Duke Power Company
Catawba Nuclear Generation Department
4800 Concord Road
York, SC 29745

William R. McCollum, Jr.
Vice President
(803)831-3200 Office
(803)831-3426 Fax

DUKE POWER

September 5, 1995

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

Subject: Catawba Nuclear Station, Units 1 and 2
Dockets Nos. 50-413 and 50-414
Request for Amendment: Reactor Coolant Leakage Detection Systems

Pursuant to 10 CFR 50.90, Duke Power Company hereby requests an amendment to its Facility Operating License Nos. NPF-35 and NPF-52 for Catawba Nuclear Station Units 1 and 2, respectively, with the submittal of the following proposed changes to the Updated Final Safety Analysis Report (UFSAR).

DESCRIPTION OF CHANGE

The Catawba Final Safety Analysis Report (FSAR), Section 5.2.5 and Safety Evaluation Report (SER) related to the application for an operating license for Catawba Nuclear Station, Units 1 and 2, dated February, 1983, Section 5.2.5, "Detection of Leakage Through Reactor Coolant Pressure Boundary" includes a review of the various Catawba reactor coolant leakage detection systems. One of the systems which provides indication of unidentified leakage from the reactor coolant pressure boundary into the containment is the Containment Airborne Particulate Radiation Monitors 1EMF38(L) and 2EMF38(L) (the prefixes 1 and 2 denote association with Units 1 and 2, respectively). The subject FSAR and SER sections state that EMF38(L) is seismic Category I. An engineering review of the seismic classification of the EMF38(L) monitors at Catawba has determined that these monitors are not seismic Category I.

A001

Further review relative to the necessity of seismic qualification for these monitors and analysis performed in support of a proposed UFSAR change to delete the seismic qualification requirement from the UFSAR indicates that the probability of a malfunction of equipment important to safety previously evaluated in the safety analysis report would be increased, with respect to the requirements of Regulatory Guide (RG) 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems". Such a change to the UFSAR constitutes an unreviewed safety question (USQ), as defined in 10 CFR 50.59. Therefore, per 10 CFR 50.59(2)(c), we request that the NRC review and approve this change through an amendment to our operating licenses pursuant to 10 CFR 50.90.

BACKGROUND

During a recent engineering review, it was determined that documentation does not exist to show that EMF38(L) is designed to withstand a Safe Shutdown Earthquake (SSE). Both 1EMF38(L) and 2EMF38(L) were subsequently declared inoperable, and remain inoperable. Although technically inoperable, both airborne particulate radioactivity monitors remain available. The inoperability of these monitors do not affect continued unit operation (Technical Specification 3.4.6.1, "Reactor Coolant System Leakage") unless the Containment Ventilation Unit Condensate Drain Tank (VUCDT) Level Monitoring Subsystem and EMF38(L), collectively categorized as one of three Reactor Coolant System Leakage Detection Systems, become inoperable at the same time on the same unit.

In March, 1994, a visual inspection of both units' sample lines to EMF38(L) revealed that they are well supported and are capable of functioning following an Operational Basis Earthquake (OBE) and a Safe Shutdown Earthquake (SSE). Most of the components associated with EMF38(L) are seismic, however, certain components associated with EMF38(L) and the power supply to EMF38(L) are not seismically qualified.

The Reactor Coolant Leakage Detection Systems are provided to detect structural degradation of the reactor coolant pressure boundary on a timely basis. This ensures that corrective actions are taken before such degradation becomes sufficiently severe that it jeopardizes the safety of the reactor coolant system, or before the leakage could increase to a level beyond the capability of the makeup system to replenish the coolant loss. The containment airborne particulate radiation monitor (EMF38(L)) is a component of the leakage detection systems. Reference 1 states that this monitor is seismic Category I.

The operability requirements for the Reactor Coolant Leakage Detection Systems are given in Reference 4, Technical Specification (TS) 3.4.6.1. Specifically, TS 3.4.6.1 requires that the following combination of Reactor Coolant Leakage Detection Systems be operable:

1) The Containment Atmosphere Gaseous Radioactivity Monitoring System (EMF39(L)),

2) The Containment Floor and Equipment Sump Level and Flow Monitoring Systems, and

3) Either the Containment Atmosphere Particulate Radioactivity Monitoring System (EMF38(L)) or the Containment Ventilation Unit Condensate Drain Tank (VUCDT) Level Monitoring System.

