



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

MAR 14 1984

Docket No. 50-390

APPLICANT: Tennessee Valley Authority
FACILITY: Watts Bar Nuclear Plant, Unit 1
SUBJECT: SUMMARY OF EQUIPMENT QUALIFICATION AUDIT FOR THE WATTS BAR
NUCLEAR PLANT, UNIT 1

During the week of February 14 thru February 16, 1984, the NRC staff and its consultant, EG&G of Idaho, audited the equipment qualification files for the Watts Bar Nuclear Plant, Unit 1. Attendees are listed in Enclosure 1.

The staff and its consultant audited eleven files for the electrical equipment located in the harsh environment. In addition, the staff audited six category "C" items, to ensure proper justification for their categorization. Based on the review of TVA's submittals and files, the following general observations and comments were made by the staff and its consultant at the exit meeting:

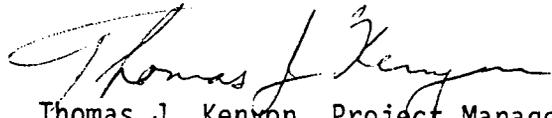
1. The temperature and pressure profiles for the outside of the containment were marked preliminary. TVA needs to submit the final profiles to the staff, with justification/explanation for the equipment which sees a higher temperature than previously calculated (see letter dated October 4, 1983, Item 5). In addition, TVA informed the staff that some areas which were classified as mild have been reclassified as harsh based on the new evaluation. TVA needs to include the equipment located in these areas in the qualification program.
2. By letter dated January 27, 1984, TVA provided a 50.55(e) report on the containment temperature profile and informed the NRC that equipment inside the containment will see a much higher temperature than what was previously determined. Provide an evaluation of the effect of these higher temperatures on the equipment qualification.
3. TVA used the spray and steam environment test as a basis for submergence qualification of the equipment. This method of qualification for submergence is not acceptable. TVA needs to either (1) relocate the equipment subjected to submergence above the flood level, or (2) provide additional testing based on the actual submergence test.
4. In accordance with the 10 CFR 50.49, all equipment which is located in a harsh environment and is category 1 and 2 in accordance with R.G 1.97 must be qualified for the environment in which they will be subjected. In accordance with this requirement, TVA must either (1) provide justification for interim operation, or (2) qualify all the equipment which is either installed or will be installed prior to fuel load.

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5. A radiation sample calculation with bases and assumption for 1 FT-3-39 should be provided to the staff to show how the radiation dose was determined. (See letter dated October 4, 1983, Item 11).
6. TVA should provide the staff with a write up to discuss how the determination was made that the instrument accuracy demonstrated is adequate for the Watts Bar application. During the audit, the staff agreed with the TVA approach for determining accuracy for the Watts Bar BOP equipment, but was informed that this evaluation is done on NSSS equipment only by exception. Westinghouse informs TVA of those cases where the generic accuracy may not be suitable for Watts Bar application. Since this is not a positive approach to equipment qualification, TVA should request Westinghouse to document that its demonstrated accuracy is acceptable for the applicable instrument(s) for the Watts Bar design.
7. During the period of the last three years, the NRC has issued many information notices e.g. IEIN 81-29, 82-03, 82-52 and 83-72, which affect the equipment qualification status. The applicant needs to confirm that it has reviewed all applicable information notices for their equipment, and ensure that proper action has been taken to resolve the concern(s) addressed in the information notices.
8. During the audit, six items which are categorized as "C" were selected for review by the staff. Out of those six items, four were reclassified as category "A" based on R.G 1.97 requirements. Proper justification was provided for the categorization of the other two items. Based on this, TVA needs to reevaluate the list of category C items and submit the updated list to the NRC staff for review.
9. For much of the equipment audited, a summary report or material analysis was used as the basis for their equipment qualification. A summary report by itself is not an acceptable way to demonstrate qualification. In cases where a summary report was used, TVA should also evaluate the complete test report, and document the findings in the file. In addition, it is TVA's responsibility that the test reports are kept for the life of the equipment. For those files where only material analysis was used for qualification, TVA should either (1) get the applicable existing test report for the equipment from the vendor, or (2) requalify the equipment by testing. A material analysis is acceptable only for aging evaluation of the equipment.
10. For any equipment which has associated outstanding Non-conformance Reports (NCR) which affect its equipment qualifications, the item should be considered unqualified and justification for interim operation must be provided if the NCR is not closed prior to fuel load.
11. During the plant walk down, the staff and its consultant made the following observation:

