

General Information or Other (PAR)

Event # 45296

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<b>Region:</b> 4	<b>Docket #:</b>
<b>City:</b> SAN DIEGO	<b>Agreement State:</b> Yes
<b>County:</b>	<b>License #:</b>
<b>State:</b> CA	
<b>NRC Notified by:</b> KEITH ASMUSSEN	<b>Notifications:</b> JOHN WHITE R1DO
<b>HQ Ops Officer:</b> VINCE KLCO	SCOTT SHAEFFER R2DO
<b>Emergency Class:</b> NON EMERGENCY	STEVE ORTH R3DO
<b>10 CFR Section:</b>	GEOFFREY MILLER R4DO
21.21 UNSPECIFIED PARAGRAPH	OMID TABATABAI NRO
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PART 21 - RADIATION MONITOR DEFECT

"The defect is contained in the General Atomics Electronic Systems, Inc (GA-ESI) radiation monitoring system model RM-80 firmware. The RM-80 firmware anomaly was initially identified at the St. Lucie Nuclear Power Plant. The radiation monitor was part of the control room outside air intake ventilation radiation monitors.

"More specifically, if the radiation monitor is already in a high and or alert alarm state, and subsequently suffers a loss of power, then upon restoration of power to the unit, the RM-80 high and or alert alarm relays are not reenergized by the RM-80 firmware. This in turn prevents the relays that are located in the [RM]-80 from performing their safety related function.

"This error in the firmware only affects those plant sites that connect annunciator panels or other safety related equipment to the RM-80 Alert and High Alarm relays.

"Plant sites that use RM-80 radiation monitors will be advised to test their systems for this anomaly. When so requested, GA-ESI will provide all necessary information to plants on how to test their RM-80 radiation monitors, and how to receive firmware upgrades if the condition is found during testing."

General Atomics will notify the following affected plants: Beaver Valley, Braidwood, Byron, Callaway, Indian Point 2 & 3, Limerick, River Bend, Shearon Harris, South Texas, St. Lucie, Waterford, and Wolf Creek.

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IE19  
MR

# FACSIMILE

August 25, 2009

**TO:** ATTN: Vince (per telephone conversion @ 1506Hrs)  
NRC Operations Center  
U.S Nuclear Regulatory Commission  
Washington, D. C. 20555  
Facsimile No.: (301) 816-5151  
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**From:** General Atomics Electronic System, Inc. (GA-ESI)

*Keith E. Asmussen*

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No. of Pages (including this one): 4

**Subject: Reportable Occurrence under 10CFR21: Firmware Anomaly in  
GA-ESI's Model RM-80 Radiation Monitoring System**

This notification of the existence of a defect is provided in compliance with the requirements of Title 10 Code of Federal Regulations Part 21.21.

**Identification of basic component which contains the defect:**

The defect is contained in the General Atomics Electronic Systems, Inc. (GA-ESI) radiation monitoring system model RM-80 firmware. The RM-80 firmware anomaly was initially identified at the St. Lucie Nuclear Power Plant. The radiation monitor was part of the control room outside air intake ventilation radiation monitors. The GA-ESI assembly number for the radiation monitor is 03733801-001, which uses RM-80 firmware number: SID136.02. The affected plant tag numbers include: RM-26-61, RM-26-62, RM-26-65, and RM-26-66.

Subsequent evaluation of other RM-80 based firmware revealed that several other firmware sets exhibited the same anomaly. The affected safety related sites are listed in the attached Table 1.

**Identification of the firm supplying the basic component:**

The RM-80 Radiation Monitoring System is designed, manufactured, and sold by General Atomics Electronic Systems (GA-ESI), an affiliate company of General Atomics. GA-ESI has been formerly known as Sorrento Electronics, Inc. and also as the Electronics System Division of General Atomics.

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**Nature of the defect and the safety hazard which is created by the defect:**

The defect in question is in the RM-80 firmware. It is manifested by a failure of the RM-80 to energize alarm relays under certain specific conditions.

More specifically, if the radiation monitor is already in a high and or alert alarm state, and subsequently suffers a loss of power, then upon restoration of power to the unit, the RM-80 high and or alert alarm relays are not reenergized by the RM-80 firmware. This in turn prevents the relays that are located in the MR-80 from performing their safety related function.

A failure to actuate the relays could result in a potential safety hazard to personnel by not actuating the plant systems connected to the alarm relays. For example, control room dampers may not remain isolated or control room annunciators may not actuate, which could result in an unintended overexposure to radiation.

However, local and remote alarm status indications and readings at the local (RM-23L), remote (RM-23) and the supervisory computer (RM-11, PC-11) are not affected by the firmware error and continue to provide the correct alarm status indications.

If, subsequent to the power loss, the radiation levels transitioned through the alarm set points, the monitor would then actuate the high and or alert alarm relays correctly.

This error in the firmware only affects those plant sites that connect annunciator panels or other safety related equipment to the RM-80 Alert and High Alarm relays.

**Date on which the information was obtained:**

On June 30, 2009, St. Lucie contacted GA-ESI concerning an anomalous radiation alarm state while conducting a test at the site. On that same date, GA-ESI began the evaluation of the nature of the anomaly. The evaluation was completed on August 20, 2009.

**Locations affected by the reported condition:**

All RM-80 firmware versions were evaluated to determine the extent of the anomaly. The evaluation included code inspection and testing. As stated above, the anomaly only affects those plant sites that connect annunciator panels or other safety related equipment to the RM-80 Alert and High Alarm relays.

Table 1 (attached) lists the safety related RM-80 firmware that has been found to contain this anomaly.

**Name of the implementing organization and time frame for implementing the corrective actions:**

The implementation of the corrective action will be performed by GA-ESI. Responsibility has been delegated to Mr. Art Evans, Manager of RMS Engineering. GA-ESI will inform the individual sites listed in Table 1, of this possible problem, and how to identify the problem. Further, the corrected RM-80 firmware will be made available to our customers within 8 weeks after acceptance of a purchase order from the respective site.

**Advice related to the defect that will be given to the purchasers:**

Plant sites that use RM-80 radiation monitors will be advised to test their systems for this anomaly. When so requested, GA-ESI will provide all necessary information to plants on how to test their RM-80 radiation monitors, and how to receive firmware upgrades if the condition is found during testing.

**Table 1: List of Affected Safety Related RM-80 Firmware Versions**

	Site Name	Firmware Version/Revision <sup>1</sup>
<i>Region I</i>	Beaver Valley	dhr173 / 02
		erm179 / 03
		wrg185 / 03
<i>Region III</i>	Braidwood	wrg181 / 03
<i>Region II</i>	Byron	wrg181 / 03
<i>Region III</i>	Callaway	wrg194 / 07
<i>I</i>	IP2	wrg092 / 06
<i>I</i>	IP3	wrg189 / 03
	Kori	hrg184 / 01
<i>I</i>	Limerick	ind149 / 02
		wrg194 / 07
	Maanshan	mapg37 / 04
<i>IV</i>	River Bend	liq119 / 01
		wrg125 / 03
<i>II</i>	Shearon Harris	gpi046 / 01
		ind149 / 02
		li1118 / 01
<i>IV</i>	South Texas	er1209 / 01
<i>II</i>	St. Lucie	sid136 / 02
		sllq16 / 08
		slpr26 / 08
		wrg194 / 07
<i>IV</i>	Waterford	ind149 / 02
		walq14 / 02
		wapr24 / 10
<i>IV</i>	Wolf Creek	wrg194 / 07
	YGN	er1010 / 01
		er1021 / 03

<sup>1</sup> Revisions numbers less than that shown are also affected.