These requirements are based on the regulatory positions of RG 1.45. Regulatory Position C6 is that the containment airborne particulate radioactivity monitor (EMF38(L)) be seismic. This position does not apply to the remaining Reactor Coolant Leakage Detection Systems. At Catawba, not all of the components and supporting equipment for EMF39(L), the Containment Floor and Equipment Sump Level and Flow Monitoring Systems, or the VUCDT Level Monitoring Systems are seismic.

The following provisions are or will be in-place in appropriate plant procedures with respect to Reactor Coolant System leakage and the ability to detect it:

1) During power operations without an earthquake having occurred, upon receipt of containment airborne particulate radiation monitor (EMF38(L)) high radiation alarm (Trip 2) or the "rate of change" alarm in the control room, the operators are directed by Reference 2 to verify the alarm and take the appropriate actions to determine if reactor coolant system leakage exceeds 1 gpm.

2) Following any earthquake, including one smaller than the OBE, the plant response procedure for earthquakes and natural disasters will be revised to assume that none of the four non-seismic detection systems are operable and to determine the status of 1(2)EMF38(L) and 1(2)EMF39(L). This is done by performing a source check from the Control Room and by visually verifying the proper operation of these monitors. Should it be determined that either EMF38(L) or EMF39(L) is not functional, the appropriate steps will be taken; i.e., declare the monitor(s) inoperable and apply the action statement for TS 3.4.6.1 which may require that the associated unit(s) be taken to Cold Shutdown (Mode 5) if the minimum required Reactor Coolant Leakage Detection Systems are not operable. Cold Shutdown is a mode for which the Reactor Coolant Leakage Detection Systems are not required operable per Reference 4 (TS 3.4.6.1).

3) In the event that an OBE occurs, the operators are directed by Reference 3 to bring the unit(s) to Hot Standby (Mode 3). Hot Standby is a mode for which the Reactor Coolant Leakage Detection Systems are required operable per Reference 4.

4) In the event that a SSE occurs, the operators are directed by Reference 3 to bring the unit(s) to Cold Shutdown. The containment particulate monitor is not required to remain functional in Mode 5

In the event that EMF-38(L) or EMF-39(L) are not operable following an earthquake of any magnitude, appropriate actions, such as the Technical Specification initiation of containment atmosphere grab samples at least once per 24 hours, will be implemented.

The results of this analysis indicated that the proposed change to the UFSAR may increase the probability of a malfunction of equipment important to safety previously evaluated in the safety analysis report. Specifically, the ability to detect Reactor Coolant System leakage may be affected by an earthquake relative to both Regulatory Position C6 of RG 1.45 and the findings of the NRC review as documented in Reference 1. Therefore, we are requesting NRC approval prior to implementing the revision to the UFSAR.

REFERENCES

1) Catawba Nuclear Safety Evaluation Report, Relating to Application for Operating License, dated February, 1983, Section 5.2., "Detection of Leakage Through Reactor Coolant Pressure Boundary".

2) Catawba Nuclear Station Computer Alarm Response Manual, Units 1 and 2, Point ID P0590, "EMF-38(L) Rate of Change" Alarm, and P0024, "EMF-38(L) High Radiation (Trip 2)" Alarm.

3) RP/0/A/5000/07, "Procedure for Natural Disaster and Earthquake".

4) Catawba Nuclear Technical Specifications, with Amendments Through 130/124.

SAFETY ANALYSIS

From a review of RG 1.45, it is apparent that two concerns are relevant to the NRC regulatory position concerning the ability to detect the presence of a leak in the Reactor Coolant System following an earthquake. First, it was noted that "if a seismic event comparable to a safe shutdown earthquake (SSE) occurred, it would be important for the operator to assess the condition in containment quickly. For this reason, the NRC states in RG 1.45, Position C6, that "the airborne particulate radioactivity monitoring system (EMF38(L)) be should remain functional when subjected to the SSE". Second, it was acknowledged that "since nuclear power plants may be operating at the time an earthquake occurs and may continue to operate after earthquake, it is prudent to require the leakage detection systems to function under the same conditions". For this reason, it is stated in Regulatory Position C6 that "the leakage detection systems should be capable of performing their functions following seismic events that do not require plant shutdowns". This latter position is relevant as Reference 3 implicitly allows the continuation of power operations at Catawba following an earthquake smaller than the Operating Basis Earthquake (OBE), given that neither unit has tripped as a result of such an event and that both EMF38(L) and EMF39(L) are available and functional.

