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The Northeast Utilities System JAN 2 9 1998

> Docket No. 50-336 B16745

> > Re: RG 1.97

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 Adequacy of Existing RCS Pressure Instrumentation for ATWS

The purpose of this letter is to inform the NRC of the results of our evaluation of Millstone Nuclear Power Station, Unit No. 2, Reactor Coolant System (RCS) pressure instrumentation with regard to an anticipated transient without scram (ATWS). This issue was identified as a Regulatory Guide (RG) 1.97 discrepancy in a letter dated April 9, 1997.<sup>(1)</sup>

RG 1.97, Rev. 2, recommends that redundant Category 1 RCS pressure indication be provided with a range of 0-4000 psig for Combustion Engineering plants such as Millstone Unit No. 2. Existing RCS pressure instrumentation provides redundant Category 1 indication with a monitored range of 0-2500 psig and non-redundant non-Category 1 indication with a monitored range of 0-3000 psig. In a letter dated August 7, 1986,<sup>(2)</sup> Northeast Nuclear Energy Company (NNECO) provided the basis for deviations from the recommendations of RG 1.97 for the RCS Pressure variables for design basis accidents (excluding ATWS). NNECO further stated that the necessity to upgrade the capability to monitor RCS pressure due to an ATWS event would be evaluated as part of the process to implement the requirements of the ATWS rule. On

<sup>(1)</sup> M. L. Bowling to U. S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2 - Regulatory Guide 1.97 Deviations," dated April 9, 1997.

J. F. Opeka to U. S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2 - Supplement 1 to NUREG-0737, Revision 2 to Regulatory Guide 1.97," dated August 7, 1986. A002/1

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February 5, 1991,<sup>(3)</sup> the Staff transmitted a Safety Evaluation which found the present RCS pressure instrumentation acceptable for design basis events excluding ATWS.

NNECO has completed the evaluation of the adequacy of the existing RCS pressure instrumentation for ATWS requirements. NNECO has concluded that the instrumentation presently credited for the RG 1.97 RCS Pressure variable is acceptable for ATWS events for Millstone Unit No. 2. Attachment (1) to this letter provides details of this determination.

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

Martin L. Bowling, Jr.

Martin L. Bowling, Jr. Millstone Unit No. 2 Recovery Officer

Attachments (1)

cc: W. D. Travers, PhD., Director, Special Projects Office H. J. Miller, Region I Administrator

D. P. Beaulieu, Senior Resident Inspector, Millstone Unit No. 2

D. G. McDonald, Jr., NRC Senior Project Manager, Millstone Unit No. 2

P. F. McKee, Deputy Director of Licensing, Special Projects Office

W. D. Lanning, Deputy Director of Inspections, Special Projects Office

<sup>&</sup>lt;sup>(3)</sup> G. S. Vissing (USNRC) to E. J. Mroczka, "Emergency Response Capability -Conformance to Open Issues Regarding Regulatory Guide 1.97, Revision 2 (TAC No. 75776)," dated February 5, 1991.

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Attachment 1

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Millstone Nuclear Power Station, Unit No. 2 Conformance to Regulatory Guide 1.97, Revision 2 RCS Pressure Instrumentation for an ATWS

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January 1998

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### 1.0 PURPOSE

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This evaluation provides justification for the use of the existing Reactor Coolant System (RCS) pressure indication credited for RG 1.97 to monitor Millstone Unit No. 2 ATWS events.

### 2.0 BACKGROUND

Several instrument loops are presently credited for the RG 1.97 RCS Pressure variable for Millstone Unit No. 2. This instrumentation consists of redundant Category 1 instrument loops monitoring a range of 0 to 1600 psig, redundant Category 1 instrument loops monitoring a range of 1500 to 2500 psig, and one non-redundant non-Category 1 instrument loop with a range of 0 to 3000 psig. The adequacy of this instrumentation has previously been evaluated for design basis accidents, excluding ATWS events.

In a letter dated August 7, 1986 (Reference 6.1), NNECO stated that:

"Regulatory Guide 1.97 presently recommends that redundant pressure indication be provided with a range of 0-4000 psig for Combustion Engineering plants such as Millstone Unit No. 2. Existing pressure instrumentation at Millstone Unit No. 2 provides redundant Category 1 indication between 0-2500 psig and a single non-Category 1 indication with a range of 0-3000 psig. For some design basis accidents RCS peak pressure approaches 2600 psig. The primary safety valves have a nominal set pressure of 2500 psig which limits these pressure excursions to relatively short duration transients. Following the initial pressure increase, the primary safety valves will limit RCS pressure to 2500 psig for all design basis accidents.

