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April 25, 1988

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

Subject: McGuire Nuclear Station
Docket Numbers 50-369 and 50-370
NUREG 0737, Item II.F.1
Reply to Request for Additional Information

Gentlemen:

By letter dated September 8, 1987, Duke submitted a request for an exception to one of four criterion regarding the sampling requirements of NUREG 0737, Item II.F.1. The exception involved the design basis shielding envelope for Table II.F.1-2, sampling and analysis or measurement of High Range Radioactive and Particulate Effluents in Gaseous Effluent Streams.

By letter dated March 1988, NRC staff requested additional information to complete review of this exception. Attached find additional information that was requested.

Should there be any further questions regarding this subject, please contact S.E. LeRoy at (704) 373-6233.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

SEL/265/jsr

Attachment

xc: Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
101 Marietta St., NW, Suite 2900
Atlanta, Georgia 30323

Mr. Darl Hood
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Office of Nuclear Reactor Regulation
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Mr. W. T. Orders
NRC Senior Resident Inspector
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DUKE POWER COMPANY
McGUIRE NUCLEAR STATION
REPLY TO REQUEST FOR ADDITIONAL INFORMATION REGARDING
NUREG 0737, ITEM II.F.1
DATED MARCH 1988

A. State the basis for the value of 0.033 microcuries per cc, or provide a specific reference containing the basis. Is the value of 0.033 based on a TID-14844 source term and the assumption of major containment failure.

The basis for 0.033 microcuries per cc on the unit vent sample is from DBA effluent analysis. Major assumptions associated with this calculation are:

1. TID 14844 and Regulatory Guide 1.4 source terms are assumed to be released in the DBA; i.e., 100% noble gases, 50% iodines, and 1% remaining fission products released from the core;

2. Instantaneous release with LOCA; i.e., no delay time;

3. Design Basis containment leak rate 0.3 v/o per day;

4. Annulus filter credit of 0.95 or DF=20;

5. Iodine concentrations include that due to bypass (unfiltered) fraction even though that activity may not be released due to #6 below;

6. No auxiliary building dilution is assumed to achieve maximum unit vent concentrations;

7. Maximum concentration (0.35 microcuries per cc) occurs 77 seconds post-LOCA due to the assumption that no annulus ventilation filtration occurs during fan startup and time to achieve negative pressure and no credit is taken for ice condenser credit for 0-600 seconds. This maximum concentration occurs for only 45 seconds and has been included in the calculation to obtain maximum sample activity; and

8. A sample flow rate of 0.8 CFM, 30 minute sample time results in an activity buildup on sample cartridge of 0.224 curies.

B. If the response to (a) is no, please provide an analysis of concentrations of radioiodines and particulates in the unit vent that is based on TID-14844 source term. Also, please provide an estimate of the concentrations and total activity of radionuclides deposited on the sample media. This analysis should include major core damage and major containment failure. Also discuss the impact of loss of offsite power on the blowers used to exhaust the Auxiliary Building. Using the preceding assumptions, compare your estimated concentrations with the design basis shielding value of 100 microcuries per cc. Please provide the basis and references for all values used in the analysis.

Containment leakage is assumed in this analysis at the design basis leak rate. Containment leakage is tested per 10CFR50 requirements and results of these tests indicate leakage much less than leakage assumed in this calculation. Containment failure is not assumed in this calculation or in any Design Basis Event.

The annulus ventilation system fans are backed up by emergency power so that the system will continue to operate on loss of offsite power. The auxiliary building ventilation system is not assumed to operate in the DBA so that maximum concentrations in the unit vent can be obtained.

Additional analysis has been performed using core melt, mechanistic iodine and particulate transport. Concentrations in the unit vent are 30 to 100 times below those assumed in the DBA case. This is due to the assumed abundance of elemental iodine post-LOCA. The DBA case assumes 91% of the iodine is in the elemental (gaseous) state for the duration of the accident. Current analysis shows the predominant iodine species to be CsI, a soluble salt and thus readily removed from the containment atmosphere.

Sampling procedures should be written to replace the sample cartridge based on dose rate. Catawba is planning to use a portable radiation monitor with local alarm capability to indicate sample activity and to commence cartridge replacement. We support this procedure over one that replaces the cartridge based on time due to the varying nature of the unit vent concentrations.