

TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS INVESTIGATION REPORT NO. I-86-120-SQN

EMPLOYEE CONCERN: SQP-5-005-001  
SQP-5-005-002  
SQP-5-005-003  
SQP-5-005-004  
SQP-5-005-005  
SQP-5-005-006  
SQP-5-005-007

SUBJECT: CONCRETE ANCHOR INSTALLATION IN UNIT 1 AUXILIARY BUILDING,  
ELEVATION 749' - SEQUOYAH NUCLEAR PLANT

DATES OF INVESTIGATION: JANUARY 27 - FEBRUARY 25, 1986

INVESTIGATOR: *M. R. Koltowich* 3/10/86  
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REVIEWED BY: *J. H. Kincaid* 3/11/86  
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## I. BACKGROUND

A Nuclear Safety Review Staff (NSRS) investigation was conducted to determine the validity of seven expressed employee concerns as received by the Quality Technology Company (QTC)/Employee Response Team (ERT). The concerns of record, as stated on the Employee Concern Assignment Request Forms from QTC, stated:

### A. SQP-5-005-001

Sequoyah: In 1976-77, Aux Bldg, Elevation 749, of Unit 1, the conduit and cable tray supports in the MOV Board Room 1A, between column lines A-2 to A-8 and "R" line were incorrectly installed. A cutting torch was used to enlarge the holes on the back side of the support plates. The holes were beveled to allow the anchor bolts to fit through the holes. Details known to QTC, withheld to maintain confidentiality. No further information may be released. CI has no additional information. Const. dept. concern.

### B. SQP-5-005-002

Sequoyah: 1976-77, Aux Bldg, Elevation 749, of Unit 1, in the MOV Board Room 1A, between column lines A-2 to A-8 and "R" line holes were left in the ceiling under the conduit and cable tray supports. Rebar was hit while drilling the holes, so the hole location was moved, and the old holes were left with the shells installed and the holes not filled with grout. Details known to QTC withheld to maintain confidentiality. No further information may be released. CI has no additional information. Const. dept. concern.

### C. SQP-5-005-003

Sequoyah: In 1976-77, Aux Bldg, Elevation 749, of Unit 1, in the MOV Board Room 1A, between column lines A-2 to A-8 and "R" line the anchor shells were cut off and installed when they hit rebar during installation. The shells were cut off to facilitate installation of conduit and cable tray supports to the ceiling. Details known to QTC and withheld to maintain confidentiality. Nuclear Power concern. No further information may be released. CI has no further information.

Note: Nuclear Power concern is believed to be a Construction department concern as the other six related concerns indicate Const. dept. concerns.

D. SQP-5-005-004

Sequoyah: In 1976-77, Aux Bldg, Elevation 749, of Unit 1, in the MOV Board Room 1A, between column lines A-2 to A-8 and "R" line the concrete anchors were installed at an angle so great that the holes in the support plates had to be beveled on the back side to enable the anchor bolt to fit through the plate. These anchors were installed for conduit and cable tray supports in the ceiling. Details known to QTC withheld to maintain confidentiality. No further information may be released. CI has no further information. Const. dept. concern.

E. SQP-5-005-005

Sequoyah: In 1976-77, Aux Bldg, Elevation 749, of Unit 1, in the MOV Board Room 1A, between column lines A-2 to A-8 and "R" line nonconforming conditions with the installation of conduit and cable tray supports such as, cut off anchor shells, incorrectly installed. Anchor shells, wrong size anchors, cut rebar, modified support plates, and anchor holes not filled were identified: However, these nonconforming conditions were not documented and appropriate action implemented. Details known to QTC, withheld to maintain confidentiality. No further information may be released. CI has no further information. Const. dept. concern.

F. SQP-5-005-006

Sequoyah: 1976-77, Aux Bldg, Elevation 749, of Unit 1, in the MOV Board Room 1A, between column lines A-2 to A-8 and "R" Line, concrete anchors were drilled into the ceiling, many of which hit rebar. This may not have been reported to engineering so that engineering could evaluate any damage. The holes were relocated and redrilled, and the conduit cable supports were installed in the ceiling. Details known to QTC, withheld to maintain confidentiality. No further information may be released. CI has no further information. Const. dept. concern.

G. SQP-5-005-007

Sequoyah: 1976-77, Aux Bldg, Elevation 749, of Unit 1, anchor bolts in the ceiling of the MOV Board Room 1A, between column lines A-2 to A-8, and "R" line were verified to be the wrong size. These anchor bolts are

utilized to support conduit and cable tray. Details known to QTC, withheld to maintain confidentiality. No further information may be released. CI has no further information. Const. dept. concern.

## II. SCOPE

- A. The scope of the investigation was determined from the stated concerns to include six issues concerning anchor installations during 1967-1977 at Sequoyah Nuclear Plant (SQN). The location was given as Unit 1 Auxiliary Building, MOV Board Room 1A, column lines A2-A8, and "R" line. The column and building lines given were for MOV Board Room 1B. QTC was contacted for clarification, and it was indicated that the concerns were for MOV Board Room 1A. Both MOV Board Room 1A and 1B were investigated. The six issues were:
1. Support plate holes were modified (enlarged) by torch and/or beveled to allow the anchor bolts to fit through the holes. Anchors were not perpendicular.
  2. Abandoned holes were left with anchor shells installed, and holes were not filled with grout.
  3. Anchor shells were cut off or shortened.
  4. Reinforcing steel (rebar) was cut or damaged without engineering evaluation.
  5. Incorrectly sized anchors were installed.
  6. Nonconforming conditions, such as those listed in the first five issues, were not appropriately documented and corrected.
- B. Construction specifications, construction procedures, inspection instructions, and standard operating procedures which governed the installation, inspection, testing, and documentation of cable tray supports, conduit supports, and anchors were reviewed. A random sample of supports located in MOV Board Rooms 1A and 1B were inspected. The installation and inspection records correlating to the sample of supports inspected were reviewed. Interviews with site and Knoxville personnel were performed to obtain the information necessary to conduct the investigation.

The documents reviewed and references used in this investigation are listed and attached to this report.

## III. SUMMARY OF FINDINGS

### A. Requirements and Commitments

1. 10 CFR 50 Appendix B (Ref. 1), "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," required that:

- a. a quality assurance program be established and take into account the need for verification of quality by inspection and test (Criterion II),
  - b. activities affecting quality be accomplished in accordance with the prescribed instructions, procedures, or drawings appropriate to the circumstances (Criterion V),
  - c. instructions, procedures, or drawings include appropriate quantitative or qualitative acceptance criteria (Criterion V),
  - d. an inspection program be executed to verify that activities affecting quality are in conformance with the appropriate and prescribed instructions, procedures, and drawings (Criterion X),
  - e. measures be established to assure that nonconformances are promptly identified and corrected (Criterion XVI), and
  - f. records be maintained to furnish evidence of activities affecting quality (Criterion XVII).
2. SQN Final Safety Analysis Report (FSAR) (Ref. 2), Section 3.8, "Design of Category I Structures," stated that TVA General Construction Specification G-32 (Ref. 3), "Bolt Anchors Set in Hardened Concrete," governed the installation of anchor bolts.

## B. Findings

The findings resulting from this investigation will be discussed in relation to the issues given in section II of this report.

### 1. Modified Support Plates

Work Request (WR) No. 114789 was initiated and performed to inspect a randomly selected sample of sixty supports in MOV Board Rooms 1A and 1B. One or more bolts were removed from each selected support and the exposed anchor shells were inspected to G-32 requirements. No torched or beveled support plate holes were observed. No anchor shells were measured to be more than the 10 percent from 90° (perpendicularity) permitted by G-32. However, two bolts (3.3 percent of those inspected) were damaged due to plate/anchor misalignment. These supports could not be returned to normal during the WR 114789 field inspection. Detailed inspection results are included in attachment A.

