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FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-026-01:on 901226,discovered that temp elements used in containment atmosphere monitoring sys did not meet Reg Guide 1.89 criterion & seismic qualification not performed. Environ seals installed on temp elements.W/910628 ltr.

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	NRC PDR	1	1	NSIC MURPHY,G.A	1	1
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NIAGARA MOHAWK

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Joseph F. Firlit
Vice President
Nuclear Generation

NMP80521

June 28 , 1991

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

RE: Docket No. 50-410
LER 90-26, Supplement 1

Gentlemen:

In accordance with 10CFR50.73, we hereby submit the following Licensee Event Report:

LER 90-26 Supplement 1	Is being submitted in accordance with 10CFR50.73 (a)(2)(i)(B), "Any operation or condition prohibited by the plant's Technical Specifications".

This supplemental report is being issued to: (1) Report additional Equipment Qualification requirements which had not been satisfied for certain model Resistance Temperature Detectors; (2) Revise the Analysis of the Event; and (3) Provide additional corrective actions.

This report was completed in the format designated in NUREG-1022, Supplement 2, dated September 1985.

Very truly yours,

Joseph F. Firlit

Joseph F. Firlit
Vice President - Nuclear Generation

JFF/GB/lmc

ATTACHMENT

xc: Thomas T. Martin, Regional Administrator Region I
Wayne L. Schmidt, Sr. Resident Inspector

IE22 Cat No P8509670083

1/1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Nine Mile Point Unit 2 (NMP2)	0 5 0 0 0 4 1 0	1 OF 0 7

TITLE (4) Technical Specification Violation - Instrumentation Not Environmentally and Seismically Qualified due to Personnel Error

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)
									N/A	0 5 0 0 0
1 2	2 6	9 0	9 0	0 2 6	0 1	0 6	2 8	9 1	N/A	0 5 0 0 0

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
4	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	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
Mr. Greg Gresock, Manager Nuclear Technology	AREA CODE 3 1 5 4 2 8 - 7 1 6 1

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On December 26, 1990, it was found that temperature elements (TE's) used in the Containment Atmosphere Monitoring System (CMS) did not meet Environmental Qualification criterion stated in Regulatory Guide 1.89 and the alternate approach committed to in the Nine Mile Point Unit 2 (NMP2) Final Safety Analysis Report (FSAR). Additionally, it was later found that Seismic Qualification testing on certain model CMS temperature element subassemblies had not been performed in accordance with the NMP2 FSAR's Seismic Qualification criteria. 1

The root cause for this condition is personnel error due to poor work practices. The equipment supplier did not qualify the subject TE's in accordance with specification requirements, the purchaser (Architect/engineer [A/E] for the plant, Stone & Webster Engineering Corp.) did not recognize that the qualification test reports submitted by the supplier did not cover all of the devices purchased under the specification, and Niagara Mohawk oversight of the A/E activities did not identify these discrepancies.

Corrective actions taken were: To declare the instrumentation inoperable; to inspect and install environmental seals on all affected temperature elements, functionally test and return the instruments to service; and to conduct a review of all safety related temperature elements and other electrical equipment to verify similar conditions did not exist. Seismic qualification analyses were completed on unqualified TE's. 1

I. DESCRIPTION OF EVENT

On December 26, 1990, at 1050 hours, following a review of the Equipment Qualification Required Maintenance (EQRM) for temperature elements used in the Containment Atmosphere Monitoring System (CMS), it was found that the Environmental Qualification criterion stated in Regulatory Guide 1.89 and the alternate approach committed to in the Nine Mile Point Unit 2 (NMP2) Final Safety Analysis Report (FSAR) were not being met. NMP2 was in a refueling outage (mode switch in the "SHUTDOWN" position) at the time this condition was discovered. 1

The condition was discovered during a review of Primary Containment temperature instrumentation in preparation for a Containment Integrated Leak Rate Test. It was observed that Resistance Temperature Detector (RTD) terminal head enclosures were unsealed making them potentially subject to moisture intrusion degradation.

A subsequent Engineering evaluation concluded that RTD temperature elements manufactured by Pyco, Inc., (Model Number 122-4030-04-2.7-6) and installed in NMP2's CMS System were not environmentally qualified in accordance with Regulatory Guide 1.89 and the alternate approach committed to in the NMP2 Updated Safety Analysis Report (USAR). The condition described above has existed since prior to issuance of NMP2's Facility Operating License on October 31, 1986.

