

I/A EMPLOYEE CONCERNS
SPECIAL PROGRAM

REPORT NUMBER: 303.05-SQN

REPORT TYPE: Sequoyah Nuclear Plant - Element

REVISION NUMBER: 4

TITLE: Reliability, Design and Maintenance of Radiation
Monitoring Equipment

REASON FOR REVISION:

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| To include three additional concerns and incorporate TAS and SRP comments. | Revision 1 |
| To incorporate TAS and SRP comments | Revision 2 |
| To include one additional concern and incorporate SQN Corrective Action Plan | Revision 3 |
| To include CAQR No SQP870178 and tracking | Revision 4 |

PREPARATION

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TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
EMPLOYEE CONCERNS TASK GROUP
OPERATIONS
CEG

Subcategory: Instrumentation and Radiation Monitoring

Element: Reliability, Design and Maintenance of
Radiation Monitoring Equipment

Report Number: 303.05 SQN Revision 4
SQP-86-003-001
XX-85-044-001
CWL-85-001
XX-85-051-001
SQP-86-003-N04
SQP-86-003-N05

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I. Reliability, Design, and Maintenance of Radiation Monitoring Equipment

This report evaluates a generic concern, three specific employee concerns, and two NRC identified concerns for Sequoyah Nuclear Plant (SQN), regarding radiation monitors, flow controls, and the improper installation of a unit 2 radiation monitor cable. These concerns were determined to be potentially safety-related by the Employee Concerns Task Group (ECTG) Technical Assistance Staff (TAS).

II. Specific Evaluation Methodology

The employee concern identified to Quality Technology Company (QTC) for a unit 2 SQN radiation monitor cable is as listed below:

SQP-86-003-001

The radiation monitor cable is not installed properly. Penetration 23, lower containment, unit 2, modifications. (Names/details known to QTC and withheld to maintain confidentiality). No further information may be released. This is a Nuclear Power concern. CI has no further information.

NRC identified the following issues which pertain to the above concern from review of the QTC file.

SQP-86-003-N04

"CI states more cables (in addition to the radiation monitor cable cited in SQP-86-003-001) may have a similar problem in penetration 23. Integrity of all connectors and associated heat shrink is in question."

This concern refers to cables in addition to the radiation monitor cable cited in SQP-6-003-001.

SQP-86-003-N05

"SQP-86-003-001 is potentially reportable"

The issues above were reviewed and the scope was determined to be the adequacy of cable installation in unit 2, penetration 23 at SQN. The NRC expurgated file for SQP-86-003 was reviewed for additional information and it was determined that the area of concern was with the coaxial cable connectors being loose. The generic issue of the proper use of Raychem heat shrink is being addressed by Operations Category Element Report 302.01-SQN and was not addressed by this evaluation.

The ECN and workplans which performed the modifications to penetration 23 were reviewed and the cognizant modifications engineer was interviewed for details. The evaluation was conducted at SQN.

The employee concern identified to QTC for a SQN radiation monitor is as listed below:

XX-85-051-001

Sequoyah: The radiation monitor (1-RM-90-104) has not been maintained and is not always operable. Any further information would compromise confidentiality. This is a Nuclear Power concern.

The ECTG files were reviewed and a report by NSRS was found which addresses the identified concern.

The following concern was identified to the SQN Employee Concerns Program for air monitor flow controls and was assigned a concern number by ECTG.

CWL-85-001

Why are the air monitor flow controls for 2-RE-90-100 not listed as either technical specification or compliance instruments?

The ECTG files were reviewed and a SQN plant response was found which addresses the identified concern. The SQN instrument engineer who prepared the memorandum was contacted for clarifying information.

The following concern identified to QTC for Browns Ferry Nuclear Plant (BFN) was determined generically applicable to SQN:

XX-85-044-001

At BFN there was an accident of radiation release on the reactor refuel floor on June 26, 1985. The concern is that Continuous Air Monitors (CAMS) did not function properly and did not register radiation levels accurately. CAMS are obsolete and should be replaced by modern instruments such as particulate iodine noble gas (PINGs). CI has no further information.

The concern was reviewed and the scope, with regard to SQN, was determined to be the adequacy of airborne particulate monitors and whether they should be replaced by more modern instruments. These monitors are listed in SQN Final Safety Analysis Report (FSAR) Table 12.2.4-1.

The SQN FSAR and monthly Surveillance Instructions (SI) SI-204 were reviewed and informal interviews were conducted with personnel in SQN Instrument Maintenance and Division of Nuclear Engineering (DNE) Instrument and Control (I&C) Section. The evaluation of this concern was conducted at SQN.

