General Information or Other (PAR) Event # 39404

Rep Org: SPECTRUM TECHNOLOGIES		**Notification Date / Time:** 11/25/2002 16:25	(EST)
Supplier: CUTLER-HAMMER		**Event Date / Time:** 11/25/2002	(EST)
		Last Modification: 11/25/2002	
Region: 1		**Docket #:**	
City: SCHENECTADY		**Agreement State:** Yes	
County:		**License #:**	
State: NY			
NRC Notified by: BILL WILLIS		**Notifications:** JOHN ROGGE	R1
HQ Ops Officer: HOWIE CROUCH			
Emergency Class: NON EMERGENCY			
10 CFR Section:			
21.21	UNSPECIFIED PARAGRAPH		

PART 21 INITIAL NOTIFICATION - CUTLER-HAMMER A200 NEMA SIZE 1 STARTERS

"Equipment Identification: Starter, Non-Reversing, Size 1, 600VAC, 3 Pole, W/125VDC coil, Westinghouse/Cutler-Hammer P/N A200M1CS, Type B Thermal Overloads, Ambient Compensated, Manual Reset Only

"In March 2002, Spectrum Technologies provided 20 Class 1E safety related Cutler-Hammer A200 NEMA Size 1 starters to Rochester Gas & Electric Company - Ginna Station. We had purchased the starters as commercial grade items from Cutler-Hammer, and dedicated them per EPRI NP5652, method 1, Special Tests and Inspections. This dedication successfully verified the following critical characteristics:
Markings
Dimensions and Configuration
Electrical Functional Attributes, Including:
Insulation Resistance
Current Carrying Capacity
Minimum Pickup and Drop Out Voltage
Time Current Characteristics of Overload Relay

"Ginna Station recently advised us that one of the starters had experienced an open phasing failure. They reported that they noted no current flow on one phase when measured with a clamp-on ammeter, and that current started to flow when the hand pressure was applied to the moving plunger extension that protrudes out the top of the starter. They also noted that the overall travel of the plunger appeared to be less than that noted on a similar older vintage starter. They provided the failed starter and the older vintage starter to us for our investigation. The continuity of all phases was successfully verified, along with the magnetic pull force of the coil, which was comparable to the older vintage starter. We then mounted the failed starter on a vertical plate in a horizontal (worst case) orientation, energized the coil and loaded the main contacts to 27 amps. This condition was maintained until the temperature stabilized with the highest temperature recorded on the terminals (i.e., 59°C to 63° with ambient at 20.3°C). None of this testing performed could duplicate the single phasing condition observed by Ginna Station. We verified that the total stroke of the failed starter was less than that of the earlier vintage starter by as much as 0.059" by our

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measurement.

"The failed starter and the earlier vintage starter were provided to Cutler-Hammer for an OEM evaluation. The results of the OEM evaluation was e-mailed to our Cutler-Hammer distributor and provided to us on November 21, 2002, a copy is attached. This information has been provided to Ginna Station, and they advised us today (November 25, 2002) that the starters have been installed in 11 safety related locations, as follows:
MOV-857A, Residual Heat Removal Pump A Discharge
MOV-4616, Service Water Isolation in Auxiliary Building (Open & Close Circuit)
MOV-860C, Containment Spray Pump B Discharge
MOV-813, Component Cooling Water Isolation to Reactor Support Coolers (Open & Close Circuit)
MOV-700, Residual Heat Removal Pump Suction from Loop A Holt Leg
MOV-878A, Safety Injection Discharge to Loop B
MOV-856, Residual Heat Removal Suction from Refueling Water Storage Tank
MOV-4780, Service Water Isolation in Screenhouse (Open & Close Circuit)

"We are currently expediting Cutler-Hammer to complete an audit at their manufacturing facility to identify the magnitude of this condition and specify the date codes effected. We are also expediting Cutler-Hammer to obtain acceptable replacements for the starters provided to Ginna Station."

****

SPECTRUM TECHNOLOGIES
112 Erie Blvd., Schenectady, New York 12305
Tel: (518) 382-0056
Fax: (518) 382-0283

FAX CONTROL SHEET

DATE: November 25, 2002
Number of pages including this sheet 4

TO: Name: NRC Operations Center
Phone #: (301) 816-5100
Fax #: (301) 816-5151

FROM: Name: **Bill Willis** Tel: (518) 382-0056
Fax: (518) 382-0283

COMMENTS: **Part 21 Initial Notification - Cutler-Hammer A200 NEMA Size 1 Starters**

Equipment Identification: Starter, Non-Reversing, Size 1, 600VAC, 3 Pole, W/125VDC coil, Westinghouse/Cutler-Hammer P/N A200M1CS, Type B Thermal Overloads, Ambient Compensated, Manual Reset Only

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- Markings
- Dimensions and Configuration
- Electrical Functional Attributes, Including:
  - Insulation Resistance
  - Current Carrying Capacity
  - Minimum Pickup and Drop Out Voltage
  - Time Current Characteristics of Overload Relay