2. Abandoned Holes

During the performance of WR No. 114789, several abandoned anchors were observed. Detailed inspection results are included in attachment A. G-32 currently states that the minimum clear distance between the hole for the working anchor and the abandoned anchor or hole for the abandoned anchor shall be equal to the diameter of the larger of the two holes. The G-32 revisions in effect during the timeframe of the concerned individual's (CI) concerns stated that slipped anchors may be drypacked with mortar or grouted full in lieu of being removed.

3. Shortened Anchor Shells

The plug depths (defined as the distance from the cone expander to the exposed end of the shell) of the anchors inspected were measured as part of the performance of WR No. 114789. G-32 provides plug depth criteria. The plug depth measurement was used as an indication as to whether anchor shells were shortened. Visual inspection did not indicate shortened anchors; however, three anchors (5 percent of those inspected) may possibly be short as indicated by short plug depth measurements. In addition, sixteen anchors (26.7 percent of those observed) were measured to have plug depths longer than specified. This may be an indication of inadequately expanded anchors. Plug depth measurements were not required by G-32 during the CI's timeframe. Detailed inspection results are included in attachment A. M&AI-10 (Ref. 4) does not currently require that the plug depth be measured.

4. Damaged or Cut Reinforcing Steel

Current and G-32 revisions in effect during the timeframe of the CI's concerns do and did not permit rebar to be cut without prior approval from Office of Engineering (OE, DED, EN DES). Site instructions and procedures in effect also required prior OE approval. These included CP P-13 (Ref. 5), CP C-8 (Ref. 6), and II 93 (Ref. 7). CP P-13, revision 8 (3/29/77), did not require a written release for cutting rebar in areas shown approved on Office of Civil Engineering sketch sheets IZ-11-8-76-0 through -16. A memorandum (Ref. 8) transmitted color-coded drawings to SQN for this purpose. However, the attached color-coded drawings were not retained by SQN or RIMS. Individual A provided the investigator with a rough color-coded drawing showing rebar that could be cut. As part of WR No. 114769 performance, a ground fault indicator was used to determine if rebar was in contact with the anchor shell. Three anchors (5 percent of those inspected) were found to be in contact with rebar. One anchor appeared to be in an area not approved for cutting by OE from the information provided to the investigator. Detailed inspection results are included in attachment A.

5. Incorrectly Sized Anchors

The anchors were inspected for size during WR No. 114789 performance and compared to the sizes required by the 47A056 typical drawing series (Ref. 9). The typicals required were determined from the review of various inspection instructions and records. These included CP G-1 (Ref. 10), CP P-30 (Ref. 11), II 66 (Ref. 12), CP E-3 and attachment As (Refs. 13 and 14), II 38 (Ref. 15), CP E-6 (Ref. 16), and CP C-8 attachment As (Ref. 17). In addition, anchor pull test documentation (Ref. 17) was reviewed in an effort to determine the sizes of the anchors when they were installed. Anchors were grouped into "lots" for sampling frequency purposes in accordance with G-32; therefore, specific test documentation correlating to a particular support was not required. The review also indicated that a sufficient number of anchors were tested as required by G-32. One anchor was found to be smaller than required by the typical drawing (support 1000HCAB749-A0519R015). One anchor found to be larger than required. This is permitted by G-32; however, the anchor pull test documentation (Ref. 17) indicated that for two supports smaller anchors were tested than those observed in the plant. Other pull test documentation indicated that some anchors were changed out. With the exceptions noted, the anchor sizes found in the plant compared favorably with those required by the typicals. Detailed inspection results are included in attachment A.

6. Nonconforming Conditions

A review of various Nonconforming Condition Reports (NCRs) was performed to determine if any of the first five issues were appropriately identified and dispositioned. No evidence could be located that the instances of plate/anchor misalignment (section III.B.1) and possibly cut rebar (section III.B.4) were appropriately identified and connected.

7. WR No. 114789 Identified Conditions

Other problems and violations to G-32 requirements (past and present) were noted during performance of the WR. Detailed inspection results are included in attachment A. These are:

- a. Three supports (5 percent) located in the plant were not statused on the "Universal Master Status Report" (Ref. 18). As a result, support inspection and anchor pull documentation could not be retrieved.
- b. Fourteen supports (23.3 percent) were found to violate current G-32 anchor to embedded plate spacing requirements.
- c. Thirteen supports (21.7 percent) were found to violate current G-32 anchor to welded attachment spacing requirements (7.b and 7.c are often related).

- d. Three anchors (5 percent) were found to violate current G-32 shell recess requirements. Several other anchors violated past G-32 requirements; however, these would not violate current requirements.
- e. Three supports (5 percent) were found to violate current G-32 gap between attachment and concrete requirements.
- f. Cracked concrete was found under one support.
- g. Four instances (6.7 percent) of adjacent anchor spacing requirement violations were noted.
- h. One bolt (1.7 percent) was found to have inadequate thread engagement due to plate misalignment, plate bow, and gap between the concrete.
- i. Four supports (6.7 percent) in the plant do not appear to match the configurations given on the typical. No support variance documentation could be located. One support plate was not welded according to the typical (1000HCAB749-A0614R014). Inspection documentation indicated support acceptance.
- j. Three supports (5 percent) were not labeled with identification tags in the field.
- k. One support (1.7 percent) had a hole bored out in the unistrut (1000HCAB749-A0611S002).

No anchored cable tray supports were observed in MOV Board Rooms 1A and 1B during performance of the WR; therefore, cable tray supports were not included in the field sampling program. Review of the "Universal Master Status Report" also revealed no anchored cable tray supports in these rooms.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

##### A. Conclusions

- 1. Employee Concern No. SQP-5-005-001 dealing with torched or beveled holes was not substantiated as no evidence of those conditions was found for the sixty supports inspected during the performance of WR No. 114789. No further corrective action is considered necessary.



2. Employee Concern No. SQP-5-005-002 dealing with abandoned holes left without filling with grout was substantiated. The G-32 requirements in effect during the CI's timeframe could have been read to imply that abandoned anchors were to be grouted. However, later G-32 revisions clarified handling of abandoned anchors. No violations to current G-32 requirements were noted. No further corrective action is considered necessary.
3. Employee Concern No. SQP-5-005-003 concerning shortened anchor shells was neither definitely substantiated nor unsubstantiated. Evidence discussed in section III.B.3 indicates that the possibility of shortened anchors exists. Also, several anchors were measured to have plug depths that were too long. Section III.B.3 also stated that plug depth measurements were not required by G-32 during the CI's timeframe. However, the inspection plug depth is currently considered by OE to be one of the most critical measurements used to determine the acceptability of anchor installations. Therefore, the failure of these anchors to meet current G-32 requirements (but meeting the requirements in effect at the time) cannot be ignored. See NSRS Recommendation No. I-86-120-SQN-1. In addition, M&AI-10 does not include an inspection for plug depth as required by G-32 and 10 CFR 50 Appendix B Criterion V. See NSRS Recommendation No. I-86-120-SQN-2.
4. Employee Concern No. SQP-5-005-004 dealing with beveled holes is similar to Employee Concern No. SQP-5-005-001. This concern was not substantiated for the same reasons as Employee Concern No. SQP-5-005-001. However, two bolts were found damaged due to plate/anchor misalignment. The two supports involved were 100HCAB749-A0318R004 and A0508R005 and were located in MOV Board Room 1B. See NSRS Recommendation No. I-86-120-SQN-3.
5. Employee Concern No. SQP-5-005-005 dealing with not appropriately identifying nonconforming conditions as required by 10 CFR 50 Appendix B Criteria X and XVI was substantiated. The performance of WR No. 114789 identified nonconforming conditions that were not previously documented. Examples include plate/anchor misalignment (section III.B.1), possibly cut rebar (section III.B.4), wrong sized anchors (section III.B.5), adjacent anchor spacing (section III.B.7), and apparent configuration problems (section III.B.7). See NSRS Recommendation Nos. 3, 4, and 5.
6. Employee Concern No. SQP-5-005-006 dealing with unevaluated cut and damaged rebar was substantiated based on the evidence found during performance of WR No. 114789 (section III.B.4). This was considered to be a violation of 10 CFR 50 Appendix B Criteria V and X. In addition, the inability to retrieve sketch sheets IZ-11-8-76-0 through -16 (described in section III.B.4) was considered a violation of the quality assurance (QA) record requirements in 10 CFR 50 Appendix B Criterion XVII. See NSRS Recommendation No. I-86-120-SQN-4.

