



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

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS  
RESTART NUCLEAR SAFETY AND REVIEW STAFF RECOMMENDATIONS  
TENNESSEE VALLEY AUTHORITY  
SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2  
DOCKET NOS. 50-327 AND 50-328

1.0 INTRODUCTION

The Nuclear Safety Review Staff (NSRS) of the Tennessee Valley Authority (TVA) issued safety reports between October 1979 and February 1986 when it was disbanded. These reports described the results of internal TVA evaluations of the performance of TVA organizations in the TVA nuclear program. Of these reports, 63 reports were either related to the Sequoyah units or to organizations which controlled activities at the units.

These NSRS reports contained recommendations to the TVA line organizations for actions to be taken to address NSRS identified safety problems. Those NSRS recommendations which were not addressed by TVA and closed out by NSRS before it was disbanded were addressed by TVA through its Nuclear Management Review Group (NMRG) or its Employee Concern Task Group (ECTG). These are the open NSRS recommendations being addressed for Sequoyah in this evaluation.

2.0 BACKGROUND

As stated in TVA's letters dated October 27, 1986 and June 16, 1987, there are 158 open NSRS recommendations which were not closed out at the time the NSRS was disbanded. Of these, 97 were determined to be related directly or generically to Sequoyah. The other open NSRS recommendations are related to TVA nuclear plants other than Sequoyah. For the 97 open NSRS recommendations related to Sequoyah, 27 are considered restart items needed to be resolved before the restart of Sequoyah Unit 2 and 70 are considered non-restart items that may be resolved after the restart of Unit 2. This evaluation addresses the 27 restart NSRS recommendations and the acceptability of the 70 non-restart NSRS recommendations being classified as non-restart. The evaluation of the 70 non-restart NSRS recommendations will be the subject of a separate letter.

TVA issued three reports which addressed the 27 open NSRS recommendations that TVA considered restart items for Sequoyah. These reports are NMRG No. R-86-02-NPS, ECTG-NSRS-01, Revision 2, and ECTG-NSRS-02, Revision 1, which were submitted in letters dated December 17, 1986 and January 30 and January 16, 1987, respectively. The NMRG report addressed two open restart NSRS recommendations and the ECTG reports addressed the remaining 25 open restart NSRS recommendations. The latter ECTG report also identified 69 (of the 70) open non-restart NSRS recommendations which may be resolved after the restart of Sequoyah.

The staff evaluated the above two ECTG reports and issued its evaluation in its letter dated August 27, 1987. The criteria used to determine if an NSRS recommendation was a restart item was that approved in the staff's letter dated June 9, 1987. The staff concluded that (1) the NSRS recommendations considered to be non-restart items for Sequoyah were acceptable and (2) the corrective actions described by TVA in the two reports (ECTG-NSRS-01 and ECTG-NSRS-02) were adequate to address the 25 open restart NSRS recommendations. In the staff's letter, TVA was requested to submit the details of the corrective actions taken. This was to allow the staff to review these details before the restart of Sequoyah.

In response to the staff's letter of August 27, 1987, TVA provided the details of its corrective actions for the 25 open restart NSRS recommendations from the two ECTG reports. TVA provided the details in its reports SQN-NSRS-1, Revision 3, and SQN-NSRS-2, Revision 2. These were submitted by letter dated October 5, 1987. In this letter, TVA also provided the report SQN-NSRS-3 which addressed 70 non-restart NSRS recommendations. This latter report included the remaining one (of the 70) non-restart NSRS recommendation which had not been provided to the staff in report ECTG-NSRS-02 Revision 2.

This evaluation addresses the detailed corrective actions provided by TVA in its letters dated December 17, 1986 and October 5, 1987 on the 27 open restart NSRS recommendations. It also evaluates the conclusion by TVA that the additional non-restart open NSRS recommendation listed in report SQN-NSRS-3 is non-restart.