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The failed starter and the earlier vintage starter were provided to Cutler-Hammer for an OEM evaluation. The results of the OEM evaluation was e-mailed to our Cutler-Hammer distributor and provided to us on November 21, 2002, a copy is attached. This information has been provided to Ginna Station, and they advised us today (November 25, 2002) that the starters have been installed in 11 safety related locations, as follows:

- MOV-857A, Residual Heat Removal Pump A Discharge
- MOV-4616, Service Water Isolation in Auxiliary Building (Open & Close Circuit)
- MOV-860C, Containment Spray Pump B Discharge
- MOV-813, Component Cooling Water Isolation to Reactor Support Coolers (Open & Close Circuit)
- MOV-700, Residual Heat Removal Pump Suction from Loop A Holt Leg
- MOV-878A, Safety Injection Discharge to Loop B
- MOV-856, Residual Heat Removal Suction from Refueling Water Storage Tank
- MOV-4780, Service Water Isolation in Screenhouse (Open & Close Circuit)

We are currently expediting Cutler-Hammer to complete an audit at their manufacturing facility to identify the magnitude of this condition and specify the date codes effected. We are also expediting Cutler-Hammer to obtain acceptable replacements for the starters provided to Ginna Station.

If you have any questions, please don't hesitate to call, fax, or e-mail us.

Assuring you of our best intentions.

William R. Willis
Vice President, QA
Spectrum Technologies Utilities Services USA, Inc.
112 Erie Blvd., Suite 3
Schenectady, NY 12305
Tel: (518) 382-0056
Fax: (518) 382-0283

cc: Gerald Bishoping, Ginna Station
(585) 771-3304

GE Nuclear Energy

General Electric Company
175 Curtner Ave., San Jose, CA 95125

November 18, 2002
02-09NRC.DOC
MFN 02-089

Document Control Desk
United States Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2738

Subject: **Final Report, Stability Option III: Possible Successive Confirmation Count Resets – Not Reportable**

Reference: MFN02-063, Stability Option III: Possible Successive Confirmation Count Resets, 10CFR Part 21 60 Day Interim Report, October 1, 2002

This letter provides closure of the reference §21.21(a)(2) 60 Day Interim Report notification for plants that have selected stability long-term solution Option III. The closure is that GE Nuclear Energy (GE) has determined that this is not a reportable condition, however, GE recommends that the BWR Owners' Group Detect & Suppress Committee evaluate the need to change the minimum allowable value for period tolerance used in the Oscillation Power Range Monitor (OPRM).

As described in the reference notification, the potential problem was associated with the algorithm that provides the licensing basis Minimum Critical Power Ratio (MCPR) Safety Limit protection for stability Option III. The algorithm determines Successive Confirmation Count (SCC) of an oscillating power signal. A reactor trip is generated when SCC and oscillation amplitude reach their trip setpoints in accordance with the Option III and reactor protection system configuration. The concern was that the oscillation period could change for an oscillation that initiates while reactor state conditions are changing towards equilibrium state (e.g., following a two-recirculation pump (2RPT) trip event) and cause the SCC to prematurely reset, thus delaying the reactor scram.

A reactor trip signal is generated when the OPRM SCC setpoint and the amplitude setpoint are reached or exceeded for at least one OPRM cell in each trip system channel required to generate the trip signal (e.g., one-out-of two taken twice). The Period Based Detection Algorithm (PBDA) determines the SCC for each OPRM cell. When an oscillation in an OPRM cell signal is detected by the PBDA it sets the base period for that cell. The period tolerance is used to determine if the period of each subsequent oscillation is within an acceptable difference from the base period. The acceptable range

for period tolerance specified in stability Option III licensing topical reports is 100 to 300 msec. A period tolerance of 50 msec has been approved for OPRM systems that have a 25 msec sampling frequency.

GE evaluated this concern with TRACG simulations of a 2RPT event for typical Option III plants for reasonably limiting Extended Power Uprate (EPU) and Maximum Extended Load Line Limit Analysis (MELLLA) conditions. TRACG calculates channel power, which can be evaluated as representative of an OPRM cell signal through the hot channel oscillation reload licensing methodology, and evaluated by the PBDA for successive confirmation counts.

PBDA resets occur when the difference between the current period and the base period exceeds the period tolerance. The worst case would be if a spurious SCC reset occurred immediately before the amplitude trip setpoint was reached. For this case, that cell would not generate a trip signal until SCC had again counted up to the trip setpoint, which could be a delay of 10 to 12 seconds.

GE evaluated the potential for SCC spurious resets for period tolerance values of 50, 100 and 150 msec. In general, more frequent spurious resets occur with shorter period tolerance. However, the spurious SCC reset does not occur at the same time for all the OPRM cells in an OPRM channel. Some OPRM cell resets delay the trip generated by that cell, while others reset at sufficiently early times that they have again counted up to exceed the count setpoint when the amplitude setpoint is reached, and others do not reset at all. Only one OPRM cell trip in an OPRM channel is sufficient to cause an OPRM channel trip, and each OPRM channel typically has 18 to 33 OPRM cells. In addition, typical core loading schemes ensure that multiple OPRM cells respond very near the peak oscillation magnitude. The analysis concluded that even though spurious resets occur, these resets are not expected to significantly delay reactor scram. Therefore, the currently licensed PBDA provides adequate protection against a MCPR Safety Limit violation for instabilities initiated during a fast transient such as a 2RPT event. Therefore, this **does not** represent a Reportable Condition under 10CFR21.21.

