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Docket No. 50-336
50-245
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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Millstone Nuclear Power Station, Unit No. 2
Control Room Emergency Ventilation System

The purpose of this letter is to provide the NRC Staff with requested details of an operability determination (OD) performed for the Millstone Unit No. 2 Control Room Emergency Ventilation System (CREVS). Also included is information on our use of International Commission on Radiological Protection (ICRP) Publication 30, "Limits for Intakes of Radionuclides by Workers," for the thyroid dose conversion factors used in this determination and other information requested in a telephone conversation held between NNECO and the Staff on June 13, 1994.

Background

On June 2, 1994, during a design review of the Millstone Unit No. 2 Control Room Air Conditioning (CRAC) system, Northeast Nuclear Energy Company (NNECO) identified an error in the design of the Control Room Filtration subsystem of the CREVS. A plant design change was implemented that corrected this error. On June 7, 1994, continuing evaluation determined that the existing assumptions used in the dose calculations for the control room operators were inconsistent with the system design basis. Pending formal recalculation of these dose values, NNECO has performed an operability evaluation which concludes that the CREVS is operable. This OD has been the subject of a number of telephone conference calls between NNECO and the Staff, the most recent held on June 13, 1994. Based on these discussions, we understand that the Staff concurs with the approach taken regarding this operability determination. We believe the information contained within this letter is responsive to that requested of NNECO on June 13, 1994, and includes a description of our OD.

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This OD is an interim measure to justify operation until a review of proposed plant design and/or design basis changes can be accomplished in accordance with 10CFR50.59. We believe that this is an acceptable approach given that the CREVS will continue to perform its design function and in consideration of the duration of the remainder of the current operating cycle. In this regard, our actions are driven by safety and, we believe, are consistent with NRC regulations.

Operability Determination

During normal plant operation, the CRAC system is operated in the "normal" mode. In this mode, one CRAC supply fan and one CRAC exhaust fan are required to be in operation. Outside air is introduced into the system, at a rate of approximately 2000 cfm, through the outside air supply louvers. This outside air is supplied through two air dampers to the suction plenum of the CRAC system supply fans. In the "normal" mode, the Control Room Filtration subsystem is in standby status with the filter fans secured and the discharge dampers closed.

The CRAC "recirculation" mode will be automatically initiated by any one of the following conditions:

1. Auxiliary Exhaust Actuation Signal
2. Enclosure Building Filtration Actuation Signal
3. Intake Duct High Radiation Condition

An automatic initiation of the CREVS will shift the CRAC to the recirculation mode of operation in which outside air is not introduced into the system and the flow of air to the cable vault and the outside are isolated. One supply fan and one exhaust fan will remain in operation with approximately 15,000 cfm of air recirculating through the system and approximately 2500 cfm of the air flow passing through the Control Room Filtration subsystem. In the original system design, proper system function cannot be ensured for all emergency ventilation conditions without operator action to verify/modify system lineup. However, the existing control room habitability analysis does not identify or include an input assumption for operator action.

The current Design Basis Accident dose assumptions for the control room operators assume that the CREVS is fully operational 42 seconds after an initiating signal, and that the filtration units are processing control room air at a rate of 2500 cfm until the end of the accident (720 hours). An updated computer analysis was performed for the two most limiting accidents with the assumption of operator action within 10 minutes. These accidents are a Millstone Unit No. 2 loss of coolant accident (LOCA) and a Millstone Unit No. 1 main steam line break (MSLB).

These analyses indicated that, with no control room air filtration during the first 10 minutes and using thyroid dose conversion factors from ICRP Publication 30, thyroid doses will be less than the current Design Basis Accident thyroid doses as stated in the FSAR.

A revised radiological assessment of Millstone Unit No. 2 control room habitability following a Millstone Unit No. 1 MSLB was performed with the following changes in assumptions from the previous calculation:

- The control room operators will not use self-contained Scott Air Pack breathing apparatus following a MSLB at Millstone Unit No. 1.
- No credit is taken for purging the control room.
- An initiation time of 10 minutes is assumed for operator initiation of the recirculation fans in lieu of the assumed 42 seconds.
- Millstone Unit No. 1 reactor coolant dose equivalent iodine (DEQ I-131) activity level is assumed to be 0.02 μCi/gm.
- The mass of steam released is assumed to be 3.86×10^7 grams, which is approximately double the amount assumed in the previous calculation.
- The volume of the control room is 66,000 ft^3, versus the previously assumed volume of 77,000 ft^3.