There are several means of assessing the condition inside the containment at Catawba which would remain available following a postulated SSE. These include, but are not limited to, the following:

- ◊ narrow range containment pressure instrumentation,
- ◊ wide range containment pressure instrumentation,
- ◊ wide range containment sump level instrumentation,
- ◊ high range containment radiation monitors (EMF53A and EMF53B), and
- ◊ acquisition and analysis of grab samples of containment atmosphere.

In addition, an inspection of the plant would be conducted following an earthquake pursuant to the steps of Reference 3, Sections 3.4 and 3.5. The condition of the Reactor Coolant System (among other plant systems) would be assessed in the walkdown. For these reasons, it is determined that the operators can assess conditions in containment following the SSE.

Following any earthquake, including one smaller than the OBE, the plant response procedure for earthquakes and natural disasters will be revised to assume that none of the four non-seismic detection systems are subsequently operable and to determine the status of 1(2)EMF38(L) and 1(2)EMF39(L). This is done by performing a source check from the Control Room and by visually verifying the proper operation of these monitors.

Should it be determined that either EMF38(L) or EMF39(L) is not functional, the appropriate steps will be taken; i.e., declare the monitor(s) inoperable and apply the action statement for TS 3.4.6.1 which may require that the associated unit(s) be taken to Cold Shutdown (Mode 5) if the minimum required Reactor Coolant Leakage Detection Systems are not operable. Cold Shutdown is a mode for which the Reactor Coolant Leakage Detection Systems are not required operable per Reference 4 (TS 3.4.6.1). This takes that unit out of the applicable modes of TS 3.4.6.1 and satisfies the intent of the first part of Regulatory Position of RG 1.45. The functional status of these monitors may be ascertained from outside containment by performing a source check from the control room and by visual inspection at the skid in the Auxiliary Building. Access from the Control Room to the monitor skid is located within Seismic Category I structures and in a "mild" environment.

From this, it is determined that it is sufficient to perform a source check and visual inspection to determine whether EMF38(L) and EMF39(L) are functional. It is also determined that this check of functional status can be done in a reasonable period of time without exposure of anyone to a harsh environment.

DETERMINATION OF NO SIGNIFICANT HAZARDS

This proposed change has been evaluated against the standards in 10 CFR 50.92 and has been determined to involve no significant hazards considerations, in that operation of the facility in accordance with the proposed amendment would not:

1. *involve a significant increase in the probability or consequences of an accident previously evaluated; or*

EMF38(L) is not used directly for any phase of power generation or conversion or transmission, normal decay heat removal, fuel handling, or the processing of radioactive fluids. As such, it is not an "accident initiator". No "accident initiator" is affected by the change to the UFSAR. Thus, the probability of accidents evaluated in Sections 6, 9.1, and 15 of the FSAR is not affected by the change. It is determined that sufficient ability to determine conditions inside containment remain available for any earthquake up to and including the SSE. Furthermore, should it be determined that either EMF38(L) or EMF39(L) are not capable of fulfilling its intended function following any earthquake, including those smaller than the OBE, the associated unit will be taken to Cold Shutdown, a mode for which neither the Emergency Core Cooling System nor the containment safeguards are required. Finally, no equipment provided to mitigate any accident is affected adversely affected by the change. For these reasons, the proposed change will not involve a significant increase in the probability or consequences of an accident previously evaluated in the SAR.

2. *create the possibility of a new or different type of accident from any accident previously evaluated; or*

As stated above, no equipment used in direct support of power generation or conversion or transmission, normal decay heat removal, fuel handling, or the processing of radioactive fluids is affected with the update. No new failure modes are identified with the change. The upper bound to an undetected leak in the Reactor Coolant System is a Loss of Coolant Accident. As noted above, no equipment provided to mitigate a LOCA is affected by the change.
For these reasons, the change will not create a new or different type of accident from any accident previously evaluated.