III. Findings

SQP-86-003-001, SQP-86-003-N04 and SQP-86-003-N05

The NRC expurgated file for SQP-86-003 was reviewed and it was discovered that the timeframe of the concern was approximately 3 months before the concerned individual's interview. Although the date of the interview was not given, it was assumed in late 1985 or early 1986. An engineering change notice (ECN) L6490 (Reference 1) was found which replaced penetrations 23 and 48 in late 1985 and early 1986; therefore, this modification was considered as the area of concern. A Cognizant Modifications planner indicated that ECN L6490 was implemented by workplans 11802, 11808, and 11959 for unit 2.

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The Cognizant Modifications engineer was contacted and confirmed that there had been some problems with the cable connectors. The dimensions for trimming the coaxial cable insulation provided by the vendor were not adequate to allow proper connection installation. These dimensions were modified by instruction change (IC) 85-1513 on November 27, 1985, with QA concurrence. The engineer confirmed that on a few occasions, connectors believed properly installed at the end of a shift were found loose the next day. These connectors had not yet been terminated and were reworked and inspected by QA before termination and heat shrinking of the Raychem in-line protective covering. The engineer stated that this only happened a few times and only to a few cables that could not be terminated before the end of the shift. The normal process was to install the connector, perform megger and continuity checks, and then apply the Raychem shrinkable covering before starting the next cable. QA inspections were performed at each step of this process as indicated in the workplan. Any further tampering with the connectors would require the obvious removal of the Raychem covering and no cases such as this were ever identified. In addition to the megger and continuity checks for each cable, SI-686.2 was performed by instrument maintenance to functionally check the radiation monitors and return them to operable status upon completion of the modification (Reference 3 and 4). No deficiencies were identified during performance of the SI except for one monitor being out of calibration. This monitor was recalibrated before its return to operability.

Conditions adverse to Quality Report (CAQR) No. SQP870178 was issued March 10, 1987 because incorrect vendor instructions were identified. These instructions pertained to installation of shields on Amphenol connectors that were being used during preparation for installation of the connectors at penetrations 23 and 48 (Reference 12 and 13).

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XX-85-051-001

The NSRS report (Reference 5) on this employee concern was reviewed and adequately addresses the stated concern. The report stated that 1-RM-90-104 is tagged "out-of-service," and the surveillance instructions are not being performed pending implementation of DCR 1596 to remove the monitor. The report also states that the specified radiation monitor performs no safety-related function and is not required to meet any technical specification requirements.

CWL-85-001

A memorandum was found to the concerned individual from the SQN Instrument Maintenance Section (Reference 9) which stated that the controls in question were for the shield building stack airflow monitor sample pump. According to the SQN instrument engineer who prepared the memorandum, the airflow sample pump and controls are not required since the radiation monitor has its own sample pump and flow controls which are technical specification instruments. Therefore, the airflow monitor sample pump and flow controls are not required for any technical specification requirements.

XX-85-044-001

The SQN FSAR states that continuous airborne radiation monitoring is performed to comply with 10 CFR 50 Appendix A, General Design Criterion 19, 63, 64 and 10 CFR 20.103 (Reference 10). However, these monitors are not required to meet any technical specification requirements.

The cognizant supervisors in the DNE I&C Section both agreed that the equipment in place for airborne monitoring adequately meets the FSAR design requirements although it is not state-of-the-art. The supervisors also stated that two PINGs are in place for effluent monitoring (condenser vacuum exhaust and shield building exhaust) and it was their understanding that instrument maintenance has had significant problems calibrating them.

A cognizant instrument maintenance engineer and an instrument mechanic foreman were contacted and confirmed problems with calibrating Eberline PINGs. The Eberline equipment is digital and the General Atomic CAMS are much more reliable to operate and maintain.

They both stated that the CAMS were not technical specification instrumentation, however they are maintained by SIS weekly, monthly, and on 18-month intervals as stated in the FSAR. They both agreed that the CAMS were adequate to meet the design requirements and believed that changing to PINGs would reduce the reliability of the system. There has been discussion about replacing the Eberline PINGs because of the reliability/maintenance problems although no decisions have been made at this time.

A spot check of SI-204, "Data Packages," from January through March 1986, revealed no CAMS out of calibration (Reference 11).

Conclusion

1. The issues presented by SQP-86-003-001, SQP-86-003-N04 and SQP-86-003-N05 were not validated and no safety-related deficiencies were identified. Some radiation monitor cable connectors were found loose during the modification, but were corrected and inspected by QA before termination. Megger and continuity checks and surveillance testing were performed before return to service to ensure proper installation of the cables in penetration 23.

CAQR No. SQP870178 was issued March 10, 1987 because incorrect vendor instructions were identified during preparations for installation of Amphenol connectors at penetrations 23 and 48.

