



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

EMPLOYEE CONCERN ELEMENT REPORT FOR

EMPLOYEE CONCERN ELEMENT REPORT 302,06

"TRANSFER CANAL ELECTRICAL EQUIPMENT PROBLEM"

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR POWER PLANT UNITS 1 AND 2

I. SUBJECT

Category: Operations (30000)

Subcategory: Cables and Conduits (30200)

Element: Transfer Canal Electrical Equipment Problem (30206) :
Rev. 3

Employee Concern: SQP-5-004-002 and SQP-6-011-001

The basis for Element Report 30206 SQN Revision 3 dated April 24, 1987 is two employee concerns which state that (1) the electrical equipment in the transfer canal is not per the drawing and (2) there are no "as constructed" drawings of the fuel transfer system.

II. SUMMARY OF ISSUE

These concerns are Sequoyah operations personnel concerns. Both concerns are from anonymous sources. TVA performed several walk-downs and concluded that the drawings are correct and reflect as-built conditions.

III. EVALUATION

The TVA review of these concerns focused on a fuel transfer canal inspection and concluded that the installed equipment was correct, per the drawing, and reflected the as-built configuration. NRC and its contractor, SAIC, reviewed this employee concern in January 1987 and found that the report provided details and an evaluation of the electrical equipment in the fuel transfer canal only. The report therefore narrowly addressed the employee concerns. NRC submitted a request for additional information which requested an evaluation of the employee concern for the entire fuel transfer system. TVA has responded to this by performing a review of the as-built configuration of the fuel transfer system pit side panels. No significant discrepancies were found.

IV. CONCLUSION

On the basis of this augmented inspection, we conclude that the employee concerns do not reflect an unsafe condition at Sequoyah. The increased TVA sample inspection found no significant discrepancies. In addition, TVA found all drawings correctly show as-constructed conditions.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT 30302 "LOCATION OF COLD LEG
ACCUMULATOR AND RWST LEVEL TRANSMITTERS"

I. Subject

Category: Operations (30000)

Subcategory: Instrumentation and Radiation Monitoring (30300)

Element: Location of Cold-Leg Accumulator and RWST
Level Transmitters (30302)

Employee Concerns: IN-85-281-003, IN-85-142-006

The basis for Element Report OP-30302-SQN Rev. 4, dated November 21, 1986, are two Watts Bar specific concerns which state:

"The two level transmitters on each of the cold-leg accumulators will not read the same level due to differences in elevation. Transmitters have been calibrated as per scaling data sheet. When put in service transmitters will read a 5% difference in level. When the engineers were told about the problem they said don't worry about it adjust one until both level indicators read the same. (Unit 1)" (IN-85-281-003)

"RWST in Unit 1 narrow range 1-LT-63-46 and 1-LT-63-49 readings were 6% off. Instrument engineer (name known) directed instrumentation mechanic to adjust to zero. This would make reading match the control room. Similar on SIS accumulators 1-4, elev. 716'. Two transmitters on each accumulator. This practice causes false reading in the control room." (IN-85-142-006)

II. Summary of Issue

The issue defined by TVA concerns the adequacy of calibration and installed location of certain Sequoyah level transmitters.

III. Evaluation

The TVA evaluation of this issue consisted of a review of Sequoyah plant calibration methods and historical performance. Technical Specifications were reviewed to determine borated water level requirements for both the cold-leg accumulator (CLA) and Refueling Water Storage Tank (RWST). Interviews with the Instrument Maintenance Section cognizant engineer revealed that problems did exist with CLA level transmitters at Sequoyah, in that deviations between level channels on the same CLA were observed. The TVA evaluation determined that these deviations were the result of elevation differences on sense line taps. Similar deviations were noted on level transmitters for the RWST. A large majority of the problems associated with the RWST transmitters were related to frozen sense lines. The interviews and a review of a large number of Sequoyah Maintenance Requests (MRs) which relate to these components, also indicate that

maintenance problems exist in the form of "instrument drift". As a result of these observations TVA determined that concerns IN-85-281-003 and IN-85-142-006 were valid at the Sequoyah nuclear power station.

The TVA evaluation of "Root Cause" for these items concluded that a lack of an adequate trending program designed to identify and resolve problems for "High Maintenance" equipment was a contributing factor.

In response to these findings TVA has provided the following corrective actions:

- Surveillance Instructions (SI) SI-706.1 and SI-706.2 were initiated to verify operability of RWST sense line heat trace circuits. The performance of these surveillance activities should reduce the maintenance problems (instrument drift) relating to sense line freezing.
- Sequoyah has implemented a new maintenance trending program to identify and evaluate potential plant and component maintenance problems.
- Sequoyah Instrument Maintenance has taken field measurements of the RWST and CLA transmitters and the sense line taps to compensate for different head pressures at the transmitters.
- The CLA level transmitters are scheduled to be replaced by ECN L6358.

