHMENT 4

Determination of

No Significant Hazards

DETERMINATION OF NO SIGNIFICANT HAZARDS

Does operation of the facility in accordance with the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated? **No.**

An alternate source term calculation has been performed for Catawba Nuclear Station that demonstrates that offsite dose consequences of a postulated fuel handling accident or weir gate drop accident remain within the limits provided sufficient decay has occurred prior to the movement of irradiated fuel without taking credit for certain mitigation features such as ventilation filter systems and containment closure. Irradiated fuel that has not undergone the required decay period of 72 hours is defined to be recently irradiated fuel and the currently approved Technical Specification requirements are applicable when this recently irradiated fuel is being handled.

The proposed amendment would allow core alterations and movement of sufficiently decayed irradiated fuel within the containment building with the equipment hatch, personnel air locks and containment penetrations open. Operation of the Containment Purge Exhaust System (CPES) is not required during movement of sufficiently decayed fuel. The amendment also would allow movement of irradiated fuel assemblies within the fuel building without the Fuel Handling Ventilation Exhaust System (FHVES) in operation. Movement of the weir gate is permitted without the FHVES in operation provided the irradiated fuel that could be impacted by a drop of the weir gate has undergone a minimum decay period of 19.5 days.

This amendment does not alter the methodology or equipment used directly in fuel handling operations and weir gate movement. Neither ventilation filter systems, the CPES nor the FHVES, is used to actually handle fuel. Neither of these systems is an "accident initiator" either in this sense or any other sense. Similarly, neither the equipment hatch, the personnel air locks, nor any other containment penetration, nor any component thereof is an accident initiator.

Actual fuel handling operations and weir gate movement themselves are not affected by the proposed changes. Therefore, the probability of a Fuel Handling Accident and Weir Gate Drop is not affected with the proposed amendment. No other accident initiator is affected by the proposed changes.

For the reasons above, the proposed amendment does not involve a significant increase in the probability of an accident previously evaluated.

The Fuel Handling Accident in Containment has been analyzed without credit for filtration by the CPES. Likewise, the Fuel Handling Accident in the Fuel Building and the Weir Gate Drop has been analyzed without credit for filtration by the FHVES. The analyses of these design basis events were conducted with the Alternative Source Term Methodology in accordance with 10 CFR 50.67 and Regulatory Guide 1.183. These analyses show that the resultant radiation doses are within the limits specified in 10 CFR 50.67 and R.G. 1.183.

The TEDE radiation doses from the analyses supporting this LAR have been compared to equivalent TEDE radiation doses estimated with the guidelines of R.G. 1.183 Footnote 7. The new values are shown to be comparable to the results of the previous analyses.

For the reasons above, the proposed amendment does not involve a significant increase in the consequences of an accident previously evaluated.

Does operation of the proposed facility in accordance with the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated? **No.**

The proposed change does not involve addition or modification to any plant system, structure, or component. The proposed amendment would increase the time during which the equipment hatch and personnel air locks could be open during core alterations and movement of irradiated fuel. The proposed amendment does not involve any change in the operation of these containment penetrations. Having these penetrations open does not create the possibility of a new accident.

The proposed amendment also would remove the requirements for operability of the CPES and FHVES during core alterations or movement of sufficiently decayed irradiated fuel. It does not alter the operation of these systems beyond their functional capabilities. Modification of the requirements of operability for these systems from the plant Technical Specifications does not create the possibility of a new accident.

The requirements for CRAVS are being revised to immediately suspend movement of irradiated fuel if one CRAVS train becomes inoperable. This change does not have the potential to cause a new or different type of accident.

The proposed amendment does not create the possibility of a new or different kind of accident than any previously evaluated.

Does operation of the facility in accordance with the proposed amendment involve a significant reduction in the margin of safety? **No.**

The assumptions and input used in the analysis are conservative as noted below. The design basis Fuel Handling Accidents and Weir Gate Drop have been defined to identify conservative conditions (concerning offsite power and single failure). The source term and radioactivity releases have been calculated pursuant to Regulatory Guide 1.183 and with conservative assumptions concerning prior reactor operation. The control room atmospheric dispersion factors have been calculated with conservative assumptions associated with the release. The conservative assumptions and input noted above ensure that the radiation doses cited in this License Amendment Request are the upper bound to radiological consequences of a Fuel Handling Accident either in Containment or the Fuel Building and the Weir Gate Drop. The analyses show that there is a significant margin between the TEDE radiation doses calculated for the postulated Fuel Handling Accident and the Weir Gate Drop accident using the Alternative Source Term and the acceptance limits of 10 CFR 50.67 and Regulatory Guide 1.183.

