Part 21 (PAR) Event # 47326

Rep Org: ATC NUCLEAR		**Notification Date / Time:** 10/06/2011 13:35	(EDT)
Supplier: MOORE CONTROLLERS		**Event Date / Time:** 10/06/2011	(EDT)
		Last Modification: 07/07/2012	
Region: 1		**Docket #:**	
City: OAK RIDGE		**Agreement State:** Yes	
County:		**License #:**	
State: TN			
NRC Notified by: GREG HOTT		**Notifications:** MONTE PHILLIPS	R3DO
HQ Ops Officer: BILL HUFFMAN		PART 21 GROUP	E-MAIL
Emergency Class: NON EMERGENCY			
10 CFR Section:			
21.21(d)(3)(i) DEFECTS AND NONCOMPLIANCE			

PART 21 NOTIFICATION CONCERNING MOORE PROCESS CONTROLLERS

The following information was received from ATC Nuclear via facsimile:

"This notification is in accordance with U.S. Nuclear Regulatory Regulation 10 CFR 21.21(a)(3)(ii)(b).

"Exelon Corporation Clinton and LaSalle Stations have identified common mode failures associated with Moore 535 Controllers (Part Number 535-000000HOST-SSTRV) provided through ATC Nuclear Tennessee. These items were provided as safety related components to Exelon under Clinton Purchase Order 00461980 and LaSalle Purchase Order 00462363. All safety related failures to date appear to originate from these specific purchase orders. The failures have been evaluated with the original equipment manufacturer and appear to be isolated to controllers containing a main processor board containing 'Revision F' labeling manufactured in early 2010 (Date Code 1310). These items all passed an extended burn-in during testing. The failures may manifest themselves as process variable (PV) drift, controller reset with loss of controller function, or create nuisance alarm conditions after a relatively short period (less than 1 year) following installation.

"Because the end-use application of each item is not known by ATC Nuclear, the safety hazard evaluation has been deferred to the customer. The Licensees above have been formally notified of the defect."

* * * UPDATE FROM RAY CHALIFOUX TO DONG PARK AT 1638 EDT ON 7/2/12 VIA FACSIMILE * * *

"A failure analysis has been concluded to determine the causes for Moore Industries International (MII) 535 Single Loop Process (SLP) Controller failures, initially reported October 6, 2011 and provided by ATC Nuclear, Oak Ridge, TN. The original failure symptoms were reported to be process variable (PV) drift, controller reset with loss of controller function, or create nuisance alarm conditions after a relatively short period (<1 year) following

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installation. These controllers passed all Method 1 Testing including an extended burn-in to monitor for early life failure. Initial investigation isolated the failure to the controller MPU [Micro-Processing Unit] Board and identified the cause as 'Indeterminate.'

"Completion of a rigorous analysis by the OEM [Original Equipment Manufacturer] and ATC Nuclear has identified the failures are the result of the introduction of a 3 vDC SRAM Chip P/N CY62256VNLL-70SNXI on the MPU by Moore Industries International in 2010 which is not compatible with the 5vDC circuit. Operation of the 3V part at 5V reduces reliability of the part and could lead to failures in the field. The part change bypassed Moore's Engineering Change Process and therefore was not evaluated as their program requires. An Extent of Condition review performed by the OEM verified no additional part changes at Moore went unevaluated."

The orders were delivered to the following facilities: Clinton, LaSalle, Byron, Callaway, Fermi 2.

Notified R3DO (Daley), R4DO (Allen), and Part 21 Group via e-mail..

* * * UPDATE FROM RAY CHALIFOUX TO HOWIE CROUCH VIA FAX 1141 EDT ON 7/7/12 * * *

"During the ATC root cause investigation, a technical error in the original qualification document S2000-RP-03, Revision 0, issued on February 7, 2000 was identified. The qualification test report identified the Moore 535 SLP controller's ability to withstand a total integrated dose (TID) of 1E5 Rad. This information is in error and is related to the original report creator's misunderstanding of the relationship between the presence of semiconductor materials and a citation from an EPRI report on the effects of radiation. The Moore 535 controllers have been tested for a TID of 1E3 Rad without failure. A report revision will be issued to clarify this item. No orders reviewed were provided for IEEE 323 harsh environment applications.