Even though this is not a reportable condition, the potential for some OPRM cells to prematurely reset SCC for an instability initiated during a 2RPT is not consistent with the original design basis of the PBDA. The original design basis was that continuous confirmation counts would occur for fully coupled neutronic/thermal-hydraulic reactor instability. Since this may not occur for a 2RPT with period tolerance values of 50 and 100 msec, it is recommended that Option III plants evaluate the need to change the minimum allowable value for period tolerance.

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If you have any questions, please call me at (408) 925-5362.

Sincerely,

Jason Post

Jason. S. Post, Manager
Engineering Quality and Safety Evaluations

cc: S. D. Alexander (NRC-NRR/DISP/PSIB) Mail Stop 6 F2
J. W. Foster (NRC-NRR/DISP/PSIB) Mail Stop 12 H2
J. F. Klapproth (GE-NE)
H. J. Neems (GE-NE)
PRC File

Attachments:
1. Closure of 60 Day Interim Report per §21.21(a)(2)
2. Previously Identified Potentially Affected Plants

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Attachment 1 – Closure of 60 Day Interim Report per §21.21(a)(2)

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

Jason S. Post, Manager, Engineering Quality & Safety Evaluation, GE Nuclear Energy, 175 Curtner Avenue, San Jose, CA 95125

(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:

Stability Solution Option III plants were previously identified as potentially affected. These plants are listed in Attachment 2.

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

GE Nuclear Energy, San Jose, California

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

It was determined that the defect or failure to comply is not associated with a safety hazard and does not lead to violation of the MCPR Safety Limit.

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

August 2, 2002

(vi) In the case of a basic component which contains a defect or failure to comply, the number and locations 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 previously identified potentially affected plants are listed in Attachment 2.

(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 (note, these are actions specifically associated with the identified Reportable Condition):

GE has communicated this concern to the BWR Owners' Group Potential Issues Resolution Team (PIRT) and to the Stability Detect & Suppress Committee. Even though this does not represent a reportable condition, the potential for some OPRM cells to prematurely reset SCC for an instability initiated during a 2RPT is not consistent with the original design basis of the PBDA. Since continuous

confirmations counts may not occur for an oscillation initiated following a 2RPT with period tolerance values of 50 and 100 msec, it is recommended that Option III plants and the D&S Committee evaluate the need to change the minimum allowable value for period tolerance.

(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:

It is recommended that this issue be addressed by the BWROG D&S Committee in their overall consideration of stability solution Option III performance and reload licensing methodology revisions.

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Attachment 2 – Previously Identified Potentially Affected Plants

	Utility	Plant
X	AmerGen Energy Co.	Clinton
	AmerGen Energy Co.	Oyster Creek
X	Carolina Power & Light Co.	Brunswick 1
X	Carolina Power & Light Co.	Brunswick 2
	Constellation Nuclear	Nine Mile Point 1
X	Constellation Nuclear.	Nine Mile Point 2
X	Detroit Edison Co.	Fermi 2
	Dominion Generation	Millstone 1
X	Energy Northwest	Columbia
	Entergy Nuclear Northeast	FitzPatrick
	Entergy Nuclear Northeast	Pilgrim
	Entergy Operations, Inc.	Grand Gulf
	Entergy Operations, Inc.	River Bend
	Entergy Nuclear Northeast	Vermont Yankee
	Exelon Generation Co.	CRIT Facility
X	Exelon Generation Co.	Dresden 2
X	Exelon Generation Co.	Dresden 3
X	Exelon Generation Co.	LaSalle 1
X	Exelon Generation Co.	LaSalle 2
X	Exelon Generation Co.	Limerick 1
X	Exelon Generation Co.	Limerick 2
X	Exelon Generation Co.	Peach Bottom 2
X	Exelon Generation Co.	Peach Bottom 3
X	Exelon Generation Co.	Quad Cities 1
X	Exelon Generation Co.	Quad Cities 2
X	FirstEnergy Nuclear Operating Co.	Perry 1
	Nebraska Public Power District	Cooper
	Nuclear Management Co.	Duane Arnold
	Nuclear Management Co.	Monticello
	Pooled Equipment Inventory Co.	PIM
X	PPL Susquehanna LLC.	Susquehanna 1
X	PPL Susquehanna LLC	Susquehanna 2
X	Public Service Electric & Gas Co.	Hope Creek
X	Southern Nuclear Operating Co.	Hatch 1
X	Southern Nuclear Operating Co.	Hatch 2
X	Tennessee Valley Authority	Browns Ferry 1
X	Tennessee Valley Authority	Browns Ferry 2
X	Tennessee Valley Authority	Browns Ferry 3