Using these assumptions, the calculated thyroid dose to the Millstone Unit No. 2 operators is approximately 17 rem. This is bounded by the docketed calculated dose of 26.2 rem. Therefore, as long as the Millstone Unit No. 1 reactor coolant specific activity remains less than 0.02 μCi/gm (DEQ I-131), the Millstone Unit No. 2 control room habitability system meets its design function without the need for Scott Air Packs and control room purging. Administrative controls are in place to ensure that should the Millstone Unit No. 1 RCS activity reach 0.02 μCi/gm DEQ I-131, the CREVS will be shifted to the recirculation mode of operation and Millstone Unit No. 2 will commence an orderly shutdown to cold shutdown conditions. The current limit required by the Millstone Unit No. 1 technical specification is 0.2 μCi/gm DEQ I-131. NNECO will submit a license amendment request to reduce this limit to 0.02 μCi/gm DEQ I-131 later this summer.

To ensure that the CRAC system will be shifted to a recirculation/filtration mode of operation within 10 minutes

following a postulated accident, a dedicated operator will be stationed in the control room. The sole function of the operator is to ensure that the CRAC system is in a recirculation/ filtration mode within 10 minutes of any event which requires initiation of the CREVS. The dedicated operator will be assigned no other duties concurrent with the dedicated operator role. The use of a dedicated operator is an interim measure until Emergency Operating Procedure changes can be implemented.

Operation of the control room ventilation supply and exhaust fans were reviewed with respect to fan operation, supply fan air flow indication, and required operator action, should the fans fail to operate properly. The control room supply fans do not have an air flow indication on a control room control board. As such, the potential exists for a failure of a fan belt to occur without an annunciator or panel indication of a change in control room ventilation air flow. The loss of either a supply fan or exhaust fan would cause a change in the control room background noise level and comfort level. Therefore, the failure of either fan would be easily recognized and the dedicated operator would be able to address this condition and take action to restore proper fan operation. The time required to effect this restoration is included within the 10 minute operating window assumed as part of the design basis analysis for control room habitability.

Based on the revised control room habitability analysis and the use of a dedicated operator to ensure proper system lineup, we conclude that the CREV System is operable.

ICRP Publication 30

A key element in this operability determination is the use of thyroid conversion factors contained in ICRP Publication 30. The original Millstone Unit No. 2 dose calculations were performed using more conservative values from an earlier version of this standard, as referenced in Regulatory Guide 1.109, Revision 1. NNECO believes that use of the later version of this publication is appropriate, and notes that the Staff has previously accepted its use by NNECO for Millstone Unit No. 3. On December 8, 1993[1], the Staff issued an amendment to the Facility Operating License for Millstone Unit No. 3 which changed the Technical Specifications for the supplementary leak collection and release system. The accident and dose consequence calculations performed by NNECO to support this change utilized ICRP Publication 30 for thyroid conversion factors. The Staff reviewed NNECO's dose

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(1) V. L. Rooney letter to J. F. Opeka, "Issuance of Amendment (TAC No. M87216)," dated December 8, 1993.

calculation parameters and determined that they were reasonable and appropriate.

Potential Design/Design Basis Changes

NNECO has under consideration a wide range of options to resolve the CREVS issue for the longer term. This is due, at least in part, to the large number of parameters involved in the control room habitability calculations. Among the potential design changes, potential design basis changes, or some combination thereof, are the following examples:

- Reinstate the requirement for Scott Air Packs.
- Perform damper adjustments that may significantly reduce the initial source term.
- Quantify and recredit the control room purge.
- Separate the emergency filtration function from the CRAC system.

The impact of each of these potential changes will be evaluated. Once the appropriate changes have been selected, they will be incorporated into the design basis of Millstone Unit No. 2. With respect to the schedule, this will be done by the completion of the next refueling outage. We will keep you informed as we make progress toward that end.

Conclusion

The use of ICRP Publication 30, with respect to the Millstone Unit No. 2 CREVS analysis, yields thyroid doses that are bounded by the current Design Basis Accident thyroid doses as stated in the FSAR. This analysis includes a 10 minute allowance for operator action to establish the proper CREVS recirculation flow, and serves to demonstrate operability of the system. This approach has been discussed with the NRC Staff in several conference calls, and it is our understanding that the Staff concurs with the utilization of ICRP Publication 30 for this analysis. We also understand that this concurrence is based, in part, on the review conducted in support of a license amendment issued to Millstone Unit 3.

Should you have any further questions on this issue, please contact R. S. Peterson at (203) 665-3776.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
Executive Vice President

cc: T. T. Martin, Region I Administrator
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