



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 169 TO FACILITY OPERATING LICENSE NPF-9
AND AMENDMENT NO. 151 TO FACILITY OPERATING LICENSE NPF-17
DUKE POWER COMPANY
MCGUIRE NUCLEAR STATION, UNITS 1 AND 2
DOCKET NOS. 50-369 AND 50-370

1.0 INTRODUCTION

By letter dated March 4, 1996, Duke Power Company (the licensee) submitted a request for changes to the McGuire Nuclear Station, Units 1 and 2, Final Safety Analysis Report (FSAR) to delete the seismic qualification requirement for the Containment Atmosphere Particulate Radiation Monitors.

The McGuire, Units 1 and 2, FSAR, Section 5.2.7, "Reactor Coolant Pressure Boundary Leakage Detection Systems" describes the various reactor coolant system (RCS) leakage detection systems. One of those described systems includes the containment atmosphere particulate radiation monitors (CAPRMs), 1EMF38(L) for Unit 1 and 2EMF38(L) for Unit 2. The FSAR originally identified that EMF38(L) was seismically qualified to function through a safe shutdown earthquake (SSE), i.e., seismic Category I. During a seismic classification review, the licensee determined that the EMF38(L) monitors were not seismic Category I and, based on documentation, which the licensee believed showed that the CAPRMs were never intended to be seismic Category I, the FSAR was revised to reflect this determination. During a subsequent review related to procedural changes associated with the nonseismic classification of these monitors, the licensee determined that an unreviewed safety question existed as defined in Section 50.59 of Title 10 of the *Code of Federal Regulations* (10 CFR). Therefore, by letter dated March 4, 1996, the licensee requested staff approval of the procedural changes through an amendment to the McGuire operating licenses.

Position C.6 of Regulatory Guide (RG) 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems" recommends that CAPRMs should be designed to remain functional during and following a safe shutdown earthquake (SSE). The basis identified in Position C.6 of RG 1.45 is that it is important for operators to quickly assess the conditions within the containment following an earthquake comparable to an SSE. In its March 4, 1996, submittal the licensee proposed alternative methods to meet the basis for Position C.6 which include other instrumentation and revised earthquake procedures.

2.0 EVALUATION

The RCS leakage detection systems are provided to detect degradation of the RCS pressure boundary on a timely basis prior to catastrophic failure of the piping. Therefore, they are only required to be operable during Modes 1, 2, 3, and 4 when the RCS is pressurized and there is a potential for a pipe rupture. The licensee has proposed to revise the plant procedures such that following any earthquake, including one smaller than an operational basis earthquake (OBE) the operators will assume that all of the leakage detection systems are inoperable and determine the status of the CAPRMs, declaring them inoperable if necessary. In the event that an OBE or earthquake of greater intensity occurs, the operators will also be directed to bring the unit(s) to hot standby (Mode 3) within the next 6 hours. In the event the earthquake is comparable to an SSE occurs, the unit(s) will be brought to cold shutdown within the following 30 hours. In the event the CAPRMs are not operable following any earthquake, containment atmosphere grab samples will be taken. The present plant procedures specify that the reactor is tripped if the effects of an earthquake are seen, heard, or felt. Subsequently, systems are thoroughly investigated for damage. The proposed procedures will provide operational flexibility without any significant reduction in safety. In fact, the proposed revisions could be considered an enhancement to safety because the present procedures provide no specific guidance for the more severe earthquakes.

There are several means of assessing the conditions inside containment 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, and
- acquisition and analysis of containment atmosphere grab samples.

In addition, an inspection of the plant would be conducted following an earthquake pursuant to the steps in the proposed plant response procedures. The conditions of the RCS would be assessed during a walkdown.

The staff agrees with the licensee that adequate means are available to assess conditions inside containment following a seismic event comparable to an SSE. Assuming that a seismic Category I CAPRM was available following a seismic event, containment atmosphere grab samples would still have to be taken to verify the validity of an increased CAPRM reading and determine the potential source of that increase. A seismic event comparable to an SSE could result in increased CAPRM readings from a number of different sources. Some of these sources may provide false indications that RCS leakage has increased and actions would have to be taken to determine the reason for the increased radioactivity level readings. The reactor coolant activity levels would likely be affected by an earthquake comparable to an SSE (e.g., such an earthquake could create crud bursts).

The CAPRMs are sensitive to such increases in coolant activity (the sensitivity of the instrument is dependent upon the presence of corrosion product activity) and are sometimes the cause of false alarms during normal operation. Air particulate radioactivity levels inside containment are also likely to increase due to surface contamination being shaken loose during a high magnitude seismic event. Generally, CAPRMs are very sensitive to changes in both reactor coolant activity levels and background activity levels, and they have a relatively low operating range since they are designed to detect small amounts of RCS leakage at rather low levels of reactor coolant activity. There may also be a 15 to 20 minute time lag (depending upon the filter paper speed) to measure any increase in particulate radioactivity because it must build up on the filter paper. Because of this relatively low range or saturation point, high sensitivity, and inherent time lag, the operators cannot rely solely on these monitors to assess conditions inside containment following an SSE. Other measures, such as those proposed by the licensee must also be used to adequately assess post-earthquake conditions inside containment. Therefore, the staff concludes that the licensee, through the use of other plant instrumentation, sampling capability, and plant procedures, has adequately addressed Position C.6 of RG 1.45 with regards to the capability to assess conditions inside containment following an earthquake comparable to an SSE.

Based on the above evaluation, the staff concludes that the licensee has demonstrated an acceptable alternative (alternate to seismic Category I CAPRMs) to Position C.6 of RG 1.45 by showing that adequate instrumentation and procedures will be available to assess conditions inside containment following a seismic event comparable to an SSE. Therefore, the licensee's proposed changes to the plant procedures for responding to earthquakes as described in the March 4, 1996, submittal are acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the North Carolina State official was notified of the proposed issuance of the amendments. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an Environmental Assessment and Finding of No Significant Impact was published in the Federal Register on July 22, 1996 (61 FR 37941).

Accordingly, based on the Environmental Assessment, the Commission has determined that issuance of this amendment will not have a significant effect on the quality of the human environment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: W. LeFave

Date: July 30, 1996