Based on the above discussion, it is concluded that the present redundant pressure channels which provide indication to 2500 psig are adequate for long term post-accident monitoring for all design basis accidents. Although the 0-3000 psig indication is not redundant, it provides adequate range to monitor and/or record the entire pressure transient for design basis accidents (excluding ATWS). Since the

> pressure transients above 2500 psig are short, it is not considered necessary to provide redundant Category 1 pressure indication above 2500 psig at this time. The necessity to upgrade the capability to monitor RCS pressure due to an ATWS event will be evaluated as part of our process to implement the requirements of the ATWS rule."

On February 5, 1991, the NRC issued a Safety Evaluation (Reference 6.2) which found the instrumentation provided for the RCS Pressure variable acceptable for all expected pressures based on NNECO's design basis event analysis. The associated Technical Evaluation Report stated that:

"Regulatory Guide 1.97 recommends Category 1 instrumentation with a range from z aro to 4000 psig for this Combustion Engineering Unit. The licensee has supplied instrumer tation for this unit as follows:

- Redundant, Category 1, zero to 1600 psig charinels
- Redundant, Category 1, 1500 to 2500 psig channels
- One zero to 3000 psig channel that is not Category 1

The redundant ranges overlap to provide redundancy from zero to 2500 psig. The licensee states that the upper range of 3000 psig is adequate for all design basis events. The primary safety relief valves limit the RCS pressure to 2500 psig following the initial pressure increase. The licensee states that any pressure excursions above 2500 psig would be short.

The pressure range of zero to 3000 psig is adequate to monitor all expected pressures based on the licensee's design basis event analysis. The licensee commits (Reference 7) to upgrade these instrument channels under the resolution of the anticipated transient without scram (ATWS) issue. We find this commitment acceptable."

It was concluded by the NRC that NNECO had committed to <u>upgrade</u> RCS monitoring under the resolution of the ATWS issue rather than to <u>evaluate</u> the need to upgrade RCS pressure indication for monitoring an ATWS event as discussed in NNECO's letter dated August 7, 1986.

#### 3.0 DISCUSSION

RG 1.97, Rev. 2, recommends that redundant RCS pressure indication be provided with a range of 0-4000 psig for Combustion Engineering plants such as Millstone Unit No. 2. However, with respect to this recommended range the RG notes that the maximum value for RCS pressure indication may be revised upward to satisfy ATWS requirements. The adequacy of the existing

instrumentation and the need to revise the maximum value for RCS pressure indication to satisfy ATWS requirements has been evaluated. NNECO has implemented the requirements of the ATWS Rule (10 CFR 50.62, "Requirements for reduction of risk from anticipated transients without scram [ATWS] events for light-water-cooled nuclear power plants"), and has determined that the previously credited pressurizer pressure instrumentation with a combined range of 0-3000 psig provides adequate indication to monitor the Millstone Unit No. 2 ATWS pressure transient.

An ATWS is an anticipated operational occurrence (such as loss of feedwater, loss of condenser vacuum, or loss of offsite power), which is accompanied by a failure of the reactor trip system (RTS) to shut down the reactor. The ATWS Rule delineates the requirements for the reduction of the likelihood of failure to shut down the reactor following anticipated transients and mitigating the consequences of an ATWS event.

The ATWS requirements for Millstone Unit No. 2 are:

- (1) The reactor must have equipment from sensor output to final actuation device that is diverse from the RTS, which will automatically initiate the auxiliary feedwater system and cause a turbine trip under conditions indicative of an ATWS. This equipment must be designed to perform its function in a reliable manner and be independent (from sensor output to the final actuation device) from the existing RTS.
- (2) The reactor must have a diverse scram system from output to interruption of power to the control rods. This scram system must be designed to perform its function in a reliable manner and be independent from the existing RTS (from sensor output to interruption of power to the control rods).

The Millstone Unit No. 2 Diverse Scram System (DSS) and ATWS Mitigating System Actuating Circuitry (AMSAC) fulfill the requirements of 10 CFR 50.62. The DSS is diverse and independent from the RTS and provides a redundant path of reactor trip. The AMSAC mitigates an ATWS event by initiating auxiliary feedwater.

The design criterion for Millstone Unit No. 2 ATWS system is Generic Letter 85-06, "Quality Assurance Guidance for ATWS Equipment that is not Safety-Related." Although the ATWS mitigation is not required to be safety-related per 10CFR50.62 and Generic Letter 85-06, the DSS/AMSAC is designed and procured as Class 1E in accordance with the NU Quality Assurance Program.

