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Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038

Nuclear Department

January 2, 1985

U. S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Division of Licensing  
Washington, DC 20555

Attention: Mr. Steven A. Varga, Chief  
Operating Reactors Branch, No. 1

Gentlemen:

CONTAINMENT HIGH-RANGE RADIATION MONITORS  
TMI ITEM II.F.1-3  
SALEM GENERATING STATION  
UNIT NOS. 1 AND 2  
DOCKET NOS. 50-272 AND 50-311

During a recent inspection by NRC Region 1, a concern was raised about the location of the R44B containment high-range radiation monitors. To resolve this concern, we are providing a technical justification for the location of these monitors for review by the Radiological Assessment Branch.

Should you have any questions, please contact us.

Sincerely,

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Manager - Nuclear  
Licensing and Regulation

Attachment (all)

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The Energy People

TECHNICAL JUSTIFICATION FOR POSITIONING OF  
CONTAINMENT HIGH RANGE RADIATION MONITORS  
AT SALEM STATION

In accordance with the requirements of NUREG-0737, Section II.7.1, containment high range radiation monitors were installed in Salem Unit 1 in April of 1982 and Salem Unit 2 in June of 1983. Redundant monitors were installed in similar positions in each unit. A recently completed NRC inspection of various NUREG-0737 items indicated that the positioning of one of the two detectors within containment did not view a relatively large portion of the containment. In response to this inquiry about the location of the Salem Nuclear Generating Station (SNGS) R-44B Containment High Range Radiation Monitors, it should be noted that these monitors are located immediately above the Containment Sump Pits in both units. Although the volume of air viewed by these monitors is relatively small compared to the approximately 1.6 million cubic feet viewed by the R-44A channels, the location of the "B" channels may in fact be more ideally suited to the early determination and evaluation of a LOCA.

The 1R44A (Unit 1) and 2R44A (Unit 2) monitors are mounted on the West wall of the Containment Building (approximately 270° azimuth) at the 130 foot elevation. These monitors are mounted in an unobstructed location so as to "view" a large portion of the Containment atmosphere as required by NUREG-0737. A detailed study of the response of this monitor was performed. Monte Carlo

techniques were utilized to account for photon scatter into the detector. The study indicated that the monitor could be used to provide accurate estimates of containment noble gas activity when appropriate assumptions of noble gas mix, decay time, and distribution of activity in Containment are considered.

The 1R44B and the 2R44B monitors are mounted on the North and South wall of Containment, respectively (approximately 0° and 180° azimuth), in the stairwell landing between the 78 and 100 foot elevations. This provides a wide physical separation of approximately 90° azimuth and 30 feet in elevation from the R44A monitors. The monitor's proximity and orientation to the Containment Sump allows this monitor to provide extremely useful information for accident analysis. The Containment Sump would be the primary collection point for reactor coolant during many LOCA scenarios and subsequent upscale readings of the R44B channels could provide the first indication that a LOCA had occurred. The magnitude of this increase can also be used to determine the relative degree of fuel damage and, paired with sump level indications, would provide a qualitative estimate of the severity of the accident.

Although somewhat dependent upon the break location, if reactor coolant is released to the sump the R44B channels could be the first radiological indicators that a LOCA did in fact occur. In the case of the TMI accident, the loss-of-coolant was through the pressurizer PORV to the Reactor Coolant Bleed Tank and through the rupture disk

to the Reactor Building Sump. A radiation monitor located in the same fashion as R-44B would have given early indications of the presence of reactor coolant in the sump and, teamed with acceptable level indication, could have been used to estimate the activity in the sump water and thus the amount of fuel damage.

Finally, it should be pointed out that, in addition to the water on the floor of the Containment, the sump pit is roughly 8' x 8' x 8' in size. This pit is located directly below the R-44B detector, providing a concentrated source of water for it to view, increasing its usefulness over other potential locations.

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