Duke Power Company
P.O. Box 33198
Charlotte, N.C. 28242

Hal B. Tucker
Vice President
Nuclear Production
(704)373-4531

DUKE POWER

March 15, 1990

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

Subject: Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 50-414
Control of Heavy Loads at Nuclear Power Plants

Gentlemen:

In response to NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," Catawba Nuclear Station committed that heavy loads (greater than 1500 lbs.) would not be handled in the Reactor Building during Condition 1 (full or reduced power) or Condition 2 (Hot Shutdown) operating conditions. Conditions 1 and 2 equate to plant operating Modes 1 through 4. This commitment precluded the need to address postulated load drops to ensure the provisions of NUREG-0612 were met. The NRC staff and its consultant, Idaho National Engineering Laboratory (INEL), concluded that Catawba's response was consistent with the intent of NUREG-0612 (reference Catawba Safety Evaluation Report, NUREG-0954, Supplement 4, Appendix F).

Attached is a revision to the Catawba commitment as stated in the INEL Technical Evaluation Report. This revision would allow the station to operate the reactor building polar crane during Modes 1 - 4 for certain maintenance activities. These activities consist of preventative maintenance (PM) tests on the polar crane and the removal of the pressurizer enclosure hatch to facilitate inspections inside the pressurizer cavity. The attachment describes the administrative controls in place and summarizes the two new load drop analyses which were performed to satisfy the intent of NUREG-0612. Duke Power concludes that there will be no damage to required safe shutdown functions and that the evaluation criteria of Section 5.1 of NUREG-0612 has been satisfied.

This issue has been discussed with the NRC Staff, and it was requested that the NRC be allowed to approve this change to the licensing bases of the Plant. In consideration of the Staff's request, Duke Power Company requests the NRC's approval to alter the Catawba NUREG-0612 commitment as discussed in the attachment. Nevertheless, in Duke's view the station is still meeting the intent of NUREG-0612 and the commitment change falls under the purview of 10 CFR 50.59.

A033
1/1

Approval of this commitment change is required prior to March 27, 1990. On this date Catawba Unit 1 is expected to be in Mode 3, starting up from a refueling outage. This change is necessary to facili ate the removal of the pressurizer hatch in Mode 3 to perform an ASME Co I inservice inspection of the pressurizer relief valves that were oved during the outage.

Very truly yours,

Hal B. Tucker/

Hal B. Tucker

RGM/03139001

Attachment

cc: Mr. S. D. Ebneter, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dr. K. N. Jabbour
Office of Nuclear Regulation
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 14H25
Washington, D.C. 20555

Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

Mr. L. A. Wiens, Project Manager
U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Reactor Projects
Washington, D.C. 20555

Catawba Nuclear Station
Control of Heavy Loads
NUREG-0612

TER Section 2.3.2

Based on the evaluation of Safe Shutdown and Decay Heat Removal equipment, it was determined that the following approach would satisfy the intent of NUREG-0612.

The operation of the polar crane is required during full or reduced power and during hot shut down for certain maintenance activities. These activities are as follows:

* Perform Preventative Maintenance (PM) tests on the polar crane

* Remove/Lift the Pressurizer Enclosure Hatch to facilitate inspections inside the Pressurizer cavity

These two activities result in two load drop scenarios which were not previously addressed in earlier submittals covering the Reactor Building. The two additional load drops are:

* Drop of the polar crane block and cable onto the operating floor or onto the CRDM missile shields

* Drop of a Pressurizer Enclosure Hatch onto the operating floor

Both of these activities have a station maintenance procedure which controls the use of the polar crane for that activity. Also, while operating the polar crane in these conditions, the station must abide by the "Upper Containment Heavy Load Path Book" (reference CNM-1125.01-0144-001). Thus, the operation of the polar crane for these activities fully complies with NUREG-0612.

The three previous drop scenarios which were addressed in earlier submittals are summarized as follows:

1) Dropping of the reactor vessel head onto the vessel flange.