### 3.0 EVALUATION

The enclosed table lists the 27 open restart NSRS recommendations for Sequoyah. The table provides TVA's resolution for Sequoyah, the status of this resolution and the staff's evaluation of this resolution. The TVA resolution for Sequoyah is one of the following: (1) a TVA program discussed in the Sequoyah Nuclear Performance Plan, such as the Design Baseline Verification Program, (2) an ECTG element report generated by the TVA Special Employee Concern Program, (3) a Sequoyah or TVA corporate procedure or instructions which was generated, reviewed or revised, or (4) modifications which were done at Sequoyah. The staff evaluated each resolution to determine if it acceptably addresses the recommendation.

Based on its review, the staff concludes that the TVA resolutions are acceptable as a means to address the restart NSRS recommendations. Where the staff has verified that the NSRS recommendation is being acceptably addressed in the specific TVA resolution for Sequoyah, the staff has concluded in the enclosed table that the TVA resolution is acceptable and verified. Where the staff concludes the TVA resolution is acceptable but has not been able to review the specific procedure, instruction or modification, the staff has only concluded in the enclosed table that the TVA resolution is acceptable but not verified. The review of the specific procedure, instruction or modification will be the subject of a separate evaluation. The staff has concluded the inspections to verify the procedure, instruction or modification may be conducted after the restart of Sequoyah Unit 2.

The "acceptable and verified" finding for a TVA program or ECTG element reports means the NSRS recommendation is being acceptably addressed in the program or

element report and the staff's safety evaluation of that program or element report will also be the evaluation of the acceptability of the TVA resolution of the NSRS recommendation. Verified may also mean that the issue, such as NSRS recommendation R-86-01-SQN-01 on improvements in overall as low as reasonably achievable, has been addressed in the staff's evaluation of the TVA Sequoyah Nuclear Performance Plan (SNPP). The staff's Safety Evaluation on the SNPP was issued on January 21, 1988.

TVA has concluded that all the restart NSRS recommendations are closed because the ECTG has completed its review of the work on the resolution of these recommendations. In some cases, there may be some work remaining to be done by TVA. For example, NRC is still reviewing ECTG element reports referenced in the enclosed table and there are non-restart electrical calculations which may be completed after the restart of Sequoyah. Because TVA is tracking on these activities through at least the Sequoyah Activities List (SAL), TVA does not want to track these activities also as an open restart NSRS recommendation for Sequoyah. Therefore, TVA has concluded that all the restart NSRS recommendations for Sequoyah are closed. This is acceptable to the staff.

For NSRS recommendations where TVA may have additional work to do, the staff is tracking this work through its review of a TVA program or ECTG element report and the staff will be issuing a separate evaluation on its review of that program or element report.

For Recommendation R-84-19-WBN-07, Development of Criteria for Cable Tray Fill Level and QC Inspections, the staff reviewed TVA procedure SQEP-06, Revision 3, December 1987. Although TVA referred to SQEP-06, Revision 2, June 18, 1976 in its submittal dated October 5, 1987, the procedure had been revised since then. Section 4.5 of the procedure specifies the cable tray loading criteria. The staff concludes that this procedure provides acceptable criteria for cable tray fill levels and quality control inspections.

The NSRS recommendations which are not considered verified are addressed below:

### 3.1 Recommendation R-84-19-WBN-01

The NSRS identified that controlled documents are not clearly identified for all plants and the purposes and uses for each document have not been delineated. The NSRS referenced an instance at Watts Bar where logic and control drawings in the control room did not agree with electrical drawings and termination lists. This recommendation was considered by TVA to be generic to Sequoyah. The ECTG's investigation at Sequoyah determined that the electrical prints are controlled; however, the logic drawings are not controlled documents and have been removed from the control room. TVA also stated by phone on January 25, 1988 that control documents at Sequoyah are identified and the purposes of the documents are delineated.

The staff concludes that TVA's actions are acceptable to close out the NSRS recommendation. This will be verified in an inspection. Based on the Plant Modification and Design Control and Design Baseline and Verification Programs being conducted by TVA and reviewed by the staff, the staff concludes that the verification may be done after restart. These TVA programs are evaluated in the staff's Safety Evaluation Report on the SNPP, dated January 21, 1988.