7. Employee Concern No. SQP-5-005-007 dealing with incorrectly sized anchors was substantiated. The determination was based on the comparison between the anchors in the field and those required by the typical. One anchor was found to be smaller than required by the typical drawing (section III.B.5); however, this was considered to be an isolated case. Other pull test and variance documentation indicated that some anchors were changed out for larger anchors. Therefore, the concern would have appeared true during the CI's timeframe. See NSRS Recommendation No. 5.
8. The performance of WR No. 114789 identified other problems and violations not included in the employee concerns. These items included unstatused supports, anchor spacing violations, shell recess violations, cracked concrete, inadequate thread engagement, configuration control, and unlabeled supports (section III.B.7). Detailed inspection results are included in attachment A. Many of the violations noted were against current G-32 requirements; most of these requirements were not in G-32 at the time these anchors and supports were installed. However, no documentation was located that evaluated the new acceptance criteria against installed conditions or justified not backfitting these new requirements. See NSRS Recommendation Nos. I-86-120-SQN-5 and -6. The bolt with inadequate thread engagement appeared to be an isolated case and was caused by field configuration and not by using too short a bolt (support 1000HCAB749-A0508R005). See NSRS Recommendation No. I-86-120-SQN-3.

B. Recommendations

1. I-86-120-SQN-2, Long and Short Plug Depths

Request OE to evaluate the short and long plug depths identified in attachment A. Appropriately document, evaluate, and correct any nonconforming conditions that occurred. Include in the evaluation consideration of generic plant implications. [P1]

2. I-86-120-SQN-1, M&AI-10 Revisions

Revise M&AI-10 to require inspection for plug depth as required by G-32. Appropriately document, evaluate, and correct any nonconforming conditions that occurred due to the failure to previously perform this inspection as required by G-32. [P1]

3. I-86-120-SQN-3, Plate/Anchor Misalignment

Appropriately document, evaluate, and correct the conditions for supports 1000HCAB749-A0318R004 and A0508R005. [P1]

4. I-86-120-SQN-4, Cut or Damaged Reinforcing Steel

Request OE to recreate the sketch sheets described by the memorandum (Ref. 8). The rebar possibly cut should be appropriately documented, evaluated, and corrected. The recreated sketch sheets should be retained as QA records. [P2]

5. I-86-120-SQN-5, Nonconforming Conditions

Appropriately document, evaluate, and correct the conditions for supports 1000HCAB749-A0614R014, A0401S020, A0508S015, A0510S004, and A0519R015. Include in the evaluation: (1) the failure of Office of Construction (OC) quality control (QC) inspection/engineering to identify nonconforming conditions, (2) the possible falsification of inspection records by OC QA (particularly for support 1000HCABA0614R014), and (3) consideration of generic plant implications. [P1]

6. I-86-120-SQN-6, WR No. 114789 Identified Items

Appropriately document, evaluate, and correct the problems identified during WR No. 114789 performance (section III.B.7). Detailed inspection results are included in attachment A. A review for specific anchor pull documentation correlating to a particular support is not being recommended as the testing frequency was determined to be adequate as required by G-32 (section III.B.5). This was included as information only. Include in the evaluation consideration of generic plant implications. [P1]

DOCUMENTS REVIEWED IN INVESTIGATION I-86-120-SQN  
AND REFERENCES

1. 10 CFR 50 Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants"
2. SQN Final Safety Analysis Report, Section 3.8, "Design of Category I Structures"
3. TVA General Construction Specification G-32, Revisions 3, 4, 5, and 10; "Bolt Anchors Set in Hardened Concrete"
4. SQN Modifications and Additions Instruction (M&AI)-10, Revision 10, "Testing of Expansion Anchors Set in Hardened Concrete"
5. SQN Construction Procedure (CP) No. P-13, Revisions 7, 8, 9, and 10; "Releases for Drilling, Chipping, Cutting, Welding, Sandblasting, and Rework of Permanent Structures or Components"
6. SNP CP No. C-8, Revisions 2, 3, and 4, "Expansion Anchor Installation, Testing, and Documentation"
7. SNP Inspection Instruction (II) No. 93, Revisions 0, 1, and 2, "Testing of Expansion Anchors Set in Hardened Concrete"
8. Memorandum from R. M. Pierce to G. G. Stack, "Sequoyah Nuclear Plant Units 1 and 2, dated September 15, 1976"
9. Various 47A056 Series Drawing Typicals for Conduit Supports
10. SNP CP No. G-1, Revisions 0 and 1, "Fabrication and Installation of Seismic Supports"
11. SNP CP No. P-30, Revision 0, "Fabrication and Installation of Seismic Supports"
12. SNP II No. 66, Revisions 0 and 1, "Inspection of Supports"
13. SNP CP No. E-3, Revisions 4, 5, 6, and 7, "Fabrication, Installation, Inspection, and Documentation of Seismic Supports for Conduit and Lighting Fixtures"
14. Various SNP CP No. E-3 Attachment As, "Inspection of Seismically Supported Conduit Flanges and Lighting Fixtures"
15. SNP II No. 38, Revision 0, "Inspection of Site Fabricated Assemblies"
16. SNP CP No. E-6, Revisions 5 and 6, "Electrical Cable Storage and Installation"

17. Various SNP CP No. C-8 Attachment As, "Test Report Expansion Bolt Anchors"
18. SQN Universal Master Status Report for All Disciplines, "Miscellaneous Steel-Cable Tray Supports," dated November 22, 1985

Attachment A  
Anchor Inspection Results  
Work Release 114789

<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
1) 1000HCAB749-A0315R001	No	<ul style="list-style-type: none"> <li>o "B" train conduit. Not on "Universal Master Status Report."</li> <li>o No support inspection or anchor pull documentation readily available. Required anchor size cannot be determined.</li> <li>o Anchor spacing 4" - reject per G-32 R4 (4/21/76) - 4 1/2"; minimal acceptance per G-32 R10 (current 4/1/85 - 4"</li> </ul>
2) 1000HCAB749-A0318R004	No	<ul style="list-style-type: none"> <li>a) o Two supports with same ID number in field.</li> <li>b) o One support is unistrut holding two conduit runs. No specific support inspection or anchor pull documentation readily available. Not inspected during investigation.</li> <li>c) o One support with four baseplates. Inspected during investigation. <ul style="list-style-type: none"> <li>o Anchors 5/8" <math>\phi</math> in field. Anchor pull reports AB 1241 &amp; AB 1253 indicate 1/2" <math>\phi</math> anchors. 47A056-16 indicated 1/2" <math>\phi</math> anchors.</li> <li>o Bolt damage during removal due to baseplate/anchor shell misalignment. Bolt not replaced. WR # (not initiated as of 3/4/86) initiated to correct this condition.</li> </ul> </li> </ul>
3) 1000HCAB749-A0318R007	No	<ul style="list-style-type: none"> <li>o Anchor spacing requirements conflict: 47A056-59 requires a minimum of 3 3/4" per G-32. G-32 R10 currently requires 4". G-32 R3 (in effect at time of inspection 3/22/76) required 4 1/2".</li> </ul>