- (a) Flexible conduits are used for class 1E cable termination. These conduits are not qualified for the environmental effect. There is a probability that these conduits may fail and provide a leakage path for water/steam to enter the class 1E equipment. These conduits should be qualified for the environment in which they are located to avoid this problem. (IEIN-83-72 No. 13).
- (b) Terminal Blocks are used inside the containment while they are listed only for application outside the containment. TVA needs to justify this discrepancy.
- (c) Terminal Block enclosures didn't have any weepholes. This will require the enclosure to be qualified for the pressure they will be exposed to in the event of a DBA. TVA needs to confirm that these boxes are qualified to withstand the pressure conditions caused by the DBA.

The staff and its consultant reviewed eleven files during the audit. The list of the audit items and specific comments on those items are attached (see Enclosure (2) and Enclosure (3)). During the exit meeting, the staff noted that a lot of effort has been put into bringing the files into the shape they are at this time. However, the staff believed that much effort is still required to bring the files into the final acceptable state. The staff noted that the comments on a particular file should also be considered for other files for which the comments could apply.


Thomas J. Kenyon, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosures:
As stated

cc: See next page

WATTS BAR

Mr. H. G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

cc: Herbert S. Sanger, Jr., Esq.
General Counsel
Tennessee Valley Authority
400 West Summit Hill Drive, E 11B 33
Knoxville, Tennessee 37902

Mr. D. Checct
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, Pennsylvania 15230

Mr. Ralph Shell
Tennessee Valley Authority
400 Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Mr. Donald L. Williams, Jr.
Tennessee Valley Authority
400 West Summit Hill Drive, W10B85
Knoxville, Tennessee 37902

Resident Inspector/Watts Bar NPS
c/o U.S. Nuclear Regulatory
Commission
Rt. 2 - Box 300
Spring City, Tennessee 37831

Mr. David Ormsby
Tennessee Valley Authority
400 Chestnut Street, Tower II
Chattanooga, Tennessee 37401

James P. O'Reilly, Regional Administrator
U.S. Nuclear Regulatory Commission,
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

ENCLOSURE 1

ATTENDEES

EQUIPMENT QUALIFICATION AUDIT AT
THE WATTS BAR NUCLEAR PLANT, UNIT 1

<u>NAME</u>	<u>COMPANY/BRANCH</u>	<u>ADDRESS</u>	<u>EXTENSION</u>
V. Bianco	TVA-NEB	W1074C-K	7171
J. Raulston	TVA-NEB	W10C126	3063
T. Kenyon	NRC/DL		
H. Garg	NRC/EOB		
O. Decker	INEL		
J. Trojovsky	INEL		
R. Holloway	INEL		
S. Stout	TVA-NEB	W10B75	7171
W. Byrd	TVA/NUC PR	Watts Bar	8524
D. Wilson	TVA/ENDES-NEB	W10D824	4483
D. Williams	TVA/ENDES-NEB	W10B85	7170
R. McCollom	TVA - NUC PR	Watts Bar	8526
D. Reed	TVA/ENDES-EEB	W8A35C-K	3653
B. Reagan	TVA/ENDES-EEB/NS	W8D198C-K	4349
M. Miller	TVA/I&E of EEB	W8A18	2240
J. McGriff	TVA/NUC PWR	1765CST-2	C7813
T. Smith	TVA/EEB I&C	W8D191C-K	3353
G. Keller	TVA/EEB	W8D201	4349
P. Ioannides	TVA/NEB	W10B87	4721
A. Lewis	TVA/NEB	W10B119	7280
P. Metcalf	TVA/NEB	W10A35	7140
J. Ebersole	NRC/ACRS		
M. Farrell	NRC/ACRS		
E. Taylor	TVA/NEB	W10C165	4112
H. DeSouez	TVA/NUC PWR	460 CST2-C	2681
D. Ellis	TVA/Power	460 CST2-C	2681
P. Studer			
E. Beasly	TVA/NEB		
P. Metcalf	TVA/NEB		
A. Lewis	TVA/NEB		
J. Collins	TVA/EEB		
R. Reeves	TVA/EEB		
P. Nesbitt	TVA/EEB		
I. Beltz	TVA/MEB		
E. Daugherty	TVA/MEB		
J. Wagner	TVA/EEB		
D. Kitchel	TVA/NEB		
D. Hill	TVA/NEB		
T. Bianco	TVA/OEDC		