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2. The issue presented by concern XX-85-051-001 was validated by the NSRS report and this report; however, the monitor is not a technical specification instrument, nor is it a compliance instrument, nor is it used in any analysis to detect or mitigate an accident. In addition, the monitor performs no automatic safety function depended upon during a fuel failure accident. The monitor is currently scheduled to be removed by DCR 1596, therefore, failure to maintain the instrument is of no safety significance.

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3. The issue presented by concern CWL-85-001 was not validated and no safety-related deficiencies were identified. The airflow sample pump controls are not required for operation of 2-RE-90-100. The radiation monitor has its own separate sample pump and controls which are technical specification instruments.

4. The issue presented by concern XX-85-044-001 could not be validated for SQN and no safety-related deficiencies were identified by this evaluation. The personnel contacted in DNE and SQN Instrument Maintenance were in agreement that the CAMS are adequate to meet the design requirements for airborne monitoring as discussed in the FSAR, and based on their experience, are more reliable than the PINGs used for other applications at SQN.

IV. Root Cause

No deficiencies were identified by this evaluation, and thus root cause is not identified.

V. Generic Applicability

Concern SQP-86-003-001, SQP-86-003-N04, and SQP-86-003-N05 were determined to be not valid regarding the concern specifics. The issue identified regarding incorrect vendor instructions will be evaluated for generic applicability by CAQR SQP 870178 and tracked by CATD 30305-SQN-04. XX-85-051-001, and CWL-85-001 are not considered generic to any other plant because they identify specific concerns related to SQN.

XX-85-044-001 has been evaluated for BFN and SQN with no negative findings. Based on this, there is no reason to suspect a safety-related deficiency at either WBN or BLN. Therefore, this concern is not considered generic to WBN or BLN.

VI. References

1. Engineering Change Notice (ECN) L6490 (B25 860114 542)
2. Workplan 11802 and 11808
3. SI-686.2, R3 "Channel Calibration for High-Range Accident Radiation Monitors," November 1, 1985
4. SI-686.2, "Data Package," February 3, 1986, SRO Approved and Complete
5. Nuclear Safety Review Staff (NSRS) Investigation Report I-85-613-SQN, "Maintenance and Operability of Process Radiation Monitor 1-RM-90-104," November 26, 1985
6. Memorandum from H. L. Abercrombie to K. W. Whitt, Plant Response to NSRS Report I-85-613-SQN, dated December 20, 1985
7. Memorandum from K. W. Whitt to H. L. Abercrombie, Corrective Action Response Evaluation to NSRS Report I-85-613-SQN, dated February 13, 1986
8. Design Change Request (DCR) P-1596, September 15, 1983
9. Memorandum from H. D. Elkins to Marvin Phillips, Response to Employee Concern, dated December 10, 1985
10. SQN FSAR, Amendment 3, Section 12.2.4
11. SQN SI-204, "Data Packages." January 10, 1986, February 7, 1986, and March 8, 1986, "Functional Tests of Radiation Monitoring System Channels (Monthly)," Data Sheet 3
12. SQN CAQR No. SQP870178: dated March 10, 1987; Revision 0.
13. Telephone Call and Visit Report (TVA form 5875) by Dan Ford, NRC Inspector, "NRC Concerns or TVA Element Report 303.05," dated March 5, 1987.

VII. Immediate or Long-Term Corrective Action

Although no safety-related deficiencies were identified by this evaluation report, the NSRS report conducted for XX-85-051-001 made some recommendations to SQN with regard to expediting DCR 1596 and revision to SIs to clearly distinguish between nontechnical specification monitors and technical specification monitors by locating them within separate SIs. The SQN response (Reference 6) stated that the current DCR implementation schedule was justifiable since the monitors performed no safety functions and that providing separate SIs placed an undue burden on the plant staff. The NSRS accepted this response (Reference 7) after SQN agreed to revise the SIs to clearly denote technical specification and nontechnical specification monitors within the SI. This is indicated in the SQN Corrective Action Plan (CATD 30305-SQN-01) which states:

SIs associated with radiation monitors will be revised to clearly distinguish between Non-Tech Spec and Tech Spec monitors.

In response to problems with PINGS, (CATD 30305-SQN-02) the SQN Corrective Action Plan states:

Factory representative from Eberline Rad Monitor will be requested to assist in correcting inherent problem with PING monitor control room control terminal and also provide IM with class on troubleshooting techniques and system description.

CAQR No. SQP870178 was issued March 10, 1987 for deficiencies identified concerning Amphenol connector installation. CATD 30305-SQN-04 was issued to track this CAQR and associated corrective action.