<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
3) 1000HCAB749-A0318R007 (continued)		<ul style="list-style-type: none"> <li>o 5/8" to embedded plate. G-32 R10 requires a minimum of 7" <u>or</u> permits 2", provided at least 18" maintained between anchor and attachment welded to embedded plate. No welded attachment noted.</li> </ul>
4) 1000HCAB749-A0320R001	No	<ul style="list-style-type: none"> <li>o Plug depth measured to be one inch. G-32 R10 requires a maximum of 15/16". (Anchor may not be adequately expanded.)</li> </ul>
5) 1000HCAB749-A0400R003	No	<ul style="list-style-type: none"> <li>o Shell recess 1/4", G-32 R10 permits <math>\leq</math> 1/4". G-32 R5 permits <math>\leq</math> 1/8".</li> <li>o Distance from anchor to welded attachment 9 1/2". Distance from anchor to embedded plate is 4". G-32 R10 requires 7" <u>or</u> permits 2", provided 18" between anchor and welded attachment.</li> </ul>
6) 1000HCAB749-A0404R003	No	<ul style="list-style-type: none"> <li>o Plug depth calculated to be 1". G-32 R10 requires a maximum of 15/16". (Anchor may not be adequately expanded).</li> </ul>
7) 1000HCAB749-A0407R003	No	<ul style="list-style-type: none"> <li>o Shell recess 3/16", G-32 R10 permits 1/4". G-32 R5 permits <math>\leq</math> 1/8".</li> <li>o Gap between concrete 5/32", G-32 R10 permits <math>\leq</math> 1/8".</li> <li>o Distance from anchor to welded attachment 9 1/2". Distance from anchor to embedded plate is 6 1/2". G-32 R10 requires 7" <u>or</u> permits 2", provided 18" between anchor and welded attachment.</li> </ul>
8) 1000HCAB749-A0407R013	No	<ul style="list-style-type: none"> <li>o Distance from anchor to welded attachment 11". Distance from anchor to embedded plate is 6 1/2". G-32 R10 requires 7" <u>or</u> permits 2", provided 18" between anchor and welded attachment.</li> </ul>

<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
9) 1000HCAB749-A0410R003	Marginal	<ul style="list-style-type: none"> <li>o Shell recess 3/16", G-32 R10 permits <math>\leq</math> 1/4". G-32 R5 permits <math>\leq</math> 1/8".</li> </ul>
10) 1000HCAB749-A0410R013	Yes	
11) 1000HCAB749-A0413R003	No	<ul style="list-style-type: none"> <li>o Shell recess 5/16"; G-32 R5 permits <math>\leq</math> 1/8", G-32 R10 permits <math>\leq</math> 1/4".</li> <li>o Shell recess 5/32"; G-32 R5 permits <math>\leq</math> 1/8", G-32 R10 permits <math>\leq</math> 1/4".</li> <li>o Distance from anchor to welded attachment 4". Distance from anchor to embedded plate is 1". G-32 R10 requires 7" <u>or</u> permits 2", provided 18" between anchor and welded attachment.</li> <li>o No specific anchor pull documentation readily available. Evaluation documentation indicates anchor pull documentation to exist.</li> </ul>
12) 1000HCAB749-A0414R013	No	<ul style="list-style-type: none"> <li>o Not readily identifiable on "Universal Master Status Report".</li> <li>o No support inspection or anchor pull documentation readily available.</li> <li>o Plug depth 31/32". Marginal acceptance - G-32 R10 requires <math>\leq</math> 15/16".</li> <li>o Support unlabeled.</li> </ul>
13) Hanger at A0416R013	No	<ul style="list-style-type: none"> <li>o Plug depths 15/16" and 1-7/16". G-32 R10 requires range of 1" - 1-3/8".</li> <li>o Distance from anchor to welded attachment 10-1/2". Distance from anchor to embedded plate is 4-1/2". G-32 R10 requires 7-1/2" <u>or</u> permits 2", provided 18" between anchor and welded attachment.</li> <li>o Not on "Universal Master Status Report".</li> <li>o Inspection documentation cannot be located.</li> </ul>
14) 1000HCAB749-A0417R003	Yes	
15) 1000HCAB 14953 (located at A0504R003)	No	



<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
16) 1000HCAB749-A0504R006	No	<ul style="list-style-type: none"> <li>o Plug depth 1-3/8". G-32 R10 requires <math>\leq 15/16"</math>. (Anchor may not be adequately expanded).</li> <li>o Distance from anchor to welded attachment 4-3/4". Distance from anchor to embedded plate is 4-3/4". G-32 R10 requires 7" or permits 2", provided 18" between anchor and welded attachment.</li> <li>o Anchor pull documentation not readily available</li> </ul>
17) 1000HCAB749-A0508R005	No	<ul style="list-style-type: none"> <li>o Presence of cracked concrete.</li> <li>o Gap between concrete 3/16" - 1/4". G-32 R10 requires <math>\leq 1/8"</math>.</li> <li>o Adjacent anchor spacing 3 1/2" and 3-3/8". G-32 R3 required 4-1/2". G-32 R10 required 4". 47A056-15 requires 3-1/2".</li> <li>o No specific anchor pull documentation readily available.</li> <li>o Bolt removed was damaged due to attachment gap, plate bow, and misalignment. Appeared to be damaged during original installation. Bolt could not be replaced.</li> <li>o With 3/8" plate thickness, bolt had inadequate thread engagement of 1/4". 3/8" was required.</li> <li>o WR # (not initiated as of 3/4/86) initiated to correct this condition.</li> </ul>
18) 1000HCAB749-A0510R015	No	<ul style="list-style-type: none"> <li>o Configuration does not match 47A056-15.</li> <li>o Plug depth 1-1/8". G-32 R10 requires <math>\leq 15/16"</math>. (Anchor may not be adequately expanded).</li> </ul>

<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
19) 1000HCAB749-A0511R013	No	<ul style="list-style-type: none"> <li>o Plug depth 1". G-32 R10 requires <math>\leq 15/16"</math>. However, recess was not measured. May be acceptable.</li> <li>o Adjacent anchor spacing 3 7/8". G-32 R10 requires 4". G-32 R4 required 4 1/2". 47A056-4 R3 required 4-1/2".</li> </ul>
20) HCAB 16948 (located at A0512R006)	Yes	<ul style="list-style-type: none"> <li>o No specific anchor pull documentation readily available.</li> </ul>
21) Unlabeled (located at A0512R015)	No	<ul style="list-style-type: none"> <li>o Support unlabeled. No support inspection or anchor pull documentation readily available.</li> </ul>
22) HCAB 14956 (located at A0515R005)	Yes	<ul style="list-style-type: none"> <li>o Shell recess 3/16". G-32 R5 required <math>\leq 1/8"</math>.</li> <li>o No specific anchor pull documentation readily available.</li> </ul>
23) 1000HCAB749-A0517R014	No	<ul style="list-style-type: none"> <li>o Plug depth 17/16". G-32 R10 requires <math>\leq 15/16"</math>. (Anchor may not be adequately expanded).</li> </ul>
24) 1000HCAB749-A0519R015	No	<ul style="list-style-type: none"> <li>o Plug depth 15/16". G-32 R10 requires <math>\leq 13/16"</math> for 5/16" <math>\phi</math> anchors. (Anchor may not be adequately expanded.)</li> <li>o 5/16" <math>\phi</math> anchors in field. 47A056-3 required 3/8" <math>\phi</math> anchors.</li> <li>o No specific anchor pull documentation readily available.</li> </ul>
25) 1000HCAB749-A0603R014	No	<ul style="list-style-type: none"> <li>o Adjacent anchor spacing 5-3/4". 47A056-55 required 6".</li> <li>o No specific anchor pull documentation readily available.</li> </ul>
26) 1000HCAB749-A060R015	Yes	
27) 1000HCAB749-A0610R015	No	<ul style="list-style-type: none"> <li>o No specific anchor pull documentation readily available.</li> <li>o Plug depth of 1". G-32 R10 requires <math>\leq 15/16"</math>. (Anchor may not be adequately expanded.)</li> </ul>