"Because the end-use application of each specific item is not known by ATC Nuclear, the safety hazard evaluation has been deferred to customers. The licensees above have been formally notified of the defect."

Notified R3DO (Daley), R4DO (Allen) and Part 21 group via email.

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To: NRC OPERATIONS CENTER
Fax number: 301 816 5151

From: RAY Chalifoux
Phone: 865 384 0124
Fax number: 865-675-5399

Date: 7/7/12

Subject: 10 CFR PART 21 UPDATE

# of pages including cover: 3

Comments:

Please post attached document. The document was revised to correct an exponential notation error.

July 7, 2012

NRC Operations Center
FAX (301) 816-5151

Revision 1

Subject: UPDATE: 10 CFR PART 21 NOTIFICATION OF DEFECTIVE MOORE 535 CONTROLLERS

Information Contact: Ray Chalifoux ATC Nuclear 865 384 0124

This notification is in accordance with U.S. Nuclear Regulatory Regulation 10 CFR 21.21(a)(3)(ii)(b).

This revision to the update corrects the TID disclosure information that contained an exponential notation error.

A failure analysis has been concluded to determine the causes for Moore Industries International (MII) 535 Single Loop Process (SLP) Controller failures, initially reported October 6, 2011. The original failure symptoms were reported to be process variable (PV) drift, controller reset with loss of controller function, or create nuisance alarm conditions after a relatively short period (<1year) following installation. These controllers passed all Method 1 Testing including an extended burn-in to monitor for early life failure. Initial investigation isolated the failure to the controller MPU Board and identified the cause as "Indeterminate".

A more rigorous analysis through the OEM has identified the failures are the result of the introduction of a 3 vDC SRAM Chip **P/N CY62256VNLL-70SNXI** on the MPU by Moore Industries International In 2010 which is not compatible with the 5vDC circuit. Operation of the 3V part at 5V reduces reliability of the part and could lead to failures in the field. The part change bypassed Moore's Engineering Change Process and therefore was not evaluated as their program requires. An Extent of Condition review verified no additional part changes at Moore went unevaluated.

ATC Nuclear review of records identifies the following facilities have purchased controllers that are potentially affected by the below conditions.

Clinton	PO 461980, 464441, 465044, 466159, 469887, 480894, 480908, 486085, 480940, 481237
LaSalle	PO 462363, 463153, 479964, 479664, 481027, 478883
Byron	PO 458656, 484756
Callaway	PO 525828
Fermi 2	PO 4700435518

All MPU Boards integral to 535 controllers with a Controller Serial # greater than **2116813** are suspect to contain the non-conforming SRAM Chip according to Moore Industries International. The SRAM Chip is not readily identifiable through visual inspection without removal of the Processor Chip which is socket mounted and installed over the device.

Based on the how customers manage the controllers, the case serial number may not be representative of the controller assembly installed. The controller assembly requires removal and directly verified using the label affixed to the rear of the display.

During the ATC Root Cause Investigation, a technical error in the original Qualification Document S2000-RP-03 Revision 0, issued on February 7, 2000 was identified. The Qualification Test Report identified the Moore 535 SLP Controller's ability to withstand a total integrated dose (TID) of 1E5 Rad. This information is in error and is related to the original report creator's misunderstanding of the relationship between the presence of

semiconductor materials and a citation from an EPRI Report on the effects of radiation. The Moore 535 Controllers have been tested for a TID of 1E3 Rad without failure. A report revision will be issued to clarify this item. No orders reviewed were provided for IEEE 323 Harsh Environment applications.
Because the end-use application of each specific item is not known by ATC Nuclear, the safety hazard evaluation has been deferred to customers. The Licensees above have been formally notified of the defect.

Sincerely,

R. A. Chalifoux
Vice President QA, ATC Nuclear