



September 23, 2009
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U.S Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, Maryland 20852

Subject: **Reportable Occurrence under 10 CFR Part 21: Firmware Anomaly in the Model RM-80 Radiation Monitoring System**

To Whom It May Concern:

On August 25, 2009, General Atomics Electronic Systems, Inc. ("GA-ESI") notified the NRC Operations Center by telephone and facsimile of a reportable occurrence under Title 10, Chapter I, of the *Code of Federal Regulations* ("10 CFR"), Part 21, involving firmware for GA-ESI's Model RM-80 Radiation Monitoring System. GA-ESI provided the Operations Center with an update on August 31, 2009. The following information is provided in compliance with the notification requirements of 10 CFR 21.21(d)(3)(ii) and (d)(4):

i) **Name and address of the person informing the Commission:**

Keith E. Asmussen, Ph.D.
Director, Licensing, Safety and Nuclear Compliance
General Atomics
3550 General Atomics Court
San Diego, CA 92121

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

The defect is contained in GA-ESI's Model RM-80 Radiation Monitoring System 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 firmware revealed that several other firmware sets exhibited the same anomaly. Sites having such firmware sets are listed in the attached Table 1.

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

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

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iv) 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 firmware to maintain alarm relays in an alarm condition 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 firmware high and/or alert alarm relays do not remain de-energized by the RM-80 firmware. This in turn prevents the relays that are located in the RM-80 firmware from performing their safety related function.

A failure to keep the RM-80 relays de-energized 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) and remote (RM-23, RM-23A) modules and the supervisory computer (RM-11, PC-11) are not affected by the RM-80 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 de-energize 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.

v) 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. The responsible officer was informed on Monday, August 24, 2009, and the NRC Operations Center was notified on August 25, 2009.

vi) 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 sites having safety related RM-80 firmware that has been found to contain this anomaly.

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

The implementation of the corrective action is being performed by GA-ESI. Responsibility for coordinating this effort has been delegated to Mr. Art Evans, Manager of RMS Engineering. By August 31, 2009, GA-ESI had provided a representative of each of the individual sites listed in Table 1 with the following notifications: 1) an oral notification of the possible problem and how to identify it, followed by 2) a written letter sent by email which described the anomaly and how to determine if the problem affects their respective system(s), which was, in turn, followed by 3) a notification letter sent by certified mail.

Corrected RM-80 firmware will be made available to GA-ESI customers within 8 weeks of acceptance of a purchase order from the respective site.

viii) Advice related to the defect that will be given to the purchasers:

GA-ESI has submitted a Quality Assurance Bulletin to each of the plant sites that use RM-80 radiation monitors. This bulletin advised them to test their systems for this anomaly. The bulletin also included the information the plant sites need to test their RM-80 radiation monitors and how to receive firmware upgrades if the condition is found during testing.

If you have any questions or need additional information concerning this report, please do not hesitate to contact the undersigned at (858) 455-2823 or keith.asmussen@ga.com. Technical questions should be directed to Mr. Art Evans at (858) 522-8348, or Mr. Gerald Scott at (858) 522-8357.

Very truly yours,



Keith E. Asmussen, Ph.D., Director
Licensing, Safety and Nuclear Compliance

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

Site Name	Firmware Version/Revision ¹
Beaver Valley	dhr173 / 02
	erm179 / 03
	wrg185 / 03
Braidwood	bhr165 / 01
	wrg181 / 03
Byron	wrg181 / 03
Callaway	wrg194 / 07
Indian Point 2	wrg092 / 06
Indian Point 3	wrg189 / 03
Kori	hrg184 / 01
Limerick	ind149 / 02
	wrg194 / 07
Maanshan	mapg37 / 04
River Bend	liq119 / 01
	wrg125 / 03
Harris	gpi046 / 01
	ind149 / 02
	li1118 / 01
South Texas	er1209 / 01
St. Lucie	sid136 / 02
	sllq16 / 08
	slpr26 / 08
	wrg194 / 07
Waterford	ind149 / 02
	walq14 / 02
	wapr24 / 10
Wolf Creek	wrg194 / 07
YGN	er1010 / 01
	er1021 / 03

¹ Revision numbers less than that shown are also affected.