<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
28) 1000HCAB749-A0600R01-1&R01-2	No	<ul style="list-style-type: none"> <li>o Supports could not be located in field. See anchor pull report AB 1200. Not on "Universal Master Status Report." (May be voided supports.)</li> </ul>
29) 1000HCAB749-A0600R01	No	<ul style="list-style-type: none"> <li>o Support could not be located in field. See anchor pull report AB 4510. Not on "Universal Master Status Report."</li> </ul>
30) 1000HCAB749-A0611R014	No	<ul style="list-style-type: none"> <li>o Plug depth 1-1/8". G-32 R10 requires <math>\leq 15/16</math>". (Anchor may not be adequately expanded.)</li> </ul>
31) 1000HCAB749-A0611R015	No	<ul style="list-style-type: none"> <li>o Anchor involved with rebar.</li> <li>o Anchor involved with rebar.</li> <li>o Support not welded to embedded plate as required.</li> <li>o Anchor pull documentation indicates typical 47A056-12 and 3/8" anchors (1/2" in field). Support inspection and field configuration indicates typical 47A056-13 and 1/2" <math>\phi</math> anchors.</li> <li>o Distance from A0616R014 to embedded plate 3". Distance from A0616R014 to welded attachment 9-1/2" G-32 R10 requires 7-1/2" or permits 2", provided 18" between anchor and welded attachment.</li> </ul>
32) 1000HCAB749-A0614R014	No	
33) 1000HCAB749-A0212S003	Yes	<ul style="list-style-type: none"> <li>o No specific anchor pull documentation readily available.</li> </ul>
34) 1000HCAB749-A0301S022	Yes	<ul style="list-style-type: none"> <li>o Plug depth 1". G-32 R10 requires <math>\leq 15/16</math>". Marginal condition. (Anchor may not be adequately expanded.)</li> </ul>
35) 1000HCAB749-A0312S020	No	
36) 1000HCAB749-A0318S006	No	<ul style="list-style-type: none"> <li>o Plug depth 1-1/16". G-32 R10 requires <math>\leq 15/16</math>". (Anchor may not be adequately expanded.)</li> </ul>

<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
37) 1000HCAB749-A0318S021	Yes	o Field configuration appears to be 47A056-60. "Universal Master Status Report" indicates 47A056-55.
38) 1000HCAB749-A0322S004	No	o Distance from anchor to welded attachment 7-1/4". Distance from anchor to embedded plate is 1-1/4". G-32 R10 requires 8" or permits 2", provided 18" between anchor and welded attachment. o No specific anchor pull documentation readily available.
39) 1000HCAB749-A0401S020	No	o Field configuration with modified 10" x 10" plate with 8" anchor spacing does not match 47A056-16. o No anchor pull documentation readily available. o Plug depth 2-1/4". G-32 R10 requires $\leq 2-1/8"$ . (Anchor may not be adequately expanded.)
40) 1000HCAB749-A0408S020	Yes	
41) 1000HCAB749-A0409S004	Yes	o Anchor pull documentation indicates 1/2" anchors. Field observation indicates 5/8". 47A056-16 indicates 1/2".
42) 1000HCAB749-A0420S006	No	o Anchor involved with rebar.
43) 1000HCAB749-A0422S009	No	o Plug depth 7/8". G-32 R10 requires $\geq 1"$ . (Anchor may have been shortened.) o No anchor pull documentation readily available.
44) 1000HCAB749-A0422S010	Yes	o Support unlabeled in field. o No specific anchor pull documentation readily available.
45) 1000HCAB749-A0505S020	Yes	
46) 1000HCAB749-A0506S001	No	o Shell protrudes 1/8". G-32 R10 permits no protrusion.
47) 1000HCAB749-A0507S005	Yes	

<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
48) 1000HCAB749-A0508S015	No	<ul style="list-style-type: none"> <li>o Plug depth 1-9/16". G-32 R10 permits <math>\leq</math> 1-1/2".</li> <li>o Support inspection documentation indicates 47A056-3. Anchor pull documentation indicates 47A056-53. Field configuration indicates 47A056-53.</li> </ul>
49) 1000HCAB749-A0510S004	No	<ul style="list-style-type: none"> <li>o 47A056-55A - With 1/2" anchors, plate thickness should be 5/8" with 6" spacing of anchors. Spacing of 5-1/2" observed. Size of anchors and plates is dependent on conduit supported.</li> <li>o No anchor pull documentation readily available.</li> </ul>
50) 1000HCAB749-A0510S019	Yes	
51) 1000HCAB749-A0511S001	Yes	
52) 1000HCAB749-A0512S001	No	<ul style="list-style-type: none"> <li>o Adjacent anchor spacing is 3-1/2". G-32 R4 requires 4-1/2". G-32 R10 requires 4". 47A056-4 required 4-1/2".</li> <li>o Distance from anchor to welded attachment 5-1/2". Distance from anchor to embedded plate 4". G-32 R10 requires 7" <u>or</u> permits 2", provided 18" between anchor and welded attachment.</li> </ul>
53) 1000HCAB749-A0512S007	No	<ul style="list-style-type: none"> <li>o Gap between concrete 1/4". G-32 R10 requires <math>\leq</math> 1/8".</li> <li>o Distance from anchor to welded attachment 7-3/8". Distance from anchor to embedded plate 5". G-32 R10 requires 8" <u>or</u> permits 2", provided 18" between anchor and welded attachment.</li> </ul>
54) 1000HCAB749-A0514S022	Yes	
55) 1000HCAB749-A0515S001	No	<ul style="list-style-type: none"> <li>o Plug depth 7/16". G-32 R10 requires <math>\geq</math> 5/8". (Anchor may have been shortened.)</li> </ul>

<u>Support Identification</u>	<u>Acceptance (Yes/No)</u>	<u>Comments</u>
56) 1000HCAB749-A0515S008	No	o Distance from anchor to welded attachment is 8-1/2". Distance from anchor to embedded plate is 4". G-32 R10 requires 7" <u>or</u> permits 2", provided 18" between anchor and welded attachment.
57) 1000HCAB749-A0603S006	No	o Distance from anchor to welded attachment is 11". Distance from anchor to embedded plate is 6". G-32 R10 requires 7" <u>or</u> permits 2", provided 18" between anchor and welded attachment. o No anchor pull documentation readily available.
58) 1000HCAB749-A0603S014	No	o Plug depth 1". G-32 R10 requires $\leq 15/16$ ". (Anchor may not be adequately expanded.) o No anchor pull documentation readily available.
59) 1000HCAB749-A0608S023	No	o Plug depth 1". G-32 R10 requires $\leq 15/16$ ". (Anchor may not be adequately expanded.) o Distance from anchor to welded attachment is 8-1/2". Distance from anchor to embedded plate is 4". G-32 R10 requires 7" <u>or</u> permits 2", provided 18" between anchor and welded attachment.
60) 1000HCAB749-A0611S002	?	o Indeterminate, hole bored out in unistrut.
61) 1000HCAB749-A0611S015	Yes	
62) 1000HCAB749-A0612S023	Yes	
63) 1000HCAB749-A0614S010	No	o Plug depth 1". G-32 R10 requires $\leq 15/16$ ". (Anchor may not be adequately expanded.)