The proposed change does not involve a significant reduction in the margin of safety.

ATTACHMENT 5

Environmental Assessment/

Impact Statement

ENVIRONMENTAL ASSESSMENT/IMPACT STATEMENT

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 significant additional quantity or type of effluent being available for adverse environmental impact or personnel exposure. The change does not introduce any new effluents or significantly increase the quantities of existing effluents. As such, the change cannot significantly affect the types or amounts of any effluents that may be released offsite. The new consequences of the revised Fuel Handling Accident analysis remain well below the acceptance criteria specified in 10 CFR 50.67 and Regulatory Guide 1.183.

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.

ATTACHMENT 6

Fuel Assembly Isotopic Inventory -
Radiological Consequences of the
Fuel Handling Accidents and Weir Gate Drop

Fuel Assembly Isotopic Inventory - Radiological Consequences of the Fuel Handling Accidents and Weir Gate Drop

Isotope	Activity per Fuel Assembly (Ci)
I-130	$2.32\times10^{+4}$
I-131	$7.46\times10^{+5}$
I-132	$1.10\times10^{+6}$
I-133	$1.61\times10^{+6}$
I-134	$1.86\times10^{+6}$
I-135	$1.53\times10^{+6}$
I-136	$7.91\times10^{+5}$
Kr-83m	$1.25\times10^{+5}$
Kr-85	$6.78\times10^{+3}$
Kr-85m	$2.80\times10^{+5}$
Kr-87	$5.76\times10^{+5}$
Kr-88	$8.14\times10^{+5}$
Kr-89	$1.05\times10^{+6}$
Xe-131m	$3.97\times10^{+3}$
Xe-133	$1.53\times10^{+6}$
Xe-133m	$4.71\times10^{+4}$
Xe-135	$3.36\times10^{+5}$
Xe-135m	$2.84\times10^{+5}$
Xe-137	$1.46\times10^{+6}$
Xe-138	$1.51\times10^{+6}$

Notes:

1) The activities listed do not account for post shutdown decay time.

2) These values were used directly for the analyses of radiological consequences of the Fuel Handling Accident. They were multiplied by 7 for the analyses of the radiological consequences of the Weir Gate Drop.

ATTACHMENT 7

Data Pertaining to the
Control Room Atmospheric Dispersion Factor
For Releases from the Unit Vent Stack

Data Pertaining to the Control Room Atmospheric Dispersion Factor For Releases from the Unit Vent Stack

Input Parameter and Dimension	Value
Height of lower wind instrument	10 meters
Height of upper wind instrument	60 meters
Dimensions of wind speed data	Miles / hour
Minimum wind speed	0.5 meters / sec
Wind direction window width	90°
Release type	Ground
Release shape	Point source
Release height	38 meters
Building cross section area	1592 meters^2
Effluent vertical velocity	0 meters / sec
Vent flow rate$_2$	15.64 meters^3 / sec
Direction from intake to source	53°
Wind direction window	8° - 98°
Distance from source to intake	43.0 meters
Intake height	1.5 meters
Terrain elevation difference	0 meters
Surface roughness length	0.20 meters
Sector averaging constant	4.3
Initial sigma y	0
Initial sigma z	0

Notes:

1) Meteorological data are being sent by computer diskette (in "zipped" form). Other input data for calculations with ARCON96 are attached.

3) In the calculations of radiation dose, the control room *X/Q* for the unit vent stack taken corresponds to a unit vent flow rate of 15.64 meters^3 / sec. There exists the potential for the unit vent stack flow rate to be essentially 0. This potential consists of unlikely scenarios involving maintenance activity on the unit vent stack to exhaust lines leading to it. It is determined that the effect of assuming a vent flow rate of 0 meters^3 / sec would be insignificant.