IV. Conclusion

The NRC Staff believes that the TVA investigation of concerns IN-85-281-003 and IN-85-142-006 was adequate and their resolution of the concerns as described in Element Report OP-30302 Rev. 4, is acceptable for restart.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS ELEMENT
REPORT 30303 "ACCURACY OF SAFETY-RELATED INSTRUMENTS"

I. Subject

Category: Operations (30000)

Subcategory: Instrumentation and Radiation Monitoring (30300)

Element: Accuracy of Safety-Related Instrumentation (30303)

Employee Concerns: IN-85-802-001, IN-86-079-002

The basis for Element Report OP-30303-SQN Rev 3, dated November 10, 1986, are Watts Bar employee concerns IN-85-802-001 and IN-86-079-002 which state:

"Both Units 1 and 2, problem exists with Target Rock valves installed on both Sampling System and Main Steam System. Target Rock valves improperly annunciate part of the time and reed switches on the valves require constant adjustment. Valves in the sampling system, located on 3/8" stainless steel lines in annulus and primary containment areas. Valves in main steam system, located on either 2-inch or 3-inch stainless steel lines in the south valve room. CI did not specify the line numbers or valve serial or mark numbers." (IN-85-802-001)

"Questionable adequacy of safety-related equipment accuracy and questionable calibration procedures for this equipment. Details known to QTC, withheld due to confidentiality. Nuclear Power (NUC PR) concern, Units 1 and 2, system withheld, time frame current. Concerned individual (CI) has no further information." (IN-86-079-002)

These concerns were evaluated by TVA as potentially safety-related.

II. Summary of Issue

The issues defined by TVA concern maintenance and potential operational problems with Target Rock valve reed switches, and the operational accuracy of safety-related instrumentation.

III. Evaluation

The TVA evaluation of these concerns is based upon information detailed in two Generic Concerns Task Force (GCTF) reports.

Regarding maintenance and operation of safety-related Target Rock solenoid valves which utilize reed switches, the GCTF report indicates that Sequoyah plant usage is limited to three systems. Valves installed in systems (30) and (43) utilize the position switch as a seal-in contact to

maintain the valve in an "open" position. Target Rock valves in system (68) utilize the position switch for indication only, consequently, function of the valve is not affected.

The valves installed in system (43) are functionally deenergized, and provide containment isolation for the Post Accident Sampling Facility. The system (30) valves provide containment isolation for a pressure differential transmitter which had not been qualified for post accident use. While the GCTF report does indicate that misadjustment of the valve position switches could result in "operation confusion" due to inaccurate position indication, an operational evaluation concludes that switch misadjustment would not affect the safety function of these components. However, based upon the recommendations of the GCTF report and the possibility of "operator confusion" due to inaccurate valve position indication, TVA has initiated steps to provide formal maintenance instructions for adjustment of Target Rock valve position switches.

The TVA evaluation of concern IN-86-079-002 consisted of a review of the GCTF report, examination of Technical Specifications and interviews with cognizant personnel. The evaluation determined that the safety-related instrumentation in question had been properly calibrated, and that set points were established below the limiting conditions for operation defined in the plant Technical Specifications. The question of component accuracy was addressed through evaluation of the calibration techniques used for this equipment. Based upon this evaluation the GCTF report concludes that the subject safety-related radiation monitors are properly calibrated and will perform their intended function.

IV. Conclusion

The NRC Staff believes that the TVA investigation of concerns IN-85-802-001 and IN-86-079-002 was adequate and their resolution of concerns as described in the Element Report 30303-9QN is acceptable for restart.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1&2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT OP-30305
"RELIABILITY, DESIGN, AND MAINTENANCE OF
RADIATION MONITORING EQUIPMENT"

I. Subject

Category: Operations (30000)

Subcategory: Instrumentation and Radiation Monitoring (30300)

Element: Reliability, Design and Maintenance of Radiation Monitoring
Equipment (30305)

Employee Concerns: SQP-86-003-001, SQP-86-003-N04, SQP-86-003-N05,
XX-85-044-001, CWL-85-001 and XX-85-051-001

The basis for Element Report 30305-SQN, Rev. 4, dated March 12, 1987, are three Sequoyah specific concerns, two NRC identified concerns and one generic concern which state:

"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." (SQP-86-003-001)

"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. (XX-85-051-001)

"Why are the air monitor flow controls for 2-RE-90-100 not listed as either Technical Specification or compliance instruments?" (CWL-85-001)

"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." (SQP-86-003-N04)

"SQP-86-003-001 is potentially reportable." (SQP-86-003-N05)

"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 more modern instruments such as Particulate Iodine Noble Gas (PINGs). CI has no further information." (XX-85-044-001)

These concerns were evaluated by TVA as potentially safety-related.

