NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Millstone Point Unit 2	0 5 0 0 0 3 3 6	1 OF 0 4

TITLE (4)
RCS RTD Response Time Problem

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 2	1 3	8 4	8 4	0 0 6	0 0	0 3	1 4	8 4	N/A	0 5 0 0 0
									N/A	0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 1 0 0	20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)	50.36(c)(2)	X 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Steve Brinkman, Plant Engineer	AREA CODE 2 0 3 — 4 4 7 - 1 7 9 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
B	J C	T I T	W 1 0 8	Y							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 6	3 0	8 5

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

With the unit operating at 100% reactor power, response time testing of the primary coolant loop RTD's ($T_h + T_c$) was initiated per surveillance procedure SP 2401Q as required by paragraph 4.3.1.1.4 of Technical Specifications. A total of sixteen (16) RTD's were tested, of which twelve (12) exceeded the Technical Specification limit of eight (8) seconds or less (Table 3.3-2 of Tech. Specs.). The unit operated in accordance with T.S.A.S 3.0.3 and was placed in Mode 2.

The baseline data accumulated during the testing was evaluated to determine the cause of the excessive response times. Several factors were determined to contribute to the large time constants for the RTD's. These factors included the time constant of the RTD element itself, the installation of the RTD in the thermowell (insufficient insertion depth), and a sensor-thermowell mismatch. A containment entry was made to correct the latter two causes for the excessive response times. Once these repairs had been effected, the response time of all but two (2) RTD's was acceptable. Both were removed from service per Plant Design Change Request #2-07-84. The unit was then returned to 100% reactor power.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Introduction:

During the Refuel outage of 1983, all Primary Coolant Loop RTD's were removed from their thermowells along with their connection heads. All thermowells were cleaned using gun cleaning brushes and then vacuumed to remove any particles in an effort to improve response time characteristics. The RTD's and connection heads were replaced with WEED Series 612 RTD's and connection heads to meet the requirements of 10CFR50-49 & IEB-79-01B, Environmental Qualification of Cat 1 Equipment. The unit was returned to service with the new RTD's on January 15, 1984.

On 2-9-84 Response Time Testing of the primary coolant loop RTD's (T_h + T_c) (JC-TIT) was initiated per surveillance procedure SP 2401Q in accordance with surveillance requirement 4.3.1.1.4. This surveillance procedure utilizes the Loop Current Step Response (LCSR) method for measuring RTD response time. The LCSR method involves heating the RTD element with an electric current to provide a temperature transient. The current is then removed and the response time required for the RTD to return to the external temperature is recorded.

Four (4) RTD's were tested and their responses analyzed to determine the element response time. This evaluation indicated that all four RTD's exceeded the Technical Specification limit of 8 seconds or less. Because the LCSR method utilizes computer analysis to determine sensor response time and the mathematical analysis is sensor type dependent, Analysis and Measurement Services (AMS) was requested to perform on-site testing of the RTD's.

AMS and the I&C Engineering Dept. continued response time testing throughout the weekend with the final "As Found" time response values being submitted on the morning of 2-13-84. Review of this data resulted in commencement of plant shutdown per Tech. Spec. 3.0.3 (to mode 2).

Discussion:

The baseline data accumulated during testing was evaluated by AMS and the I&C Dept. in an effort to determine the cause of excessive response times. Three factors were determined to contribute to large time constants for the installed RTD's. These are:

1. The time constant of the RTD element itself (i.e.; the time constant of the bare assembly).

2. The installation into the thermowell (insufficient insertion, etc.)

3. Sensor - Thermowell mismatch (at the tapered tip).

Upon CIMT entry and subsequent investigation of the RTD installation, the following was discovered:

1. Several of the subject RTD's were found to be improperly seated in the thermowell. The RTD element could be forced deeper into the well thus correcting the long time response characteristics. The added insertion depths ranged from 1/16" to 1/2".

   NOTE: The new WEED RTD's are spring loaded. The sensors were initially installed in the thermowell and tightened down until the element bottomed-out and began to work against the spring force. It should also be noted that the WEED RTD's were installed while the plant was shutdown and cold. As the primary system was brought up in temperature and the thermowell expanded, some movement of the sensing element could have occurred.

2. Several of the subject RTD's were found to have excessive amounts of side to side movement in the well resulting in a sensor to thermowell mismatch. The sensor to well contact at the tapered tip must be at least 40% surface area match in order to assure proper sensor response.

Corrective Action:

With the plant at approximately 10^{-4}% reactor power and the primary coolant temperature at 532°F, CIMT entry was made to correct the RTD problems. The initial attempt at repair involved forcing the elements into the well to assure correct position and metal to metal contact. As addressed previously this action was successful on several RTD's. The increased insertion depth and metal contact improved the response times considerably on four RTD's. Each RTD was again tested and the remaining unacceptable elements identified. The sensors were removed from the thermowell and the well cleaned using the WEED de-burring tool and gun cleaning brush. Several of the wells were found to contain small amounts of dried particles which were removed. The sensors were re-installed and tested again. This action did not result in improved sensor response times.

The RTD elements were again removed from the wells. Nuclear Grade Never-Seez Lubricant was applied to the tapered tip of the WEED RTD's to improve thermal coupling and the element re-installed. The application of Never-Seez lubricant to the sensing element greatly improved the response times for all subject RTD's except two. This method of coupling the element to the well has been previously used on MP-2 with similar success. The two RTD's which remained unacceptable were TE122CA and TE112CB. Both were removed from service per PDCR #2-07-84.

The slowest element response time for the RTD's in service is 5.3 seconds.

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Action to Prevent Recurrence:

1. I&C procedure IC 2417N was generated to provide guidance in the installation of reactor coolant temperature RTD's.

2. It is anticipated that the subject RTD's will be replaced in the future with new WEED sensing elements. This consideration is presently under engineering review.

Assessment of Potential Safety Consequences:

A slower RTD response time had the potential for affecting the Thermal Margin/Low Pressure trip (TM/LP) and the High Power (ΔT power) trip. However, the unit was operated at all times in accordance with T.S.A.S. 3.0.3.

Similar LER's: None

NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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March 14, 1984
MP-5872

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Reference: Facility Operating License No. DPR-65
Docket No. 50-336
Reportable Occurrence RO 50-336/84-006-0

Gentlemen:

This letter forwards the Licensee Event Report 84-006 required to be submitted within thirty days pursuant to paragraph 50.73 (a) (2) (i) (A) the completion of a plant shutdown required by Technical Specifications.

Yours truly,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: E. J. Mroczka
Station Superintendent
Millstone Nuclear Power Station

R. Herbert

BY: R. J. Herbert
Station Services Superintendent
Millstone Nuclear Power Station

EJM/SKB:mo

Attachment: LER RO 50-336/84-006-0

cc: Dr. T. E. Murley, Region I

IE-22
1/1