ENCLOSURE 2

EQUIPMENT AUDITED

WATTS BAR NUCLEAR PLANT, UNIT 1

1. G. E. Terminal Blocks	EEB-TB-1
2. Limitorque MOV Actuator	MEB-1-107
3. Limitorque MOV Actuator	MEB-67-134
4. Barton Transmitter	NEB-3-29
5. Target Rock Solenoid Valve	EEB-0001
6. Chicago Fluid Power Pump	MEB-1-101
7. Rosemount RTD	MEB-68-24
8. Parsons/Peebles Motor	MEB-30-121
9. Electro Switch Switch	EEB-XS-1
10. Samuel Moore Cable	EEB-CBL-4
11. Conax Penetration	EEB-PEN-1

ENCLOSURE 3

ITEM SPECIFIC COMMENTS/QUESTIONS

EQUIPMENT QUALIFICATION AUDIT

WATTS BAR NUCLEAR PLANT, UNIT 1

TERMINAL BLOCKS

GE-EB-5

EB-25

CR-151B

1. The terminal blocks qualification is based only on the material analysis. However, it should be noted that NUREG-0588 Category II requirements, which are applicable to Watts Bar, allows use of the material analysis only for aging consideration. In order to demonstrate the qualification of the terminal blocks either (1) a new test should be performed, or (2) a previously performed test on similar equipment should be referenced. See generic comment (9).
2. Explain how the composition and/or manufacturing process was taken into account, when the reference material was used for the material analysis.
3. Explain the differences between the TVA type-D enclosure and the NEMA enclosure. Demonstrate the similarity between the TVA type D and the tested enclosure.
4. Are terminal blocks subjected to submergence? If yes, how was the qualification for submergence determined?
5. The test report reviewed is a summary document based on another test report. Has TVA reviewed this report? If yes, where is the TVA evaluation documented. How will the test report be maintained for the life of the equipment?

Limitorque SMB-000 FCV-67-87A

1. Analysis and justification needs to be provided for the lack of time margin to support the thermal lag analysis.
2. Provide documentation listing operators, if any, which contain Buchanan 0824 terminal blocks. Ref. IEIN 83-72
3. Per IEIN 83-72, motors with class B, insulation rated for 40°C are not qualified. The subject motor has class B insulation. This was noted during the walkdown.

Limitorque SMB-00 FCV-1-15

1. Analysis and justification needs to be provided for the lack of time margin to support the thermal lag analysis.
2. Provide documentation listing operators, if any, which contain Buchanan 0824 terminal blocks. Ref. IEIN 83-72
3. During the walkdown it was noted that the flexible conduit was broken at the connector and pulled away exposing the cables. TVA should ensure this is repaired prior to fuel load.

Target Rock 77J-001 FSU-30-134-B

1. No comments

Rosemont RTD, 176KF TE-68-2A

1. The temperature at which the RTD was tested is 320°, the EOS shows it was tested at 340°F, and the required parameter is 327°F. Explain the discrepancies.
2. No aging tests were performed on the equipment. These tests should be performed. Also, an analysis to determine the correct temperature for the head of the switch during normal operation is needed to show qualification.
3. The radiation parameter does not have any margin. Justify the lack of margin.
4. The required and demonstrated accuracy needs to be provided.
5. The qualified life for the RTD was calculated by the 10°C rule using 120°F. This may be the wrong temperature to use for qualified life. See comment No. 2 above.
6. During the walkdown it was noted that a potting compound was used in the head of the RTD. This should be addressed in the test report.