### 3.2 Recommendation R-85-2-SQN/WBN-2

The NSRS identified the following as remaining to be done to close the issue on high-pressure seals: (1) issue procedure MI-1.11, (2) issue revised procedure SMI-0-94-3, (3) revise procedure SMI-0-94-3 and (4) revise appropriate instructions to preclude pressurizing the primary systems with the thimble tubes disconnected from the overhead path transfer system (OPTS) or preclude work on the seals with the primary system pressurized above atmospheric pressure and the thimble tubes disconnected from the OPTS. TVA stated that the special maintenance instructions were reviewed for adequacy, compared to the recommendations and found acceptable. Interviews were also held to verify that the level of understanding the lessons learned was acceptable.

The staff concludes that TVA actions to close the NSRS recommendation are acceptable. The instructions will be verified in an inspection. Based on the staff's review of TVA maintenance program and its maintenance instruction enhancement program as described in TVA's Sequoyah Nuclear Performance Plan (SNPP), the inspection may be conducted after restart of Sequoyah Unit 2. The staff's evaluation of TVA's maintenance program is in its Safety Evaluation Report of the SNPP, dated January 21, 1988.

### 3.3 Recommendation I-85-06-WBN-05

The NSRS recommended that the TVA Division of Quality Assurance identify the required controls applicable to systems identified with limited quality assurance (QA) in the TVA Nuclear Quality Assurance Manual (NQAM). TVA stated that the NQAM contains a revised description of the limited QA program and specified the requirements that are imposed on the 13 features and programs to which a limited QA applied. At Sequoyah, TVA stated that these requirements are implemented in procedure Standard Practice SQA-189.

This is acceptable to the staff to close out the NSRS recommendation. An inspection will be conducted to verify that procedure SQA-189 properly implements the NSRS recommendation. Based on the staff's review of TVA's quality assurance program as described in the SNPP, the inspection may be conducted after the restart of Sequoyah Unit 2. The staff's evaluation of the site quality assurance program is in its Safety Evaluation Report of the SNPP, dated January 21, 1988.

### 3.4 Recommendation R-80-05-SQN-10

The NSRS recommended that the design of the Sequoyah containment and other areas be reviewed to determine if they are adequate to withstand the effects of tornados. The additional analyses by TVA to verify the adequacy of the structures at Sequoyah to withstand tornados were reviewed and approved by NSRS except for one issue.

For NSRS recommendation R-80-05-SQN-10, there is an apparent inconsistency between the TVA report ECTG-NSRS-02, Revision 1, and SQN-NSRS-2. The former report was submitted by letter dated January 16, 1987 and was addressed in the staff's Safety Evaluation dated August 27, 1987. The former report stated that

the NSRS had concluded that its remaining concern was the temperature monitoring system which was to be installed in the 480-V shutdown transformer rooms. The latter report was in the TVA submittal dated October 5, 1987, and stated that the only remaining concern was vertical missile strikes down the exhaust vent of the containment. On November 2, 1987, TVA (R. Gagne, ECTG program) stated that the two concerns were in fact the same concern.

TVA stated that a missile plate has been installed beneath the opening of the exhaust vent to provide protection installed directly under the opening. This is acceptable to the staff to close out the NSRS recommendation. This will be verified in an inspection; however, based on the staff's review of the Design Baseline and Verification Program being conducted by TVA, the inspection may be conducted after restart of Sequoyah Unit 2. This program was evaluated in the staff's Safety Evaluation Report on the TVA SNPP, dated January 18, 1988.

### 3.5 Recommendation R-82-08-NPS-01

The NSRS determined that water quality analytical procedures were inadequately controlled and documented and inconsistencies were found between the Nuclear Steam Supply System vendor procedures and ASTM standards. The NSRS report stated that there were no procedural controls established for the central office preparation, qualification and issuance of analytical procedures. TVA stated that procedural controls for qualifying and issuing analytical procedures are required by the NQAM and implemented for Sequoyah through procedure SQE 22. In addition, major modifications have been made to upgrade the water chemistry program.

