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The Northeast Utilities System

Docket No. 50-336
B17611

Re: RG 1.97

JAN 25 1999

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

Millstone Nuclear Power Station, Unit No. 2
Conformance to Regulatory Guide 1.97, Revision 2
De ation for Containment Area Radiation Variables

The purpose of this letter is to request NRC approval of a deviation from the Regulatory Guide (RG) 1.97, Revision 2, design criteria for the Containment Area Radiation variables for Millstone Unit No. 2. Although the instrumentation provided for Millstone Unit No. 2 meets all the essential design and qualification criteria for these variables, the accuracy requirement attributed specifically to these variables is not met over the full range of the instruments.

BACKGROUND

RG 1.97, Revision 2, recommends that Containment Area Radiation be monitored as both a Type C (Category 3) and a Type E (Category 1) variable. The Type C variable is intended to provide detection of breach and verification. The Type E variable (high range) provides for detection of significant releases, release assessment, long-term surveillance, and emergency plan actuation. A note to the RG 1.97 category designation for both of these variables specifies that the overall system accuracy should be a factor of 2 over the entire range.

Northeast Nuclear Energy Company (NNECO), has designated the two Containment Area Radiation variables as variable numbers C-07 and E-01 for Millstone Unit No. 2. The indication for both variables is provided by redundant Category 1 instruments, the Containment High Range Radiation Monitors (HRRM). The HRRMs were supplied by General Atomic (now Sorrento Corporation), and issues regarding accuracies associated with these monitors have been raised by the industry and the NRC on several occasions. The inherent accuracy of the HRRMs is subject to changes due to installation factors, the most influential of which are post-accident temperature effects

on detector cable. NNECO has conservatively assessed the overall accuracy of HRRM indication including the effects of post-accident temperature on the detector cable, and has determined that an overall system accuracy of a factor of 2 is not met at low containment radiation levels under all postulated conditions.

DISCUSSION

The Millstone Unit No. 2 HRRMs (RM-8240 & RM-8241) do not meet a factor of 2 system accuracy over the full range of the instruments (10^0 R/hr to 10^8 R/hr). This is due primarily to the effects of the "keep-alive" source which by design provides a constant bias approximately equal to 1 R/hr additive to the actual area radiation, and post-accident temperature induced detector cable insulation resistance losses. Because of these errors, a factor of 2 accuracy is not technically achievable at the low end of the indicated range.

The principal post-accident function of the Containment Area Radiation monitors is to assist the operator in making emergency assessment determinations. However, these determinations, as well as those concerning public protection based on containment radiation levels, occur at such high radiation levels that the potential accuracy biases would be insignificant and there would be no effect on the conclusions of these assessments.

A loop accuracy calculation based on methodology provided by Sorrento Corporation indicates that there is a small negative bias error due to thermal effects during Design Basis Accidents (DBA) in containment. This calculation, however, does not consider an inherent positive bias introduced by the monitor's "keep-alive" source. When the DBA error and the "keep-alive" bias are considered concurrently, NNECO has determined that the HRRMs will indicate within a factor of 2 for radiation levels greater than approximately 7.4 R/hr. NNECO has concluded that not meeting a factor of 2 accuracy in the lower (first) decade of indication will not significantly impact the operator's ability to detect a breach or verify abnormal containment radiation levels. Furthermore, with a factor of 2 accuracy in the second decade and above, NNECO considers the accuracy to be acceptable for high range monitoring considering that the Technical Specification alarm setpoint for the containment high radiation monitors is 100 R/hr and the Emergency Plant Implementing Procedure emergency action level is 4000 R/hr.

NNECO is aware that the NRC has determined that the high accuracy specified in Revision 2 of RG 1.97 for the containment high range monitors is unnecessary and should be reduced. This modified position is reflected in Revision 3 of RG 1.97,[1] where the overall system accuracy specification was deleted and accuracy was linked

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[1] Regulatory Guide 1.97, Revision 3, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," dated May 1983.

to detector dose rate response. The Millstone Unit No. 2 HRRM detectors have a dose rate response accuracy within a factor of 2 over a gamma radiation photon energy range of 60 keV to 3 MeV. However, since Millstone Unit No. 2 is committed to Revision 2 of the RG, a request for deviation is considered necessary.

SUMMARY

NNECO has evaluated the Millstone Unit No. 2 HRRMs with respect to RG 1.97 variables C-07 and E-01, Containment Area Radiation. As a result of this evaluation, it has been determined that although the HRRMs meet the general design and qualification criteria for Category 1 variables, the accuracy specification in Revision 2 of RG 1.97 is not met at low containment radiation levels. However, NNECO has concluded that this deviation is justified. NNECO requests that the NRC review and approve this exception to the guidance provided in RG 1.97 prior to startup from the current outage.

COMMITMENTS

There are no commitments contained within this letter.

Should you have any questions on the information provided herein, please contact Mr. R. G. Joshi at (860) 440-2080.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

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Recovery Officer - Technical Services

BY: _____
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