Note: Sketches of the support baseplates, typical drawing numbers, and actual field inspection information were recorded on data sheets attached to WR #114789.

RESPONSES TO INVESTIGATION REPORTS SUBMITTED BY LINE ORGANIZATIONS AND  
NOT YET REVIEWED FOR ACCEPTABILITY

RESPONSES TO CONCERN NUMBERS:

IN-85-354-001

IN-85-228-001

IN-85-069-001

IN-85-369-001

UNITED STATES GOVERNMENT

# Memorandum

TENNESSEE VALLEY AUTHORITY

TO: H. L. Abercrombie, Site Director, Sequoyah Nuclear Plant

FROM: K. W. Whitt, Director of Nuclear Safety Review Staff, E3A8 C-K

DATE: **MAR 14 1986**

SUBJECT: NUCLEAR SAFETY REVIEW STAFF INVESTIGATION REPORT TRANSMITTAL

Transmitted herein is NSRS Report No. I-86-120-SQN

Subject Concrete Anchor Installation - Unit 1


Concern Nos SQP-5-005-001; -002; -003; -004; -005; -006; -007

and associated prioritized recommendations for your  
action/disposition.

This report contains five Priority 1 [P1] recommendations which must be  
addressed before startup. It is requested that you respond to this report  
and the attached one Priority 2 [P2] recommendation by May 13, 1986.

Should you have any questions, please contact W. D. Stevens at telephone  
6231-K.

Recommend Reportability Determination: Yes  No

  
Director, NSRS/Designee

WDS:JTH

Attachment

cc (Attachment):

- W. C. Bibb, BFN
- W. T. Cottle, WBN
- James P. Darling, BLN
- R. P. Denise, LP6N40A-C
- G. B. Kirk, SQN
- D. R. Nichols, E10A14 C-K
- QTC/ERT, Watts Bar Nuclear Plant
- Eric Sliger, LP6N48A-C
- J. H. Sullivan, SQN

3/19/86



0601U



UNITED STATES GOVERNMENT

EM

# Memorandum

TENNESSEE VALLEY AUTHORITY

TO : R. P. Denise, Program Manager, Watts Bar Employee Concern Task Group  
Watts Bar Nuclear Plant ONP

FROM : Guenter Wadewitz, Project Manager, Watts Bar Nuclear Plant OC

DATE : MAR 10 1986

SUBJECT: WATTS BAR NUCLEAR PLANT - REQUEST FOR INVESTIGATION/EVALUATION

Attached is our response to employee concern number IN-85-354-001.



Guenter Wadewitz

COC:JM  
 QERT.CR  
 Attachment

3/13/86



ERT CONCERN IN-85-354-001

Concern: Instrumentation design of unit 1 & 2. Changes have been made on unit 2 instrumentation sensing lines, and not on unit 1. C/I was not told a maximum distance for the installation of condensate pots for unit 1. C/I does have a maximum distance on unit 2. The possibility exists unit 1 has not been checked. This concern is located in the turbine room and north-south valve room.

Response:

As requested in the conclusion section of the subject ERT Investigation Report, the following response addresses items 3 thru 7 of the Summary of Findings.

Item 3 FCR A-10528 was incorporated on the applicable drawing on August 14, 1985 by OE, and OC signoff on August 27, 1985.

Item 4 Workplan 4235 was written to install the valve tags referenced in item 4. The referenced drawing, 47W600-31 R13, was as-constructed on July 3, 1984, prior to workplan closure, which reflects the as-built field configuration.

Item 5 The mis-file finding addressed in item 5 was corrected by the DCU. A review of the applicable documentation on March 5, 1986, revealed the correct filing of IOS 1381 with subassembly 1-001-L196-0001.

Item 6 The hydrostatic test documentation addressed in item 6 was reviewed and corrected on March 7, 1986.

Item 7 The need for an ANI final review signoff of hydrostatic test package 1-001-L196-0008 was overlooked by DCU Record Review personnel prior to filing the document in the QA vault. The error was discovered during a subsequent review of the document performed after completion of the system N-5 Data Report. Since the completion of the N-5 Data Report involves a final review by an ANI of all system documentation, and the ANI had signed the referenced package for "Test Witnessed by", DCU personnel placed an "N/A" in the "Final Acceptance by" space.

Principally prepared by J. A. Cruise, extension 3467.

MY

UNITED STATES GOVERNMENT

# Memorandum

TENNESSEE VALLEY AUTHORITY

TO : R. P. Denise, Program Manager, Watts Bar Employee Concern Task Group  
Watts Bar Nuclear Plant ONP

FROM : Guenter Wadewitz, Project Manager, Watts Bar Nuclear Plant OC

DATE : **MAR 10 1986**

SUBJECT: WATTS BAR NUCLEAR PLANT - REQUEST FOR INVESTIGATION/EVALUATION

Attached is our response to employee concern numbers IN-85-228-001 and WI-85-091-014.



Guenter Wadewitz

COC:JM  
 QERT.CR  
 Attachment

3/13/86



EMPLOYEE CONCERN NUMBERS IN-85-288-001 AND WI-85-091-014

Subject: Snubber Control and Handling

Concern IN-85-288-001: Snubbers are not handled properly and are not adjusted and installed in accordance with the manufacturer's recommended practices of protecting them in waterproof coverings, storing and carrying them compressed, and adjusting their paddles only while they are held vertical.

Concern WI-85-091-014: TVA has very poor control over snubbers in the manner in which they are stored and handled. These expensive snubbers are frequently scrapped and later retrieved from the scrap yard for installation.

Recommendation I-85-713-WBN-01: Develop a Quality Control Instruction delineating the requirements for handling and installation of snubbers.

Response: It is agreed that a Quality Control Instruction regarding the handling and installation of snubbers is needed, and one will be issued by May 31, 1986.

Recommendation I-85-713-WBN-02: Establish measures to identify and control damaged snubbers. Apply the requirements of QCI-1.02.

Response: According to section 4.5 of QCI-1.02 (revision 15) "Failed inspections of work in progress before inspector acceptance and documentation...are not considered nonconformances." Thus, the requirements of QCI-1.02 do not apply to components between the time they are issued from the warehouse and the time they are installed.

A safety problem does not exist because final inspection procedures prevent the acceptance of damaged components. However, an economic problem does exist since damaged snubbers inadvertently installed require removal upon final inspection. Therefore, a memorandum containing instructions to ensure that damaged snubbers are tagged, marked, and/or segregated will be provided by March 31, 1986.

Recommendation I-85-713-WBN-03: The construction QA organization should conduct a generic review of the applicability of the requirements of QCI-1.02 to components between the time they are issued from the warehouse and the time they are installed.

Response: QCI-1.02 is in compliance with upper-tier document QAPP 15 and does not apply to components between the time they are issued from the warehouse and the time that they are installed. A memorandum containing instructions to ensure that damaged snubbers are tagged, marked, and/or segregated will be provided by March 31, 1986.

Principally prepared by J. Randolph Chambers, extension 3527.

UNITED STATES GOVERNMENT

# Memorandum

TENNESSEE VALLEY AUTHORITY

TO : R. P. Denise, Program Manager, Watts Bar Employee Concern Task Group  
Watts Bar Nuclear Plant ONP

FROM : Guenter Wadewitz, Project Manager, Watts Bar Nuclear Plant OC

DATE : MAR 10 1986

SUBJECT: WATTS BAR NUCLEAR PLANT - REQUEST FOR INVESTIGATION/EVALUATION

Attached is our response to employee concern number IN-85-069-001.



Guenter Wadewitz

COC:JM  
 QERT.CR  
 Attachments

3/13/86



ERT CONCERN IN-85-069-001

Concern: Pipe clamps on supports that had appeared to have been inspected, but were missing nuts or the bolts were not even turned to hand tightness. Location in Auxiliary Building, elevation 772', column A1 through A15 and R-V lines. Item is Fire Protection Appendix R lines.

