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April 13, 1984

Docket No. 50-336
B11098

Director of Nuclear Reactor Regulation
Attn: Mr. James R. Miller, Chief
Operating Reactors Branch #3
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Steam Generator Tube Rupture Reassessment
Summary of Radiological Results

On December 12, 1983(1) Northeast Nuclear Energy Company (NNECO) provided the Staff with a reevaluation of the Millstone Unit No. 2 Steam Generator Tube Rupture (SGTR) Event. This reevaluation assessed the impact of an increased core flow rate and altered core loading pattern for Cycle 6 operation. Additionally, NNECO performed a reanalysis of the SGTR event to estimate the radiological impact of information received from Dresser Industries regarding steam generator safety valve performance characteristics.

At the time of the Reference (1) submittal, NNECO committed to document a summary of the radiological results of the SGTR reanalysis following startup from Cycle 6 operation. In fulfillment of this commitment, NNECO hereby presents to the staff a summary of results of the radiological consequences of this event. Table 1 provides the doses for all analyzed cases.

In computing the off-site radiological consequences of the SGTR event at Millstone Unit No. 2 all assumptions and input other than the revised RETRAN-02 MODO2 data are the same as that specified in Attachment 2 of our April 13, 1983(2) submittal.

In order to determine the impact of the safety valve performance information, 3 cases were modeled. NNECO refers the Staff to Reference (1) for a detailed discussion of assumptions and methodology used in determining the thermal-hydraulic results. Case 4B investigated the impact of modeling the safety valves as designed (closing at a pressure 5 percent below the opening pressure), resulting in an increase in steam releases to the environment 32 percent greater than the results reported in Reference (2). Based on this information the two hour Exclusion Area Boundary (EAB) thyroid dose was calculated to be 0.31 Rem.

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(1) W. G. Counsil letter to J. R. Miller dated December 12, 1983.
(2) W. G. Counsil letter to R. A. Clark, dated April 13, 1984.

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Case 5B, the most conservative case, modeled the impact of the safety valves closing at a pressure 12 percent below the opening pressure. In this case, as well as Case 4B and Case 3 of Reference 2, the operator was assumed not to trip the reactor coolant pumps even though emergency operating procedures require him to do so when pressurizer pressure decreases below 1600 psia. This assumption was made because a sensitivity study reported in Reference (2) found this conservative. Results of the Case 5B analysis indicated increased steam releases of 229 percent above the results reported in Reference (2). Radiological computations revealed an EAB thyroid dose of 0.74 Rem. As expected, the maximum thyroid dose increased by approximately a factor of a 3 over the reported results for Cycle 6 operation but remained a small fraction of 10CFR Part 100 limits.

Additionally, Reference (1) reported that Case 5C was run for the purpose of determining if "not tripping the reactor coolant pumps when the safety valves are open for longer times" remains a valid conservative assumption. Steam releases for this case were predicted to be 53 percent lower than when the pumps were not tripped (Case 5B). Radiological consequences for this case resulted in an EAB thyroid dose of 0.36 Rem.

In summary, Case 5B, as reported in Reference (1), is the most conservative case. The off-site dose predicted for Case 5B was 0.74 Rem. Although this is an increase over Case 3 of Reference (2) which was docketed in support of Cycle 6 operation, this value remains well within the limits of 10CFR100.

NNECO notes that with the summary provided herein, the second of two Reference (1) commitments has been completed. The first commitment to provide QA verification of the SGTR event was documented in our letter dated January 17, 1984[3]. As per our commitment this verification was completed prior to startup for Cycle 6 operation.

We trust you will find the information contained herein satisfactory.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

W. G. Counsil
Senior Vice President

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[3] W. G. Counsil letter to J. R. Miller, dated January 17, 1984.

Table 1

Millstone Unit No. 2 SGTR Analysis Off-Site Doses
(Total Dose)

Doses (Rems)

Case	Thyroid Dose		Whole Body Dose	
	EAB	LPZ	EAB	LPZ
4BX	6.042E-2	6.995E-3	8.062E-2	2.626E-2
4BY	9.916E-3	1.044E-3	8.062E-2	2.626E-2
4BZ	3.100E-1	3.253E-2	8.062E-2	2.626E-2
5BX	1.448E-1	1.565E-2	8.340E-2	2.624E-2
5BY	1.924E-2	1.995E-3	8.340E-2	2.624E-2
5BZ	7.387E-1	7.650E-2	8.340E-2	2.624E-2
5CX	7.082E-2	8.053E-3	8.823E-2	2.859E-2
5CY	9.493E-3	9.955E-4	8.823E-2	2.859E-2
5CZ	3.634E-1	3.800E-2	8.823E-2	2.859E-2

Note: X, Y and Z correspond to the following radiological conditions:

X - Equilibrium dose equivalent Iodine-131 concentration of 1 uCi/gm in the primary coolant system initially with an iodine spike induced by the SGTR transient increasing the iodine release rate by a factor of 500.

Y - Equilibrium dose equivalent Iodine-131 concentration of 1 uCi/gm in the primary coolant system with no iodine spike at anytime during the transient.

Z - Non-equilibrium elevated iodine concentration in the primary coolant system raises the dose equivalent Iodine-131 concentration prior to the accident to 60 uCi/gm. No post accident spike is assumed.