ATTACHMENT 8

Data Pertaining to the Analyses of
Radiological Consequences of the
Fuel Handling Accidents and Weir Gate Drop

Data Pertaining to the Analyses of Radiological Consequences of the Fuel Handling Accidents and Weir Gate Drop

Input Parameter	Value
Data Pertaining to Isotopic Inventory Available for Release	
Core Power Level[1]	3479 MW
Fuel Assembly Core Isotopic Inventory	Cf. Attachment 6
Number of Damaged Fuel Assemblies	1 (FHA) 7 (Weir Gate Drop)
Decay time prior to initiating event	3 days (FHA) 19.5 days (Weir Gate Drop)
Gap Fraction[2]	
I-131	0.08
Other iodine radioisotopes[3]	0.05
Kr-85	0.10
Other krypton and xenon radioisotopes	0.05
Alkali metal (Cs, Rb) radioisotopes	Not included[3]

Attachment 8, Continued

Input Parameter	Value
Data Pertaining to Release of Radioactivity from the Pool[4]	
Water Level	23 feet
Release Duration	2 hours
<u>Iodine Chemical Form in the Pool</u>	
Elemental	99.85 %
Organic	0.15 %
<u>Pool Decontamination Factors</u>	
Elemental iodine	500
Organic iodine compounds	1
Noble Gases	1
<u>Chemical Form of Iodine Released</u>	
Elemental iodine	57%
Organic iodine compounds	43%
Atmospheric Dispersion Factors (X/Q's)	
EAB Atmospheric Dispersion Factor	4.78×10^{-4} sec/meter^3
LPZ Atmospheric Dispersion Factor[5]	6.85×10^{-5} sec/meter^3
CR Atmospheric Dispersion Factor[6,7]	1.74×10^{-3} sec/meter^3
Control Room and CRAVS Parameters	
Control Room Volume	117,920 cu.ft.
Delay Time to Start Standby CRAVS Train[8]	30 minutes
<u>Rate of unfiltered CR inleakage</u>	
Before Standby CRAVS train starts	</= 2100 CFM
After Standby CRAVS train starts	</= 100 CFM
Rate of CRAVS CR recirculation airflow	>/= 1500 CFM
Rate of CRAVS CR total airflow	>/= 3500 CFM
<u>CRAVS filter efficencies[9]</u>	
Elemental iodine removal	99%
Organic iodine removal	95%
Control Room Occupancy Factors	
0 hr - 24 hr	1.0
24 hr - 96 hr	0.6
96 hr - 720 hr	0.4

Breathing Rates

Control Room Breathing Rate	3.5×10^{-4} meters^3/sec
<u>Offsite Breathing Rate</u>	
0 hr - 8 hr	3.5×10^{-4} meters^3/sec
8 hr - 24 hr	1.8×10^{-4} meters^3/sec
24 hr - 720 hr	2.3×10^{-4} meters^3/sec

Dose Conversion Factors

Deep Dose Equivalent	Federal Guidance Report 12
Committed Dose Equivalent	Federal Guidance Report 11

<u>Notes:</u>

1) The value for core power level includes a factor of 1.02 to count for uncertainty in calorimetric measurement. The rated core power is 3411 Mwth.

2) Bromine radioisotopes are not included in the isotopic inventory available for the Fuel Handling Accident and Weir Gate Drop. The half life of the bromine radioisotopes are small compared to the lower bound value (3 days) for the decay time prior to the initiating event. With one exception, this is true of the daughter radioisotopes. The exception is Kr-85 the "grand daughter" of Br-85 with a half-life of 10.756 years. However, the activity of Kr-85 produced from decay of Br-85 and Br-85m is very small compared to the activity of Br-85.

3) The isotopic inventory for the Fuel Handling Accident and Weir Gate Drop does not include alkali (Cs and Rb) radioisotopes. This is equivalent to assuming an infinite pool decontamination factor for these radioisotopes.

4) The term "pool" denotes the Reactor Cavity for the Fuel Handling Accident in Containment and the Spent Fuel Pool for both the Fuel Handling Accident in the Fuel Building and the Weir Gate Drop.

5) Only the value for 0 hr - 8 hr is given for the LPZ atmospheric dispersion factor (X/Q). Activity releases are taken to end at 2 hours after the initiating event.

6) Only the value for 0 hr - 2 hr is given for the control room atmospheric dispersion factor (X/Q). Activity releases are taken to end at 2 hours after the initiating event.

7) For the Fuel Handling Accidents and the Weir Gate Drop, the release point is the unit vent stack. Other potential release points include the equipment hatch and Fuel Building. Of the above release

points, the unit vent stack is associated with the highest values for the control room X/Q.

8) A failure resulting in loss of the operating CRAVS train is taken. Offsite power is assumed to be available. Under these conditions, operator action is required to start the redundant CRAVS train.