Response to Recommendation Q-85-069-001-01

The walkdown initiated by this concern in conjunction with NCR 6194, was performed to identify and correct support bolting deficiencies suspected on system 26 Appendix R modifications in the auxiliary building, el. 772'. As previously submitted, this walkdown included all Appendix R support additions, approximately 800 support anchor bolts and clamp bolts. It was revealed that a total of 19 clamp bolts exhibited damaged or missing torque stripe. These 19 bolts involved 11 total supports. The OC engineering personnel and the Hanger QC inspector involved in the walkdown and subsequent NCR rework, were contacted to discuss their observations of the subject bolts in preparing this response. Based on these perceptions (see attached) and the documented rework per NCR 6194, the bolts in question represent an isolated condition with respect to the subject Appendix R support additions. The particular bolts in question are located in supports which, by their proximity to electrical boards and cable trays, are not all easily accessible. All applications of torque stripe apparently do not appear the same, however, the functional integrity of torque striping can still be maintained. The traces left from a missing torque stripe can still provide the observer with a reasonable determination of whether the bolt head had been turned since application. Missing torque striping can, in many cases, be attributed to drying and flaking of torque seal or being accidentally knocked off, but certainly not always attributable to bolt torque tampering. Wrench marks are often detectable in cases where previously torque striped connections are adjusted. In cases where wrench marks or turning bolts are evidenced by missing or damaged torque stripe, the presence of, and apparent tightness of, the bolt hardware is evaluated. If a bolt was missing or could be loosened by hand, then certainly the ability of that joint to perform its design function had been compromised. This would certainly indicate unauthorized degradation of a documented feature. The particular bolts in question did not indicate obvious unauthorized tampering or undocumented rework, nor were there any apparent compromises to the functional integrity of these connections. The observation that this relatively small group of connections were bolted up and snug tight provides reasonable assurance of the support's ability to perform its design function. The subject connections were retorqued and reinspected according to NCR 6194.

Response to Recommendation Q-85-069-001-02

In addition to the previously referenced memorandum, OC has begun other actions to increase the visibility and emphasis on work control. This has been established in part by the forthcoming issuance of WBNP-QCI-1.60, which standardizes the work control documents presently provided by WBNP-QCI-1.56 "Work Packages" and WBNP-QCI-1.30 "Control of Work on Transferred Features" (workplans). Therefore, one document will control work on all unit 2 non-transferred features as well as transferred features. The former work controls involved the above referenced procedures and meant that two separate methods were employed to establish and maintain control work. With the issuance of WBNP-QCI-1.60 to control

all unit 2 work, and the use of Watts Bar ONP's AI-8.8 to accomplish unit 1 work control, a streamlining effect will be achieved which will certainly eliminate some confusion about governing procedures. This should provide distinct clarification for control of work.

The actions taken to establish better administrative work control are a result of recent nonconformances and audit deficiency findings with the work control program. Significant Condition Report (SCR) 6497-S R0 has been generated to identify and correct discrepancies in established work control procedures for units 1 and 2 at WBNP.

Principally prepared by R. K. Burt, NSB-B

FOR	NAME	RICK BURT	DATE	3-7-86
	ADDRESS	NSB	<input type="checkbox"/> CHRG RANK	<input type="checkbox"/> M S NO
FROM	NAME	DWIGHT T. FLOYD	EXTENSION	3467
	ADDRESS	NSB	<input type="checkbox"/> CHRG RANK	<input type="checkbox"/> M S NO

REF: EMPLOYEE CONCERN IN-85-069-001

I WAS INVOLVED IN THE COMPLETE WALKDOWN OF THE FIRE PROTECTION SYSTEM ON ELEV. 772' IN THE AUXILIARY BUILDING IN JULY 1985 TO INSPECT SUPPORT BOLTING. DURING THIS WALKDOWN ALL BOLTED CONNECTIONS WERE VISUALLY INSPECTED FOR TORQUE STRIPE DAMAGE DUE TO UNAUTHORIZED DISASSEMBLY AND REASSEMBLY. ON THOSE CONNECTIONS THAT WERE FOUND TO HAVE DAMAGED TORQUE STRIPE THE TORQUE STRIPE APPEARED TO HAVE BEEN BROKEN LOOSE FROM THE SURFACE OF THE SUPPORT DUE TO IMPROPER BONDING TO THAT SURFACE DURING APPLICATION. ALTHOUGH THE TORQUE STRIPE APPEARED TO BE DAMAGED THERE WAS ENOUGH OF THE TORQUE STRIPE REMAINING ON THE SUPPORTS AND



F O R	NAME	DATE
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THE HEX HEAD BOLTS THAT THE CONCLUSION WAS THE SUPPORTS HAD NOT BEEN DISASSEMBLED. THERE WERE TWO OR THREE CASES WHERE WE FOUND MISSING TORQUE STRIPE ON SUPPORT CLAMPS WHERE UNAUTHORIZED DISASSEMBLY COULD HAVE BEEN DONE, ALSO ONE CASE WAS FOUND WHERE ONE BOLT ON A UNISTRUT CLAMP HAD NO TORQUE STRIPE AND THE OTHER BOLT DID.

THEREFORE THOSE INVOLVED IN THE WALKDOWN CONCLUDED THAT THERE WAS NO PROBLEM WITH THE QUALITY OF THE SUPPORTS DUE TO UNAUTHORIZED DISASSEMBLY AND REASSEMBLY.

Dwight J. Floyd  
3-7-86

F O R	NAME	3-6-86
	ADDRESS	
	Nuclear Services Branch, WBN OC	<input type="checkbox"/> Chatta <input type="checkbox"/> M S <input type="checkbox"/> Reno <input type="checkbox"/> Nor

F R O M	NAME	EXTENSION
	ADDRESS	
	RR Kirkpatrick	8418
	Meek Mtn, WBN NUP	<input type="checkbox"/> Chatta <input type="checkbox"/> M S <input type="checkbox"/> Reno <input type="checkbox"/> Nor

During the investigation of employee concern IN-85-069-001, I participated in a complete walkdown of Appendix R support bolting on elev 772 in the Auxiliary building during July '85. During this walkdown NSB engineers visually inspected torque stripe on all sys 26 Appendix R supports for damage, specifically damage due to unauthorized disassembly and reassembly of support clamps. There were several cases found where torque stripe was damaged. However it appeared that in almost all cases, the torque stripe had simply broken loose from the surface of the support due to the fact that the torque stripe had not properly bonded to the surface of the support when it was applied. We arrived at this conclusion

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	ADDRESS	<input type="checkbox"/> CHATG <input type="checkbox"/> RICH	<input type="checkbox"/> M S <input type="checkbox"/> NY	

based on the fact that in most cases all of the torque stripe was not damaged on a particular area of the support, ie, although the torque stripe was damaged there was sufficient torque stripe left between the hex head and the support surface to positively verify that the support had not been tampered with.

There were only two or three cases where we discovered missing torque stripe on Appendix P clamps where unauthorized tampering could have been the cause. On one particular case, a unistrut clamp was found with torque stripe missing on only one of the two bolts. But it was my opinion upon completion of the walkdown that there was no significant compromise in the quality of the hangers due to tampering.

R. K. Kuhlitz

3-6-86

FOR	NAME	Dwight Floyd	DATE	3-6-86
	ADDRESS	N.S.B	<input type="checkbox"/> CHATL	<input type="checkbox"/> M.S
----- Paid here for return -----				
FROM	NAME	Wendell Jones	EXTENSION	
	ADDRESS	HQC	<input type="checkbox"/> CHATL	<input type="checkbox"/> M.S

I checked 9 supports  
per NCR 6194.