The DSS/AMSAC provides a backup to the RTS for initiating a reactor trip and auxiliary feedwater flow in the event of an anticipated transient without a reactor

> trip. It utilizes the 1500-2500 psig Category 1 instrument loops as an input for an initiation signal. An ATWS trip signal will be generated when a high pressurizer pressure signal exceeds 2400 psia on two of the four input channels. Since the ATWS trip setpoint is the same as the nominal Reactor Protective System trip setpoint, the peak RCS pressure would be comparable to the FSAR Chapter 14 accident analysis results where a range of 0-3000 psig is sufficient to monitor the pressure transient.

> The need for the operator to monitor RCS pressure for an ATWS event is minimal for two reasons:

- The operator actions for ATWS mitigation are initiated based on power level and control rod position, and
- 2) The ATWS event has a short duration maximum RCS pressure transient, the indication of which would be of no value to the operator.

Therefore, NNECO has determined that the existing instrumentation to assess RCS pressure during and following an ATWS event is adequate and appropriate on the following bases. The non-redundant non-Category 1 instrumentation with a range of 0-3000 psig is the indication credited for monitoring the ATWS peak pressure.

- With the implementation of DSS/AMSAC, the likelihood of an ATWS that would exceed 3000 psig is significantly reduced.
- If an ATWS were to occur with the additional failure of DSS/AMSAC, the RCS pressure excursion above 3000 psig would be short, on the order of one to two minutes, with the peak limited to 4220 psia (Reference 6.3).
- 3) All transmitters are capable of handling an overrange pressure of at least 4000 psi without experiencing any deformation or subsequent malfunction. The transmitter for the 0-3000 psig indication has a maximum overrange pressure of 9000 psi.
- 4) The ATWS environment is an anticipated operational occurrence environment, which means a normal containment environment and a mild control room environment. Environmental qualification of the non-Category 1 instrument loop is not required.
- The ATWS design criteria do not require redundancy of equipment.
- 6) The 0-3000 psig non-Category 1 instrument loop does not provide any input to the ATWS trip system, and there are no Millstone Unit No. 2 Emergency

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Operating Procedures that identify this instrumentation as providing information for operator action during or after an ATWS.

## 4.0 SAFETY SIGNIFICANCE

As stated in Reference 6.4, NNECO's design in DSS/AMSAC meets the ATWS Rule requirements on diverse Scram System, diverse Turbine Trip, and diverse Auxiliary Feedwater System. The NRC safety evaluation (Reference 6.5), concludes that the Millstone Unit No. 2 ATWS trip system meets all the requirements of 10 CFR 50.62. RCS pressure information during the short ATWS peak pressure transient is not needed by control room personnel. The capability to monitor wide range RCS pressure indication has no impact on ATWS mitigation or the Reactor Protective System.

### 5.0 CONCLUSION

With respect to RG 1.97, it is not necessary to upgrade the Millstone Unit No. 2 capability to monitor RCS pressure due to an ATWS event. Based on the evaluated ATWS event transient durations, there is no need to provide RCS pressure indication with a range above 3000 psig for ATWS monitoring. The presently credited pressurizer pressure instrumentation with a combined range of 0-3000 psig provides adequate indication to monitor the Millstone Unit No. 2 ATWS pressure transient.

## 6.0 REFERENCES

- 6.1 J. F. Opeka to Ashok C. Thadani (USNRC), "Millstone Nuclear Power Station, Unit No. 2 - Supplement 1 to NUREG-0737, Revision 2 to Regulatory Guide 1.97," dated August 7, 1986.
- 6.2 G. S. Vissing (USNRC) to E. J. Mroczka, "Emergency Response Capability - Conformance To Open Issues Regarding Regulatory Guide 1.97, Revision 2 (TAC No. 75776)," dated February 5, 1991.
- 6.3 Combustion Engineering Report CENPD-263-P, "ATWS Early Verification: Response to NRC Letter of February 15, 1979, for Combustion Engineering NSSS's," dated November 1979.
- 6.4 E. J. Mroczka to USNRC, "Millstone Nuclear Power Station, Unit No. 2 ATWS Modifications (TAC No. 59114)," dated June 27, 1988.

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6.5 D. H. Jaffe (USNRC) to E. J. Mroczka, "ATWS Rule, 10 CFR 50.62 (TAC No. 59114)," dated December 13, 1988.