2) Oblique drop of the reactor vessel head onto the upper internals.

   These two analyses were performed by Westinghouse and were documented in WCAP-9198, which concluded that the integrity of the fuel cladding, vessel, and vessel nozzles is maintained.

3) Reactor vessel head drop onto the operating floor.

This analysis was performed by Duke Power, Des... Engineering Department with the conclusion that the reactor vessel head does not penetrate the operating floor and, structural stability and functional requirements are maintained.

The two new drop analyses were performed by Duke Power, Design Engineering Department and are summarized as follows: (Note that the reactor vessel drop was for a much higher load than the two new drops, however, the new analyses are for drops from much greater heights)

1) Polar crane block and cable drop onto the operating floor or onto the CRDM missile shields:

   Initial Conditions/Assumptions:

   a. Weight of heavy load: 6000 lbs. ; main block and cable-this includes hook

   b. Impact area of load: 292.5 sq. in.

   c. Drop height: 62.5625 ft. highest main hook elevation to operating floor elevation

   d. Drop location/target: operating floor or CRDM missile shield

   e. Credit for the action of impact limiters: None

   f. Thickness of target: oper. floor: 2 feet - 6 inches, Missile shield: 3 feet

   g. Drag forces: None assumed

   h. Load combinations: Impact load plus dead load plus seismic load (In accordance with CNS FSAR Sect. 3.8)

   i. Material properties: Oper. floor: Main reinforcing: No. 11 bars, grade 60, Cocrete: f'c = 5000psi CRDM missile shield: Main reinforcing: No. 11 bars, grade 60, Concrete: f'c = 5000psi

   Method of Analysis:

   The impact load, slab/shield ductility, and penetrations were determined based on methods described in Chapter 6 of ASCE manual no. 58, "Structural Analysis and Design of Nuclear Plant Facilities" and, Williamson and Alvy, "Impact Effect of Fragments Striking Structural Elements". The impact load was combined with other appropriate load cases and resultant shears and moments were calculated treating the slab or shield as a fixed beam of certain width.

Conclusion:

The postulated polar crane block and cable drop does not penetrate the operating floor nor the CRDM missile shields and, the structural stability and functional requirements are maintained.

2) Pressurizer enclosure hatch drop onto the operating floor:

Initial Conditions/Assumptions:

a. Weight of heavy load: 2810 lbs. ; largest pzr. hatch

b. Impact area of load: 1681 sq. in.

c. Drop height: 44.17 ft. - 6 feet above pzr. enclosure roof to operating floor elevation

d. Drop location/target: operating floor

e. Credit for the action of impact limiters: None

f. Thickness of target: oper. floor: 2 feet - 6 inches,

g. Drag forces: None assumed

h. Load combinations: Impact load plus dead load plus seismic load (In accordance with CNS FSAR Sect. 3.8)

i. Material properties: Oper. floor: Main reinforcing: No. 11 bars, grade 60, Concrete: f'c = 5000psi

Method of Analysis:

The impact load, slab ductility, and penetration were determined based on methods described in Chapter 6 of ASCE manual no. 58, "Structural Analysis and Design of Nuclear Plant Facilities" and, Williamson and Alvy, "Impact Effect of Fragments Striking Structural Elements". The impact load was combined with other appropriate load cases and resultant shears and moments were calculated treating the slab as a fixed beam of certain width.

Conclusion:

The postulated pressurizer enclosure hatch drop does not penetrate the operating floor and, the structural stability and functional requirements are maintained.

Also, an analysis was performed by Duke Power, Design Engineering to verify the adequacy of the polar crane bridge seismic restraints and the polar crane trolley stops for seismic movements and loads with the trolley being capable of movement along the bridge rails. This was done because the original seismic report from Whiting Corp. analyzed the polar crane with the trolley locked in place at one end of the bridge beams. The results of this analysis found the bridge restraints and the trolley stops to be acceptable for seismic loadings.