The staff concludes that TVA's actions are acceptable to close out the NSRS recommendation. This will be verified in an inspection. Based on the staff's review of TVA's quality assurance program as described in the SNPP, the inspection may be conducted after the restart of Sequoyah Unit 2. The staff's Safety Evaluation Report on the SNPP was issued on January 21, 1988.

### 3.6 Recommendation R-84-17-NPS-12

The NSRS determined that the receipt inspection between Field Quality Engineering and Power Stores for QA levels I and II material and commercial grade items was inadequate. It recommended that such items be receipt inspected by individuals qualified to ANSI N45.2.6. TVA stated that receipt inspection of these items are done by individuals qualified to that ANSI standard.

The staff concludes that TVA's actions are acceptable to close out the NSRS recommendation. An inspection will be conducted to verify the implementation of TVA's actions. Because the staff has addressed TVA's piece part qualification program in its evaluation of TVA's SNPP and found it acceptable, this inspection may be conducted after the restart of Sequoyah Unit 2. The staff's Safety Evaluation Report on the SNPP was issued on January 21, 1988.

### 3.7 Recommendation I-86-101-SQN

The NSRS determined that the Conax connectors in the containment did not always meet vendor wire bend radius requirements and that deficient connector installations were accepted by Sequoyah quality control. TVA stated that work requests were initiated in 1986 to correct problems found during its verification activities. These work requests have been completed. TVA has addressed its quality assurance program in the SNPP.

The staff concludes that TVA's actions are acceptable to close out the NSRS recommendation. The staff evaluated TVA's quality assurance program in its Safety Evaluation Reports on TVA's Corporate and Sequoyah Nuclear Performance Plan, dated July 28, 1987 and January 21, 1988. The program was found acceptable by the staff. The staff has also examined this specific issue as part of its evaluation of TVA Inspection Performance in its Safety Evaluation Report dated October 22, 1987 and found it acceptable. Therefore, an inspection to verify the work requests may be conducted after the restart of Sequoyah Unit 2.

### 4.0 CONCLUSION

Based on its review of the TVA submittal dated October 5, 1987, on restart NSRS recommendations, the staff concludes that (1) all the restart NSRS recommendations are closed and (2) all the TVA resolutions at Sequoyah for the restart NSRS recommendations are acceptable as a means to address the recommendation.

In some cases, the staff has been able to verify that the TVA resolution, a program or an element report, is acceptably addressing the NSRS recommendation. In these cases, the staff has concluded that the TVA resolution is acceptable and verified. The separate staff safety evaluation on the program or element report will address the acceptability of that program and element report. Where the staff has not concluded a resolution is verified, the staff will, in a future letter, address the specific procedure, instruction or plant modification.

In its submittal dated October 5, 1987, TVA also provided its resolution for 70 non-restart open NSRS recommendations. The staff's review of these TVA resolutions at Sequoyah will be the subject of a separate evaluation. The TVA submittal dated October 5, 1987, provided an additional non-restart NSRS recommendation which had not been evaluated by the staff in its Safety Evaluation dated August 27, 1987. This additional recommendation is 79-10-03-3, concern for reliability, in TVA report SQN-NSRS-3. This recommendation report stated that programmatic aspects of reliability activities did not exist at TVA in 1979. The staff concludes that, in accordance with the restart criteria approved in its letter dated June 9, 1987, this is not a restart item. The ECTG has concluded in its report that this recommendation has been satisfactorily addressed and TVA has an active reliability program.

An inspection will be conducted to verify implementation of TVA corrective actions for those NSRS recommendations that the staff concluded in the Table were acceptable but not verified. The staff has concluded that this inspection does not have to be conducted prior to the restart of Sequoyah Unit 2.

