

SNUPPS

Standardized Nuclear Unit
Power Plant System

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SUBJ: Final Report: Lock-up of the
RM-23 Display in the Radiation
Monitoring System (SDR 83-04)

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Docket Nos. STN 50-482 and STN 50-483

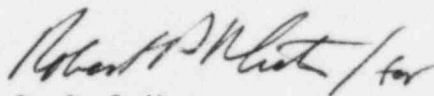
Ref: SLNRC 83-016, 3/22/83: Same Subject

Gentlemen:

The referenced letter provided an interim significant deficiency report to NRC Region III and Region IV representatives. The report was filed on behalf of Union Electric Co. (UE) and Kansas Gas and Electric Co. (KGE) and is applicable to the Callaway and Wolf Creek Radiation Monitoring Systems. The reported deficiency involves a display lock-up associated with the RM-23 control/display module which could give control room operators an erroneous indication of channel activity for ten safety-related radiation monitors.

Attached is the final report concerning this deficiency. Please note that tests performed by the vendor, G.A. Technologies, have confirmed that proposed modifications to a circuit board in the RM-23 control/display module will correct the software design deficiency. Current plans are to return these circuit boards to the vendor for modification and testing, and to install the modified circuit boards at Wolf Creek and Callaway prior to fuel loading. In addition to the control/display modules which have been shipped to Callaway and Wolf Creek, several modules have not yet been shipped to the SNUPPS sites. These unshipped control/display modules will be modified prior to shipment.

Very truly yours,


S. J. Seiken
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Attachment
cc: Page Two

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FINAL REPORT
ON
THE LOCK-UP OF
THE RM-23 DISPLAY
IN THE RADIATION
MONITORING SYSTEM
PER
10 CFR 50.55(e)

SNUPPS PROJECT

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1.0 INTRODUCTION

In compliance with 10CFR50.55(e), this report is being issued as a result of an anomaly observed in the RM-23 display during the start-up of General Atomics Technologies Inc. (GA) Radiation Monitoring System at a Non-SNUPPS nuclear power plant. Identical RM-23 control/display modules have been delivered to the Callaway and Wolf Creek jobsites and the same defect is present in these units.

On February 23, 1983, Union Electric Co. (UE), and Kansas Gas and Electric Co. (KGE) notified NRC Region III and Region IV of a deficiency involving the lock-up of the RM-23 display in the radiation monitoring system. An interim report was submitted to the two NRC regions on March 22, 1983. GA has also reported the problem, pursuant to 10CFR21 reporting requirements.

2.0 DESCRIPTION OF RM-23 READOUT

The Class 1E RM-23 module is a complete microcomputer that is capable of making logical decisions according to instructions contained within its memory. The RM-23 module is used to provide display and control of safety-related digital radiation monitoring data. The RM-23 modules are located in the control room.

Specifically, the RM-23 functions are as follows:

- a. Provides digital display
- b. Command control of monitor functions
- c. Loading or changing of the digital radiation monitor data base

3.0 DESCRIPTION OF DEFICIENCY

During start-up of one of the GA Radiation Monitoring Systems at a Non-SNUPPS nuclear power plant, an intermittent lock-up of the RM-23 digital display was observed. The lock-up caused the channel activity display to freeze at the most recent activity value for each channel.

4.0 ANALYSIS OF SAFETY IMPLICATIONS

The control room RM-23 display lock-up deficiency could give an erroneous indication of the channel activity for the ten safety-related radiation monitors. The safety isolation function of the monitors is not affected.

5.0 RESOLUTION AND CORRECTIVE ACTION

GA has conducted an extensive testing and design review to resolve the deficiency and has concluded that the defect is with the RM-23 software.

Modified RM-23 software has been developed to prevent the

conditions which caused the lock-up. Additionally, a re-start feature has been incorporated which detects that a lock-up has occurred and automatically re-starts the RM-23. This change eliminates the potential for future undetected lock-ups. The RM-23 with the modified software was powered and operated continuously for several weeks with completely satisfactory results.

In order to rectify the deficiency, the RM-23 control/display modules are being returned to GA for rework and modification at their facility.

6.0 CONCLUSIONS

The Class 1E RM-23 control/display modules were found to have a software deficiency that, if allowed to exist, would give an erroneous indication in the control room and would render the RM-23 display module unserviceable. The correction will assure that all the RM-23 control/display modules will function as designed, and satisfy their safety design basis.