In March 1991, after reviewing Seismic Qualification test data submitted by Pyco, Inc., for supplied RTD's, it was determined that certain model RTD's (model No.'s affected: 122-4030-04-2.7-6 and 122-7039-314) had not been dynamically qualified prior to being shipped to the site for installation.

Specifically, the RTD dynamic qualification tests for model 122-4030-04-2.7-6 (performed by the vendor), involved testing of the units with thermal wells installed. Site application included mounting the RTD's without use of the thermal well. Without this well as a lateral support, the 6 inch element of the TE was questionable as to its ability to withstand seismic and hydrodynamic loads. This model included 18 Containment Atmosphere Monitoring System temperature elements located in the Primary Containment Drywell and Suppression Chamber. 1

Model 122-7039-314 resistance temperature detectors were not intended to be used with thermal wells. Except for its head assembly, the detector was not bounded by any qualified dynamic analysis or testing supplied to NMP2. These included 8 CMS temperature elements located in the Suppression Pool.

II. CAUSE OF EVENT

A root cause analysis was performed using Nuclear Division Procedure NDP-16.01, "Root Cause Evaluations". The root cause is personnel error due to poor work practices on the part of both the equipment supplier (PYCO), the equipment purchaser (Architect/ Engineer for the plant, Stone & Webster Engineering Corp.), and Niagara Mohawk. The purchase specification (NMP2-C041D) required the affected temperature elements be water tight and dynamically qualified, but did not require them to be mounted in thermowells. The installation specification (NMP2-E061A, "Electrical Installation") therefore did not include thermowells as required for the installed configuration. Contrary to these requirements, vendor correspondence and Environmental and Seismic/Hydrodynamic Qualification test reports required that the supplied model no. 122-4030-04-2.7-6 RTD's be mounted in thermowells. Additionally, RTD model 122-7039-314 were vendor Seismic Qualified for the units head assembly (probe assembly not included). The responsible engineers did not recognize these failures to comply with the specification. 1 1 1

III. ANALYSIS OF EVENT

This event is considered reportable in accordance with 10CFR50.73 (a)(2)(i)(B), "Any operation or condition prohibited by the plant's Technical Specifications".

NMP2 Technical Specification Definition No. 1.27 defines a component as having operability when it is capable of performing its specified function and when all necessary attendant instrumentation, controls, electrical power, cooling, etc., that are required for the system to perform its function are also capable of performing their related support function. The installation of Resistance Temperature Detectors (RTD's) that were not environmentally qualified for NMP2's specific application and installation constitute a condition that renders them and their associated Accident Monitoring Instrumentation channels inoperable. Therefore, the total number of operable channels was reduced to a non-conservative number less than the minimum number of operable channels as required by NMP2's Technical Specifications, section 3.3.7.5.

There is a total of forty-six (46) Containment Monitoring temperature elements (TEs) located at various locations throughout the Containment that measure temperature. Of the 46 TEs, twelve (12) monitor Drywell ambient air temperature, six (6) monitor Suppression Chamber ambient air temperature and twenty-eight (28) monitor Suppression pool temperature.

III. ANALYSIS OF EVENT (cont.)

The eighteen RTD's (model 122-4030-04-2.7-6), found to be not environmentally and dynamically qualified, are part of the Containment Atmosphere Monitoring System (CMS). The purpose of the CMS RTD temperature elements that are affected by this condition is to monitor Drywell and Suppression Chamber ambient air temperature. There are twelve (12) Drywell RTD's (six [6] in Division I and six [6] in Division II) and six (6) Suppression Chamber RTD's (three [3] Division I and three [3] Division II). Each group of RTD's provides analog signals to the Control Room plant computer and recorder. High and low temperatures from each group are monitored by Control Room indicators. A high temperature alarm from each group also energizes control room computer and annunciator alarms. These groups of RTD's do not perform any trip function but are designed to provide the operator with important information regarding the containment status during accident conditions. 1

Model 122-7039-314 RTDs found not dynamically qualified are also part of the Containment Atmosphere Monitoring System. There are eight (8) Suppression Pool RTD's associated with this model (four in Division I and four in Division II). Each RTD provides post-accident monitoring of the Suppression Pool water temperature and supplies a signal for temperature indication to the Main Control Room.

There are 3 possible temperature indication failure modes due to failure of the Containment atmosphere temperature elements; indication fails higher than actual, provides no indication, or fails lower than actual. For the first two cases, the Emergency Operating Procedure (EOP) actions performed by the operators in response to Loss of Coolant Accident (LOCA) conditions would be premature, yet conservative with regard to maintaining Containment integrity. Therefore the health and safety of the public and plant personnel would not have been compromised by these failure modes. 1

The major concerns that were evaluated for conditions where the RTDs indicate lower than actual were:

1. Could this failure mode cause the initiation of Drywell sprays under inappropriate conditions thereby causing Containment failure?