9) No credit is taken for removal of noble gas radioisotopes by the CRAVS filters.

ATTACHMENT 9

Administrative Controls

Applicable to Movement of

Non-recently Irradiated Fuel Assemblies

ADMINISTRATIVE CLOSURE CONTROLS DURING FUEL MOVEMENT

Containment Building Closure:

The following requirements shall be maintained to ensure defense-in-depth. Closure Controls are in effect whenever the affected Containment is open during operations within containment involving movement of non-recently irradiated fuel assemblies. The definition of an open containment penetration is a penetration that provides direct access from the containment atmosphere to the outside environment.

1. The equipment necessary to implement containment closure shall be appropriately staged prior to maintaining any containment penetration open including airlock doors and the containment equipment hatch.

2. Hoses and cables running through any open penetration, airlock, or equipment hatch should be configured to facilitate rapid removal in the event that containment closure is required.

3. The containment personnel airlock (PAL) may be open provided the following conditions exist:

   a. One door in each airlock is capable of being closed.
   b. Hoses and cables running through the airlock shall employ a means to allow safe, quick disconnection or severance.
   c. The airlock door is not blocked in such a way that it cannot be expeditiously closed. Protective covers used to protect the seals/airlock doors or devices to keep the door open/supported do not violate this provision.
   d. Personnel are available with the responsibility for expeditious closure of at least one door on the PAL or closure of an appropriate temporary door following containment evacuation.

4. The containment equipment hatch may be open provided the following conditions exist:

   a. The containment equipment hatch is capable of being closed or a temporary closure method is available and can be implemented.

b. Hoses and cables running through the equipment hatch shall employ a means to allow safe, quick disconnection or severance.
c. The equipment hatch is not blocked in such a way that it cannot be expeditiously closed. Protective covers used to protect the seals/equipment hatch or devices to keep the hatch open/flange supported do not violate this provision.
d. Necessary tools to install the equipment hatch flange and tighten at least four equipment hatch closure bolts are available or other methods to close the equipment hatch opening (i.e., restrict air flow out of the containment), such as an air curtain, are fabricated and staged at the work area along with the necessary installation tools.
e. Sufficient number of personnel are available with the responsibility for expeditious closure of the containment equipment hatch opening following containment evacuation.

5. Other containment penetrations may be open provided the following conditions exist:

    a. One valve in each open containment penetration is capable of being closed, or
    b. Other methods to close the open penetrations (i.e., restrict air flow out of the containment), such as a closure cover, shall be fabricated and available along with the necessary installation tools.
    c. Personnel are available with the responsibility for expeditious closure of open penetration(s) following a fuel handling accident inside containment.

6. If containment closure would be hampered by an outage activity, compensatory actions will be developed.

7. The Containment Purge system, with associated radiation release monitoring, will be available for the release path, whenever movement of irradiated fuel is in progress in the containment building and the equipment hatch is open. If for any reason this ventilation requirement can not be met, movement of fuel assemblies within the containment building shall be discontinued until the flow path(s) can be reestablished, the

equipment hatch closed, or a temporary cover is placed over the equipment hatch opening.

8. Personnel responsible for Containment Building Closure shall be trained and knowledgeable in using the procedure for executing containment closure. Walkdowns should be considered to demonstrate the closure capability including compensatory actions in the event of loss of electrical power.

Fuel Building Closure:

The following requirements shall be maintained to ensure defense-in-depth. Closure Controls are in effect during operations within the fuel building involving movement of non-recently irradiated fuel assemblies.

1. The fuel building doors shall be maintained closed except for normal entry and exit unless a designated person is available to close the open door(s) should a FHA occur within the fuel building.
2. The fuel handling area ventilation system, with associated radiation release monitoring, will be available for the release flow path. If for any reason operation of the fuel handling area ventilation system flow path must be discontinued and the fuel building is open to the outside environment, fuel movement within the fuel building shall be discontinued until the flow path can be reestablished, or until the openings to the outside environment are closed.
3. If fuel building closure would be hampered by an outage activity, compensatory actions will be developed.

Control Room Area Ventilation System

During movement of irradiated fuel assemblies, both Control Room Area Ventilation System outside air intakes should normally be open. If one intake is closed, movement of irradiated fuel assemblies will be suspended until the intake is reopened, it is confirmed that sufficient decay has occurred to reduce Control Room dose rates to below administrative limits, or other compensatory actions are established.