Barton Transmitter NEB-3-29

1. The submergence qualification is inadequate. See generic comment (3).
2. There is a Non Conformance Report on calibration errors. See generic comment (10).
3. Provide an analysis of the anomalies discussed in the test report to verify that they do not affect the Watts Bar equipment qualification.
4. Provide documentation in the file to verify that the Watts Bar specific accuracies are enveloped by the test report generic accuracies.
5. Address the IE bulletins and notices that may be applicable to the Barton transmitters.
6. Document in the file the verbal analysis given for selection of the 6 year life for Buna-N o-rings as the most age-susceptable material.
7. What is the required operating time:
100 days (Ref. Table 3.11 - 4/N3 or
4 months (Ref. WAT-12-5490 19.3.3.1.4)?

Samuel Moore Cable EEB-CBL-4

No comments

Chicago Fluid Power Actuator MEB-1-101

1. What is the qualified life of the valve actuator, complete with solenoids and limit switches? Provide an analysis to support your answer.
2. Provide analysis to extrapolate the 10 day test profile to envelope the 100 day post-accident requirement.
3. Provide the actual test data (not the "required" profile).
4. Provide an analysis to determine if the actuator could be flooded in environmental condition #21 (Table 6.1(R1)).
5. Address the pressure as it pertains to environmental qualification.
6. The installed limit switches were different from the tested limit switches. Address this anomaly in the file.
7. The file does not state the manufacturer and model of the solenoid valve. Is the installed solenoid valve the same as the tested solenoid valves? Document the results in the file.

8. Provide documentation that the Test Actuator is the same model or equivalent as the installed actuator.

Parsons/Pebbles Motor MEB EOS-3-201

1. Insufficient test data was provided in the EOS package for the Parsons/Pebbles Electric Motor. Provide the necessary data. (See Generic Comment No. 9)

ELECTRO-SWITCH EEB-XS-1

1. The test document is a summary document based on another test report. Has TVA reviewed the complete report? If yes, where is the TVA evaluation documented? How will the test report be maintained for the life of the equipment? See generic comment (9).
2. The qualified life and replacement interval have not been determined for the equipment. Provide this information.
3. The equipment was subjected only to aging tests (thermal, radiation, humidity) and seismic tests but was not subjected to an environmental condition expected during and after the HELB. If aging data is used to demonstrate the qualification of the switch during an HELB, then the corresponding time should be taken out from the qualified life consideration.
4. WBN-EEB-1009 lists equipment located in all general spaces outside the containment. However the equipment qualification parameter does not envelope the required parameter for all locations outside the containment. If the equipment is located only in particular location which appears to be the case, then the environmental condition for that location should be specified on the sheet WBN-EEB-1009, on Table 3.11-6.

CONAX PENETRATION

1. The test report referenced in EEB-PEN-1 is a summary document which uses data from many other referenced reports. TVA had these reports in their possession but there was no evidence that the referenced reports have been reviewed and approved for their applicability to Watts Bar. Provide documentation that this is the case. In addition, there are some test anomalies reported in the test report. How have they been resolved for Watts Bar? See generic comment (9).
2. The similarity between the tested equipment and the installed equipment has not been demonstrated. Provide an analysis showing the similarities.

MEETING SUMMARY DISTRIBUTION

Docket No(s): 50-390

NRC PDR

Local PDR

NSIC

PRC System

LB #4 r/f

Attorney, OELD

E. Adensam

Project Manager T. Kenyon

Licensing Assistant M. Duncan

V. Noonan

NRC PARTICIPANTS

T. Kenyon

H. Garg

J. Ebersole

M. Farrell

DESIGNATED ORIGINAL

Certified By

[Handwritten Signature]

bcc: Applicant & Service List