2. Could this failure mode result in the operators improperly evaluating the operability of vessel level instrumentation and what would be the impact?

III. ANALYSIS OF EVENTS (cont.)

It was concluded that, for all design basis events, Containment integrity would not have been compromised due to the following:

* For large line break LOCAs, Drywell pressure increases above 10 pounds per square inch gauge (psig) within a few seconds and peak drywell temperature remains below 350 degrees Fahrenheit (°F). This response prevents violation of the Drywell Spray Initiation Limit curve regardless of the temperature indication.

* For small line LOCAs, EOP actions direct Containment pressure control utilizing the Suppression Pool sprays, which should prevent Drywell pressure from exceeding 10 psig and thus prevent the need for spraying the Drywell. The bounding Updated Safety Analysis Report (USAR) case, however, assumes that Drywell pressure and temperature continue to increase and that Drywell sprays are initiated after Drywell pressure exceeds 30 psig. The peak Drywell temperature, however, remains below 350°F thereby maintaining margin to the Drywell Spray Initiation Limit curve.

Failure of the RTDs causing lower than actual indication could lead an operator to conclude that the vessel level instrumentation is operable when it indeed is not. This, however, could only occur when Drywell temperatures are greater than Reactor Pressure Vessel (RPV) saturation temperature (i.e. under Design Basis Analysis [DBA] LOCA conditions). Engineering has reviewed qualification test reports for the subject RTDs and has concluded that, under DBA LOCA conditions, the RTDs would have experienced rapid gross failure. Under these conditions while executing the EOPs, the operators would have concluded that the level instruments were not operable, and would have initiated RPV flooding. This action is consistent with the automatic station response to DBA-LOCA conditions. 1

Based on the preceding analysis, it has been concluded that the unqualified RTD installations would not have compromised the health and safety of the public or plant personnel.

IV. CORRECTIVE ACTIONS

The following corrective actions were taken:

1. The affected instrumentation was declared inoperable.

2. An environmental seal was installed around each containment atmosphere RTD probe at the RTD terminal head enclosure after

IV. CORRECTIVE ACTIONS (cont.)

inspecting each RTD assembly for signs of degradation and correcting as appropriate. Each RTD was functionally tested prior to being placed back into service. This design change was implemented prior to startup following the completion of NMP2's 1990/1991 Refueling Outage.

3. A review was conducted to compare vendor supplied documentation for all electrical component sealing requirements to NMP2-EO61A, Electrical Installation Specification, for all safety related temperature elements and other electrical equipment (e.g. instrument transmitters) installed at NMP2. There were no other discrepancies found. It has been concluded that this was an isolated condition and is limited to Containment Atmosphere monitoring RTDs used to monitor Drywell and Suppression Chamber ambient temperature at NMP2.

4. Engineering has completed a review of the RTD manufacturer's (Pyco, Inc.) fabrication data to determine the extent of plant supplied equipment that had not been seismically qualified in accordance with their procurement specification requirements. It was concluded that the only concern for the detectors (elements/conduit assemblies) from a dynamic qualification standpoint was their structural integrity. This was successfully demonstrated analytically for all RTD's in question. 1

Procurement of components is now accomplished utilizing Niagara Mohawk Power Corporation procedures. The current procedures for procurement of safety-related components consists of two parts, a purchase review and a receipt inspection. The purchase review ensures that the purchasing requirements are consistent with the design specifications, and the receipt inspection process confirms that the hardware delivered meets the purchase specifications. This two part review should prevent recurrence of a similar event.

V. ADDITIONAL INFORMATION

A. Previous similar events:

There have been no previous events at NMP2 where the environmental qualification of components was compromised due to purchase of the incorrect component.

Additionally, there have been no previous similar events involving the identification of deficient vendor supplied Seismic Qualification data. 1

V. ADDITIONAL INFORMATION (cont.)

B. Failed component identification: None.

C. Identification of components:

COMPONENT	IEEE 803 EIIS FUNCTION	IEEE 805 SYSTEM ID
Drywell Ambient Air Temperature Elements	TE	IK
Suppression Chamber Ambient Air Temperature Elements	TE	IK
Thermowells	TW	N/A
Containment Atmosphere Monitoring System (CMS)	45	IK
Reactor Pressure Vessel (RPV)	RPV	N/A
Drywell Cooling System	N/A	VB
Drywell Spray System	N/A	VB