II. Summary of Issue

Several issues were defined by TVA during evaluation of this element.

Employee Concerns SQP-86-003-001, SQP-86-003-N04, SQP-86-003-N05 and XX-85-044-001 address the reliability of components in the Sequoyah Radiation Monitoring system based upon alleged deficiencies in triax cable installations, and the use of "obsolete" instrumentation for monitoring airborne radiation.

Employee Concern XX-85-051-001 addresses the adequacy of maintenance activities associated with radiation monitor 1-RM-90-104.

Employee Concern CWL-85-001 addresses the adequacy of design classification for air monitor flow controls associated with 2-RE-90-100

III. Evaluation

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 of penetration 23, 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. (The generic issue of the proper use of raychem heat shrink is addressed in Element Report OP-30201.)

The issue presented by concern XX-85-051-001 was validated by an 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.

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.

The issue presented by concern XX-85-044-001 could not be validated 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. Conclusion

An NRC Outage/Modification inspection at Sequoyah during the periods December 7-18, 1986, and January 12-23, 1987, examined several components associated with the penetration modification cited in the TVA element report. Results of this inspection indicate no additional deficiencies in this area. The NRC staff believes that the TVA investigation of the concerns was adequate, and their resolution as described in Element Report 30305 is acceptable for restart.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 & 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT OF 30401, "PROCEDURE PROBLEMS"

I. Subject

Category: Operations (30000)

Subcategory: Cable and Conduit (30400)

Element: Procedure Problems (30401)

Concerns: TAK-86-005
IN-85-112-001

The basis for Element Report 30401 - SQN, Rev. 3, dated April 10, 1987, are the following employee concerns:

Concern TAK-86-005: Concerned individual (CI) stated that RTV applied to junction boxes on SMI-0-360-0 may not have been properly applied on all junction boxes. RTV was not QA level and had exceeded its shelf life. Employee stated that shelf life was not a concern as he has verified that RTV in question will in fact set up properly.

Concern IN-85-112-001: CI states that TVA Nuclear Power Department is not working in accordance with construction specifications when making modifications and additions. No maximum pull tension is specified when Nuclear Power Department personnel pulls a new cable and minimum bend radius is also not specified.

II. Summary of Issue

Concern TAK-86-005. References the questionable quality of RTV 3140 used to coat junction box terminal strips/blocks in order to comply with environmental qualification requirements of 10 CFR 50.49.

Concern IN-85-112-001. References the failure of TVA's Division of Nuclear Power to specify maximum pull tension or minimum bend radius when cable pulling operations are performed.

III. Evaluation

A. TAK-86-005. Cognizant engineers in the electrical maintenance section along with the supervisor that documented the concern were interviewed by the evaluator. The junction boxes to be coated were originally listed in Special Maintenance Instruction SMI-0-360-3, Rev. 0, and maintenance request MR No. A554518 was written to perform that actual work. It was determined that no traceability existed for the RTV 3140 used on this MR. Other MRs written for coating of terminal blocks were reviewed and the RTV 3140 used in these cases had proper material traceability. Since it was determined that only one junction box (3190) associated with

MR A554518 was required to be coated by the Environmental Qualification (EQ) binder TB001, the event was considered to be an isolated case. Junction box 3190 was later recoated under a separate MR using QA RTV 3140. The material traceability practices of the Electrical Maintenance Tool Room at the time of the subject work were found to be inconsistent with the intent of SQA 45, Rev. 17, Quality Control of Material and Parts and Services. This problem was later identified and investigated by NSRS. NSRS Report No. I-86-165 SQM addresses their findings. Sequoyah's responses of May 21, 1986, and July 1, 1986, to the recommendations on the NSRS Report, along with completed Discrepancy Reports, document completion of all recommended corrective actions.

- B. IN-85-112-001. The Construction Category Evaluation Group (CEG) has issued an element report No. C010900 SQM which also addresses the issue of cable installation practices and procedures, maximum pull tension and minimum bend radius. The concern was validated and is discussed in the subject element report. Based on this no further evaluation of the concern was conducted by TVA.

