



February 8, 1994

Document Control Desk
U. S. Nuclear Regulation Commission
Washington, D.C. 10555

Gentlemen:

Subject: 10CFR21 Reportability Item - Microprocessor Stack Overflow

As an unanticipated result of investigations conducted to determine channel item discrepancies for a Sorrento Electronics' wide range gas monitor in use at New York Power Authority's Indian Point 3 (IP3) power plant, it was determined by use of newly acquired communication testing software that memory locations used for memory stack data can overwrite a preset stack size limit. The overwritten memory locations can then lead to unanticipated subroutine calls and cause the microprocessor to perform unanticipated activities. These subsequent activities preclude calls to lower priority level tasks such as history updates, thus "hanging" lower level activities. The lower priority level tasks (those RM 80 tasks below TP6SEC in priority) are likely to be affected.

In practice, field experience with the RM 80 suggests that the probability of stack overflow occurrences are very low. The anomaly is related to stack size and the amount of stack size used is a function of subroutine and communication interrupts used to fill the stack, the anomaly manifests itself in monitor applications using multiple communication ports (the RM 80 A, B and C ports). This deviation in intended function potentially affects all RM 80 configurations where more than one communication port is in use.

This condition is viewed by Sorrento Electronics as a reportable defect as defined by 10CFR21 because stack overflow errors are not directly detectable and alarmed, and the anomaly can only be determined through query of Monitor Items that are changed as a function of low priority level tasks. Operators of RM 80 equipment in multi ported communication configurations can assure proper functioning of the RM 80 equipment by changing the value of Monitor Item 50 to an arbitrary value. If, after a six minute time interval, the value of Monitor Item 50 does not change, it infers that the lower priority tasks have not been called due to stack overflow. This method can be used as a site surveillance method to assure continued correct monitor operability. In order to clear the anomaly, the operator may perform a CPU reset.

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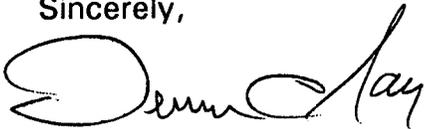
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Additionally, limiting usage of the RM 80 communication port to a single communication port or into "BYPASS" mode will reduce communication interrupts to the stacks, thus reducing the already small possibility of stack overflow.

The engineering staff at Sorrento Electronics has preliminarily determined that anomalies resulting from the stack overflow problem can be eliminated by straightforward firmware changes. These changes will be thoroughly investigated and confirmed prior to manufacturing release in conformance with Sorrento Operating Procedures.

If it is determined that evaluation of firmware used in multi communication ported configurations at your site is in order, SE can offer assistance similar to that already performed for IP3. Alternately, SE can prepare revised firmware which incorporates the correction and provide you with the necessary documentation and programmed PROMs to allow you to eliminate the potential error altogether. Should you have further questions, please contact Mr. John Bickley, our supervisor of Customer Service at 1-800-955-2258.

Sincerely,



Dennis C. Nau
President

DCN/dd

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10CFR21 Files (QA)