5.0 REFERENCES

1. Letter, R. L. Gridley (TVA) to H. Denton (NRC), Nuclear Manager's Review Group Report, R-86-02-NPS, dated December 17, 1986.
2. Letters, J. A. McDonald (TVA) to H. Denton (NRC), Employee Concern Task Group Report ECTG-NSRC-01, Revision 2, and ECTG-NSRS-02, Revision 1, dated, respectively, January 30 and 16, 1987.
3. Letter, J. A. Zwolinski (NRC) to S. A. White (TVA), Evaluation of Nuclear Safety Review Staff Concerns Requiring Resolution Before Restart, dated August 27, 1987.
4. Letter, R. Gridley (TVA) to NRC, Sequoyah Nuclear Safety Review Staff (NSRS) Reports, dated October 5, 1987.
5. Letter, S. D. Ebnater (NRC) to S. A. White (TVA), Safety Evaluation Report on the TVA Sequoyah Nuclear Performance Plan, dated January 21, 1988.

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## TABLE

SAFE Y EVALUATION OF RESTART NSRS  
RECOMMENDATIONS FOR SEQUOYAH

<u>NSRS Recommendation</u>	<u>TVA Resolution at Sequoyah</u>	<u>TVA Status</u>	<u>Evaluation</u>
<u>SQL-NSRS-1 Report</u>			
R-80-05-SQN-04B, Configuration Control	Design Baseline Verification Program	Continuing, SAL Number 101	Acceptable and Verified*
R-84-19-WBN-01, Clear Identification of Purpose and Use of All Controlled Documents at All Plants.	The identifica- tion and purpose for the electrical logic and control drawings has been accomplished.	Completed	Acceptable but not verified
R-84-19-WBN-07, Development of Criteria for Cable Tray Fill Level and QC Inspections	SQEP-06 (Revision 3, December, 1987).	Completed	Acceptable and Verified*. NRC is reviewing the procedure within its review of Element Report 23803.
R-85-2-SQN/WBN-2, Maintenance, Operating and Test Instruction	Instructions SMI-0-94-3, MI-1.9, MI-1.10 and MI-1.11.	Completed	Acceptable but not verified
I-85-06-WBN-01, Adequacy of Dispositions for Identified Cable Bend Radius Program	ECTG Element Report 10900	NRC reviewing element report	Acceptable and verified*
I-85-06-WBN-02, Adequacy of Program for Cable Pulling Activities	ECTG Element Report 10900	NRC reviewing element report	Acceptable and verified*
I-85-06-WBN-05, Development of Established and Documented Limited QA Program and Failure to Incorporate the Established Limited QA Program into NOAM	Standard Practice SQA-189	Completed	Acceptable but not verified

\* The staff has verified that the NSRS recommendation is being addressed in the "TVA Resolution at Sequoyah." The staff's evaluation of the ECTG element report or TVA program will also be the evaluation of TVA's resolution of the NSRS recommendation.

<u>NSRS Recommendation</u>	<u>TVA Resolution at Sequoyah</u>	<u>TVA Status</u>	<u>Evaluation</u>
R-86-01-SQN-01, Improvements in Overall Low As Reasonably Achievable	Evaluated in staff's August 27, 1987 Safety Evaluation.	Completed	Acceptable and Verified*. As Issue addressed in staff's SER# on Sequoyah Nuclear Performance Plan (Section 4.13).
<u>SQN-NSRS-2-Report</u>			
R-80-05-SQN-10, Adequacy of Containment to Withstand Tornado Damage	Missile plate installed beneath exhaust vent to protect equipment	Completed	Acceptable but not verified
R-82-07-WBN-06, Visual Inspection of Welds Through Primer	ECTG Element Report WP-02-SQN	NRC reviewing element report	Acceptable and Verified*
R-82-08-NPS-01, Issuing Directives Contrary to TVA Commitments	SQE-22	Completed	Acceptable but not verified
R-84-07-WBN-1, Pipe Support Calculations Destroyed	ECTG Element Report 20501	NRC reviewing element report	Acceptable and Verified*
R-84-17-NPS-10, R-84-17-NPS-11, R-84-17-NPS-12, for Commercial Grade Items With QA Level I and II Designation, Receipt Inspections	SQA-45 (Section 27), QMI 710.2 (Rev. 0), QMI 710.3 (Rev. 0) and AI-11	Completed	Acceptable for all three and Verified* for R-84-17-NPS-10 and 11.
R-84-19-WBN-6, Trip Settings of Breakers for Motor-Operated Valves (MOV)	Trip settings are pre-set by the MOV vendor and are not adjustable, and ECTG Element Report 23702.#	NRC reviewing element report	Acceptable and Verified*