IV. Conclusion

The NRC staff believes that TVA's investigation of the first concern was adequate, and their resolution of that concern as described in Element Report OP 30401 is acceptable. The NRC staff will review the cable pulling issues associated with the second concern as part of the review of element report No. C010900 SQM.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT OP 30402, "ELECTRICAL PENETRATION BREACHED"

I. Subject

Category: Operations (30000)
Subcategory: Cable and Conduit (30400)
Element: Electrical Penetration Breached (30402)
Concern: IN-85-207-002

The basis of Element Report OP 30402-SQN, Rev. 3, dated November 14, 1986, is Watts Bar Employee Concern IN-85-207-002 which states:

Crafts are using steel fish tape in lieu of fiberglass or wood rods to breach penetration seals. This may cause damage to existing cables in the breached penetration.

This concern was evaluated by TVA as potentially nuclear safety-related and potentially applicable to Sequoyah (generic).

II. Summary

This concern was identified at Watts Bar and evaluated to be generically applicable to Sequoyah. The concern deals with the use of steel fish tape to breach penetration seals which may cause damage to existing cables in the breached penetration.

III. Evaluation

TVA determined by interviews that work involving a breach of penetration seals is performed per Modification and Addition Instruction (M&AI) 13, "Electrical Pressure Seal, Fire Stop Barrier, and Flame Retardant Cable Coating". M&AI-13 was implemented on December 4, 1979. Prior to Rev. 4, effective February 22, 1982, the use of metallic breaching tools was not allowed for breaching sealed penetrations. Rev. 4 to M&AI-13 allowed the use of a metallic breaching tool at the discretion of the responsible engineer. If a metallic breaching tool was authorized for use, the craft foreman was required to document that the metallic tool was free of burrs and sharp edges prior to use. This provision has remained in subsequent revisions (Rev. 7 is presently effective). To date, the use of a metallic breaching tool, under the controls specified in M&AI-13, has not caused any known damage.

The TVA investigation concluded that this concern was not valid for Sequoyah since procedural controls had been in place since December 4, 1979.

IV. Conclusion

The NRC staff believes that the TVA investigation of the concern was adequate, and their resolution of the concern as described in Element Report OP 30402 is acceptable for restart.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 & 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT OP 30403 "CABLE PROBLEMS IN MANHOLES"

I. Subject

Category: Operations (30000)

Subcategory: Cable and Conduit (30400)

Element: Cable Problems in Manways (30403)

Concerns: IN-85-945-001
BNP-QCP-10.35-8-13

The basis for Element Report 30403 - SQN, Rev. 2, dated November 7, 1986, are the following employee concerns:

Concern IN-85-945-001: Concerned individual (CI) stated that electrical manholes are in a very disorganized state. Cables are laying out of trays with several feet of slack due to cables being spliced and not laced down properly. Examples may be found in the manhole next to the "Fab" shop or manholes in front of the Turbine Building and Auxiliary Building entrance.

Concern BNP QCP-10.35-8-13: CI expressed concern about condition of manholes in electrical cable trench to IPS.

II. Summary of Issue

Concerns IN-85-945-001 and BNP QCP-10.35-8-13 reference the potential failure of electrical cables that are located in manholes at Sequoyah. The potential for failure is due to poor housekeeping, excessive moisture, and other conditions in the manholes possibly due to lack of control of maintenance or modification work occurring within the manholes.

III. Evaluation

The evaluator conducted interviews with various TVA management and engineering personnel concerning the condition of the electrical manholes and the potential for failure of electrical cables due to adverse conditions. Although no specific engineering requirements address this condition, experience has shown that some electrical cables have increased potential for failure after being subjected to excessive moisture for several years due to "water treeing". An inspection of electrical manholes at Sequoyah was performed which revealed the presence of

excessive water buildup, manhole sump pumps that were out of service, and general poor housekeeping with loose debris. The concerns were substantiated and determined to be due to lack of procedures governing housekeeping and preventative maintenance on sump pumps in electrical manholes. Corporate and site procedures failed to incorporate requirements to specify and maintain the environment for class 1E cables in manholes. As corrective action TVA has committed, prior to startup, to correct sump pump deficiencies (including power supply, controls, and discharge piping) in all class 1E/CSSC manholes. Additionally all class 1E/CSSC medium and low voltage power cables routed through manholes will be tested with the results evaluated to determine if the cables are adequate for their application with any inadequate cables replaced. As long term corrective action TVA will include an evaluation of all class 1E/CSSC cables and splices for fitness for duty relative to past and future submergence with respect to manufacturer's test data.

IV. Conclusion

The NRC staff believes that the TVA investigation of the concerns was adequate, and their resolution of the concerns as described in Element Report OP 30403 is acceptable.