



June 29, 1999
LD-99-036

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

**Subject: Report of a Defect Pursuant to 10 CFR 21 Concerning
ABB Oscillation Power Range Monitors for BWRs**

The purpose of this letter is to notify the Nuclear Regulatory Commission of a defect as defined in 10 CFR 21, "Reporting of Defects and Noncompliance." The defect concerns the ABB Oscillation Power Range Monitor (OPRM) delivered to Susquehanna 1 & 2, Clinton, Hope Creek, WNP-2, Perry, LaSalle 1 & 2, Dresden 2 & 3 and Quad Cities 1 & 2. Specifically, the defect concerns the Slave OPRM module randomly resetting, potentially causing the OPRM trip channel to be out of service for a short period of time, typically under one minute. The defect could lead to non-conservative failure of detecting and suppressing thermo-hydraulic core oscillations during this time.

Information required by 10 CFR 21 is provided on the attachment. Please feel free to contact me or Virgil Pagen of my staff at 860-285-4700 if you have any questions.

Very truly yours,

Ian C. Rickard, Director
Nuclear Licensing

Attachment:

cc: J. M. Triampo (ABB Automation)

ABB Combustion Engineering Nuclear Power, Inc.

P.O. Box 500

2000 Day Hill Rd.
Phone 860-285-9878

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Fax 860-285-3253

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10 CFR 21 Report of a Defect or Failure to Comply

The following information is provided pursuant to the requirements set forth in 10 CFR 21.21(c)(4):

(i) Name and address of the individuals informing the Commission:

Ian C. Rickard, Director
Nuclear Licensing
ABB Combustion Engineering Nuclear Power, Inc.
2000 Day Hill Road
Windsor, CT 06095-0500

(ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect:

The activity for which this report is being filed is the use of the ABB Oscillation Power Range Monitor (OPRM) where the Slave OPRM module randomly resets, potentially causing the OPRM trip channel to be out of service for a short period of time, typically less than one minute. This defect applies to Susquehanna 1 & 2, Clinton, Hope Creek, WNP-2, Perry, LaSalle 1 & 2, Dresden 2 & 3 and Quad Cities 1 & 2.

(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect:

ABB Automation, Inc.
2000 Day Hill Road
Windsor, CT 06095-0500

(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply:

Two OPRMs are installed in each channel of the Boiling Water Reactor (BWR) Neutron Monitoring System. The OPRM pair is configured such that one OPRM is the Master and the other OPRM is the Slave. The function of the OPRM is to detect core power oscillations and trip (scram) the plant if the magnitude of these oscillations exceeds the setpoint. The OPRMs detect power oscillations by monitoring individual Local Power Range Monitor (LPRM) signals from various core locations. The LPRM signals monitored by the Master OPRM are shared with the Slave, and likewise, the LPRM signals monitored by the Slave are shared with the Master OPRM. In each OPRM there are a maximum of 18 cells. Each cell is composed of signal inputs from up to four LPRMs. Some plant configurations use two LPRM signals from the Master OPRM and two LPRM signals from the Slave for each cell configuration.

Some utilities have observed several instances of some Slave OPRM modules resetting (approximately three or four times a day). When the Slave OPRM resets, the Slave OPRM is unable to perform its protective function while the module is performing its

startup routine. Since the Master OPRM has invalid data from the Slave OPRM for the cell calculations, the Master OPRM cells automatically reconfigure to use only the two local valid LPRM signals for each cell. Reconfiguration of the cell requires typically 30 seconds for cell stabilization before the cell becomes valid and is able to provide the protection function. Both OPRMs are unable to provide their channel protective function while the Slave OPRM is resetting, and the Master OPRM cells are re-configuring. Technical Specifications require that at least one OPRM module per channel be available for the protective function. Multiple channels could be affected by this defect.

Investigations to date indicate that the processor is resetting due to a software watchdog timer. This problem has only occurred in the OPRM Slave module and is displayed as code "220" in the error log.

(v) *The date on which the information of such defect or failure to comply was obtained:*

It was determined that a defect exists in the OPRM on June 25, 1999.

(vi) *In the case of a basic component which contains a defect or fails to comply, the number and location of all such components in use at, supplied for, or being supplied for one or more facilities or activities subject to the regulations in this part:*

The defect applies to Susquehanna 1 & 2, Clinton, Hope Creek, WNP-2, Perry, LaSalle 1 & 2, Dresden 2 & 3 and Quad Cities 1 & 2. None of the OPRM systems are presently being used to detect and suppress core oscillations. Installed OPRM systems are in the monitor mode with the trip contacts disabled.

(vii) *The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action:*

The defect has been duplicated, and an action plan to determine the cause of the defect is currently being developed. This will include identifying the technical cause of the defect and developing a technical solution. Further actions such as corrective actions and a root cause evaluation will be evaluated once the technical issues are understood. It is expected that these activities could take approximately four to eight months.

(viii) *Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees:*

Affected utilities have been advised of the issue and how to identify it. Many of these utilities also provided information that led to the identification of this issue.

General Information or Other (PAR)

Event # 35879

Rep Org: ABB COMBUSTION ENGINEERING	Notification Date / Time: 06/29/1999 16:28 (EDT)
Supplier: ABB COMBUSTION ENGINEERING	Event Date / Time: 06/29/1999 (EDT)
	Last Modification: 06/29/1999
Region: 1	Docket #:
City: WINDSOR	Agreement State: No
County:	License #:
State: CT	
NRC Notified by: IAN RICKARD (VIA FAX)	Notifications: LAWRENCE DOERFLEIN R1
HQ Ops Officer: BOB STRANSKY	JAMES CREED R3
Emergency Class: NON EMERGENCY	LINDA SMITH R4
10 CFR Section:	VERN HODGE (via fax) NRR
21.21 UNSPECIFIED PARAGRAPH	

10 CFR PART 21 REPORT DUE TO DEFECTIVE OSCILLATION POWER RANGE MONITORS

The following text has been excerpted from a letter submitted via facsimile from the vendor:

"The defect concerns the ABB Oscillation Power Range Monitor (OPRM) delivered to Susquehanna 1 & 2, Clinton, Hope Creek, WNP-2, Perry, LaSalle 1 & 2, Dresden 2 & 3 and Quad Cities 1 & 2. Specifically, the defect concerns the Slave OPRM module randomly resetting, potentially causing the OPRM trip channel to be out of service for a short period of time, typically under one minute. The defect could lead to non-conservative failure of detecting and suppressing thermo-hydraulic core oscillations during this time.

"None of the OPRM systems are presently being used to detect and suppress core oscillations. Installed OPRM systems are in the monitor mode with the trip contacts disabled."
