

DUKE POWER COMPANY

P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

85 FEB 6 A 8:03

January 29, 1985

Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Subject: McGuire Nuclear Station
Catawba Nuclear Station
Docket Nos. 50-369, -370, -413, and -414
NRC/OIE Bulletin 84-03, Supplemental Response

Dear Mr. O'Reilly:

Duke provided an initial response to IE Bulletin 84-03 in a letter dated November 21, 1984. Additional information was provided in a letter dated January 18, 1985. On January 9, 1985, a telephone conference call was held between Duke and NRC staffs. NRC expressed concern for the adverse effect of a dropped assembly on the Pressray seal and requested that Duke evaluate this or protect the seal.

Duke has evaluated the potential for a dropped fuel assembly to damage the cavity seal and determined that no hardware changes are required. The bases for this is three fold. First, the fuel handling mechanism is designed to prevent inadvertent release of an assembly. It is single failure-proof and it is highly unlikely that an inadvertent release will occur. Second, the period of time an assembly is over the cavity seal is very small. Thus, the exposure of the seal to an inadvertently released assembly is very small. The combination of these two provides an extremely low likelihood that an assembly would ever be dropped on the cavity seal. Finally, even if an assembly were dropped on the seal, recent Duke test data shows that the seal would remain in tact.

A summary of the testing is provided in the attached.

There are additional considerations regarding the potential hardware modification which make it undesirable. Additional personnel radiation exposure of some magnitude would be needed to install and remove the hardware at each outage. It would be a personnel hazard to those working in the area, and it is another heavy load that could cause damage to fuel or equipment if dropped. These considerations, in addition to the analysis described earlier form the bases of the Duke decision to make no hardware changes to the reactor vessel cavity seal design.

If there are any questions, please advise.

Very truly yours,

H.B. Tucker
Hal B. Tucker

HBT/mjf

Attachment

8503010241 850129
PDR ADCK 05000369
G PDR

IE-11
1/1

Mr. James P. O'Reilly, Regional Administrator
January 29, 1985
Page -2-

cc: Mr. R. C. DeYoung, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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

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

P. K. VanDoorn
NRC Resident Inspector
Catawba Nuclear Station

DUKE POWER COMPANY
McGuire Nuclear Station
Catawba Nuclear Station

Supplemental Response to IE Bulletin 84-03

A series of four tests were conducted to establish the consequences of a postulated drop of a fuel assembly on the reactor vessel cavity seal. The tests and test results are outlined below:

Assumed conditions of operation at time of accident.

- 1) The cavity seal is in place and inflated to 35 psi air pressure. (normal operating conditions)
- 2) Annulus opening is 2 1/4" wide with a differential elevation of 1/4". (Upper bound condition taken from field survey of the area in question)
- 3) The seal is covered by a 24' head of water. (normal operating conditions)
- 4) The fuel assembly in transient is inside the refueling mast, and raised 19 1/2" above the vessel flange. (normal condition, fuel is not handled outside the refueling mast)
- 5) The fuel assembly in transient weighs 1600 lbs. (max. assembly weight in air, fuel plus control rods)
- 6) Fuel is dropped and free falls until impact with the seal.

Testing Setup:

The testing fixture head used for the cavity seal pressure tests was used to represent the annulus opening in these tests. The head was set up with a 2 1/4" width and a 1/4" difference in relative elevation. The seal test specimens were seals no. 2 and 5 from the pressure testing tests. The fuel assembly was represented by a 1600 lb weight. The assembly end fixture, through which any impact must occur, was machined to the exact dimensions of those in service at McGuire and those that will be in service at Catawba. All loads were applied through the 1 3/8" x 1 3/8" legs on the end fixture mockup.

Tests:

Test No. 1:

Test number 1 used seal specimen number 2 in an inflated condition. Impact was through two of the four legs on the end fixture model. The drop height was 19 1/2".

The seal showed scuffing of the upper surface under each end fixture leg. Two small cuts approximately 1" long and 1/2" deep were made under each impact area along the seal solid rubber wedge section. The seal showed no permanent set in either the head or wedge areas. The seal remained inflated and was not displaced further in the annulus opening.

Test No. 2:

Test number 2 was identical to test number 1 except impact area was through one leg. The seal showed only scuffing of the upper surface under the end fixture leg. The seal was not cut and did not deflate. No permanent set was imparted to the seal head or wedge. The seal was not displaced further into the annulus.

Test No. 3:

Test number 3 was identified to test number 1 except seal number 5 was used, uninflated. The impact seated the seal into the opening approximately 1". The seal showed scuffing of the upper head under each end fixture leg and two small cuts approximately 1" long and 1/2" deep along the seal wedge under each loading point. The seal showed no permanent set in either the head or the wedge areas. The seal did not push through the annulus opening.

Test No. 4:

Test number 4 was identical to test number 2 except seal number 5 was used in the uninflated condition. The impact seated the seal into the opening approximately 3/4". The seal showed only scuffing of the upper surface under the impacting leg. No cutting of the seal was experienced. No permanent set was imparted to the seal head or wedge and the seal did not push through the annulus.