3. *involve a significant reduction in a margin of safety.*

It has been determined that sufficient means remain at the disposal to the operators to assess conditions within the containment following any earthquake up to and including the SSE. In particular, the ability to determine leakage with the sensitivity comparable to that of EMF38(L) can be established. This meets the intent of the latter part of Regulatory Position of RG 1.45. In addition, should it be determined that either EMF38(L) or EMF39(L) is not functional following any earthquake, the associated unit(s) will be brought to Cold Shutdown even if it (they) have remained on line following that earthquake. This brings the unit(s) to a mode in which TS 3.4.6.1 does not apply. It ensures that at least the minimum required Reactor Coolant System leakage detection systems will be functional before power operations are continued following a postulated earthquake smaller than the OBE (cf. Reference 3). It ensures protection of the reactor coolant pressure boundary, one of the fission product barriers. No other fission product barrier is affected by the change. Therefore, the margin of safety is not reduced.

Therefore, based on the information contained in this submittal, it is determined that no significant hazard is associated with the proposed change to the UFSAR.

ENVIRONMENTAL ASSESSMENT

As determined above, both equipment and procedural steps are in place to ensure that the intent of Regulatory Position C6 of RG 1.45 are met.

EMF38(L) and EMF39(L) have interfaces with both the Containment Purge Ventilation (VP) System and the Containment Air Addition and Release (VQ) System. The VP System is designed primarily to remove radioactivity from the containment and incore instrumentation rooms by exhausting air from these volumes through filters and replacing it with outside air. Pursuant to TS 3.6.1.9, the VP System is not used in Modes 1 - 4; its containment isolation valves are sealed closed. The VQ System is designed to maintain containment within the limits of TS 3.6.1.4 (between -0.1 and +0.3 psig). Pursuant to the limitations of TS 3.6.1.9, the VQ System may be used during Modes 1 - 4.

As noted, the operators are directed in Reference 2 to determine the status of 1(2)EMF38(L) and 1(2)EMF39(L). If either monitor is not functional following an earthquake, it will be declared inoperable and the appropriate steps will be taken. Pursuant to TS 3.3.3.1 (Table 3.3-6, Action 30), Selected Licensee Commitment (SLC) 16.11-7 (Table 16.11-5, Action 4), if EMF39(L) was found to be not functional, the purging operations with the VP System would be stopped and the containment isolation valves closed. In addition, Action 1 of SLC 16.11-7 (Table 16.11-5) would be taken, including the cessation of operation of the VQ System and closure of its valves, if necessary. These steps would ensure that no releases in excess of 10 CFR 100 would occur.

SCHEDULE

This UFSAR revision is requested to be approved and issued by February 1, 1996 such that the UFSAR can be revised and submitted to your staff by May 28, 1996. Issuance of this amendment is not currently identified as having an impact on outage completion or continued plant operation, however, these monitors remain technically inoperable until approval of this Facility Operating License Amendment is granted by your staff.

SAFETY COMMITTEE REVIEW

This proposed change to the Facility Operating License and our determination of significant hazards have been reviewed by our Plant Operational Review Committee (PORC) and our Nuclear Safety Review Board (NSRB), and have concluded that implementation of these changes will not result in an undue risk to the health and safety of the public.

Should you have any questions regarding this matter, please contact Jeff Lowery at (803) 831-3414.

Very truly yours,

W. R. McCollum, Site Vice-President
Catawba Nuclear Station

/JLL

xc: S. D. Ebneter
Regional Administrator, Region II

R. E. Martin, ONRR

R. J. Freudenberger
Senior Resident Inspector

W. R. McCollum, being duly sworn, states that he is Site Vice-President, Catawba Nuclear Station, Duke Power Company; that he is authorized on the part of said company to sign and file with the U. S. Nuclear Regulatory Commission these revisions to the Catawba Nuclear Station License Nos. NPF-35 and NPF-52, and that all statements and matters setforth therein are true and correct to the best of his knowledge.

W. R. McCollum, Site Vice-President
Catawba Nuclear Station

Subscribed and sworn to before me this 5th day of September, 1995

Notary Public

My Commission expires:

JANUARY 23, 2005

bxc:	ELL	EC050
	Z. L. Taylor	CN01RC
	J. E. Snyder	MG01RC
	J. E. Burchfield	ON03RC
	A. V. Carr	PB05E
	T. B. Bright	CN03MC
	J. M. Stackley	CN03MC
	L. Lee	CN03MC
	T. E. Crawford	CN03SE
	B. J. Horsley	EC12T
	J. L. Lowery	CN01RC
	NCMPA-1	
	SREC	
	PMPA	
	NCEMC	
	Document Control:	801.01