\* The staff has verified that the NSRS recommendation is being addressed in the "TVA Resolution at Sequoyah." The staff's evaluation of the ECTG element report or TVA program will also be the evaluation of TVA's resolution of the NSRS recommendation.

# Phone conference on February 2, 1987 with R. Gagne (TVA, ECTG).

<u>NSRS Recommendation</u>	<u>TVA Resolution at Sequoyah</u>	<u>TVA Status</u>	<u>Evaluation</u>
I-84-34-SQN-03, Availability of Material Certification and Requirements for Heat Number Sort Printout Entries	ECTG Element Report 40703	NRC reviewing element report	Acceptable and Verified*
I-85-06-WBN-3, Voltage Drop and Short Circuit Current Determination	SQEP-09, Design Calculations Review Program	Continuing, completed restart electrical calculations	Acceptable and Verified*. Issue addressed in staff's SER# on Sequoyah Nuclear Performance Plan (Section 2.3.3).
R-85-08-OE/NUC PR-01, and Inadequate Environmental Qualification (EQ) Procedure for Equipment Qualification by Similarity	SQN EQ Program, NEB-DI-125.01, SQN EQ Project Manual	Completed	Acceptable Verified*
R-85-08-OE/NUC PR-02, R-85-08-OE/NUC PR-03, R-85-08-OE/NUC PR-04, R-85-08-OE/NUC PR-05, TROI R-85-08-OE/NUC PR-06, Timely Initiating and Processing of NCR, FE and ER**	Conditions Adverse Quality (CAQ) Program, System	Completed	Acceptable and and Verified*
I-86-101-SQN, Wire Bend Radius In Installation Using Conax Connectors	Work to correct problem completed	Completed but Quality Engineering has not inspected the work	Acceptable but not verified

\* The staff has verified that the NSRS recommendation is being acceptably addressed. The staff's evaluation of the SNPP ECTG element report or TVA program will also be the evaluation of TVA's resolution of the NSRS recommendation.

\*\*NCR = non-conformance reports, FE = failure evaluations, ER = engineering reports.

<u>NSRS Recommendation</u>	<u>TVA Resolution at Sequoyah</u>	<u>TVA Status</u>	<u>Evaluation</u>
<u>R-86-02-NPS Report</u>			
R-85-03-NPS-07, Common Mode Failure	MMSL-A46, Evaluated in staff's August 27, 1987 Safety Evaluation	Completed	Acceptable and Verified*. Issue addressed in Staff's SERs# on Corporate and Sequoyah Nuclear Performance Plan (Sections 6.4.2 and 4.8 respectively).
R-85-03-NPS-08, Quality Assurance Surveillance of Maintenance Program	Findings 0-1, 2, 3 in NMRG Report R-86-02-NPS dated December 17, 1986	Completed	Acceptable and Verified.* Issue addressed in staff's SER# on TVA's Corporate and Sequoyah Nuclear Performance Plans (Sections 6.4.2 and 4.8, respectively).

\* The staff has verified that the NSRS recommendation is being acceptably addressed. The staff's evaluation of the SNPP ECTG element report or TVA program will also be the evaluation of TVA's resolution of the NSRS recommendation.

# SERs (NUREG-1232, Volume 1 and 2) dated July 28, 1987 and January 22, 1988 respectively.