Of these two had Torque  
seal broken, but bolts were  
not missing or loose.

The others had had no  
Torque seal on either or  
one of bolts but no  
missing bolts or loose bolts

Bolts were Torque with  
Wrench per NCR 6194 + QCP  
4-23-8 R/7. Before R/7 of QCP  
4-23-8 there was no Requirement  
for Torque on bolts

Wendell Jones  
HQC

UNITED STATES GOVERNMENT

## Memorandum

TENNESSEE VALLEY AUTHORITY

TO : R. P. Denise, Program Manager, Watts Bar Employee Concern Task Group  
Watts Bar Nuclear Plant ONP

FROM : Guenter Wadewitz, Project Manager, Watts Bar Nuclear Plant OC

DATE : MAR 12 1986

SUBJECT: WATTS BAR NUCLEAR PLANT - REQUEST FOR INVESTIGATION/EVALUATION

Attached is our response to employee concern numbers IN-85-369-001.

  
Guenter Wadewitz

COC:JM  
QERT.CR  
Attachment

3/13/86



RESPONSE TO EMPLOYEE CONCERN IN-85-369-001

A. Q-85-369-001-01: "Warehouse Operations"

"The deficiencies in segregation, labeling, and storage of materials identified in this report need to be corrected via a quality assurance document."

The specific items given to "substantiate" this are as follows:

1. 1/2-inch ball valve, SA479-316, SW 600#, Mark 37W2061218; Stored in nonsafety location

Response: This valve was received as a QA code valve in February 1979. The valve was issued in March 1979 to the steamfitters. There is not a credit record for return to the warehouse; therefore, it would not have been listed in the ledger books. It must be assumed that the craft later returned the valve but did not follow appropriate procedures for crediting back to warehouse control. While bookkeeping accountability was violated, the traceability of the valve was maintained. A credit document (TVA 575) has been written, and the valve relocated to an ASME location.

2. 14-inch sch 140 pipe, HT #2809-1-2, HT lot #72376; Marked with paint stick ASTM A312-376 when material was ASME Sec III Class I

Response: This pipe was received in 1976. It had the heat number stamped into the pipe and the proper documentation is available as QA Level I material. There was improper paint stick markings on the pipe which have been removed.

3. Concentric reducers, HT Code AEA; Filled with water

Response: Carbon steel butt weld fittings above two inches such as this one are stored in Level D storage on a plywood platform. This particular fitting has a plastic end cap resulting in some water collection. This cap was removed and the remaining fittings checked for potential water collection.

4. Flange, orifice union, HT #216841-MHA; Stored in wrong location

Response: This particular union had a location of W21AF31 and had been placed on the bin below at W21AF21. This was corrected.

5. I Beam 5" x 14.75, HT #1815151; Wrong HT number, should be 181S151

Response: We have 390 feet of 5" x 14.75 I beam in stock. 240 feet is HT #181S151 and 150 feet is HT #170S813. We were unable to find any markings as 1815151. Each was marked correctly.

6. Piping material yard 1B-6, yard 1C-5; Uncapped or ends split

Response: This is a continuous problem where variance in temperature cause the plastic end caps to pop out or split. These items are checked each month and replaced on the monthly housekeeping tour. To help prevent future occurrences, we are in the process of securing these end caps with tape. This will be completed April 7, 1986.

7. The roof of building D-6, yard #1; Brace of roof resting on piping material

Response: A support brace for a roof section had settled and was resting on some stainless pipe. This was corrected March 3, 1986.

8. I Beam in uncontrolled DC laydown area identified as PM/QA/04 R 551661, 10' x 10" x 1/2", A500 Gr B, HT 77H14; Completely uncontrolled

Response: For stock material where the crafts perform shop or field fabrications, the point of installation is the controlling factor for material integrity.

All transfers of heat numbers require inspector verification whether it takes place in the warehouse or in the field. At the point of installation, heat numbers are reverified for compliance by a quality control inspector. If the number cannot be read or verified to the heat code program, its installation is not accepted until resolved.

A general cleanup of all material which has left the warehouse but has not been installed is planned. This will be covered under our summary of actions required. The possibility for a craftsman to pick up a substitute piece of material will always exist regardless of the controls in place. It is for this reason that we must rely on inspector verification of material at the time of actual installation.

9. Nonconforming cable - various types; Uncontrolled

Response: The cable stored under the control of the warehouse had all nonconforming cable segregated by roping off with red QC tape and a NCR tag fastened to each reel. To use this cable would occur only with the purposeful

intent of an individual to violate the quality control program. To avoid any future question of this type, all nonconforming reels have been moved to a location approximately 100 yards away and will be covered with tarps. This cable was previously surplused and sold and is awaiting shipping.

The cable referred to as "Engineering Storage" is outside the warehouse yard and is the staging area for the crafts. These are the "working reels" for the electricians and used for their various pulls. Again, the "control" of the material is maintained by requiring a final inspection at the point of installation. An inspector must be present at the beginning of each pull to verify the proper cable is being used along with the appropriate pull requirements. Any cable of a nonconforming nature that a craftsman might substitute would be caught at this time. If we locked up the staging area and issued only a strand of cable at a time for a specific use that would not stop the use at another unspecified location. For this reason, the control of proper use must occur at the point of actual installation.

10. In addition to the above, several other areas need to be addressed.
  - a. The report says that material on the ledger cards could not be found. To check the magnitude of this we selected 486 items at random from ledger cards. From the cards, we copied descriptions of the material and its designated location. We then went to the designated locations to see (1) if the items were there and (2) if it was properly identified by tag, marking on container, or if the description was painted or marked on the item itself.

Following are our findings:

Of the 486 items on the books, 36 were not in place or 7.4 percent.

Of the 36 not in place, 21 were being surplused and remained on the books until paperwork cleared to show the items gone. Three of the missing items were electrical, which were being consolidated with like items. These were on pallets in a staging area. Three of the items showed "0" on the books. This only left nine items that could not be accounted for or 1.9 percent of the sample.

We found no problem identifying any of the material by tags attached to the material, markings or descriptions on containers, or on the items themselves. However, there is problem of identification of stenciled information, such as heat numbers on items like carbon steel pipe and fittings that are stored outside and have been there a number of years.



This takes us back to the problem of being exposed to the elements for 8 to 10 years. This will be addressed in our overall plan to review all material and to keep what can be cleaned up and used and surplus the remaining for sale.

- b. We have some items stored in ASTM locations that have ASME markings. For instance, a piece of material was transferred in from the Hartsville jobsite. We requested ASTM but Hartsville only had ASME. When received, we placed the material in the ASTM location since there was its intended use. An auditor or investigator will see the ASME paint stick markings and assume we have erred in storing the material. To correct this we will review all markings and remove the reference to ASME where we intend the use the piece as ASTM. Heat numbers will remain stamped into the material so the traceability of the material is maintained.
- c. The report also states that there was a "lack of material separation (safety and nonsafety) prior to 1977-1979 timeframe. There are only four remaining people in the warehouse that were stores clerks at Watts Bar prior to 1977-1979. They supplied the following information concerning receipt and storage of material.

Evidence of the material program prior to 1977 is shown by the attachments on Sections 3.6 and 3.7 dating back to 1974.

Areas for nonpermanent and permanent material having different levels were provided in outside and inside storage locations. Items, such as steel, pipe, and fittings, were segregated in outside locations that correspond to warehouse locations on ledger cards. The cards indicating quantity, cost, type, level of material, and contract number would tie the material and contract together. Areas were marked for carbon steel or stainless steel storage. Inside storage areas consisted of racks and bins which were marked or labeled indicating type and level of material. The ledger cards also correspond to these locations indicating type, quantity, and level of materials.

Stainless steel pipe, valves, and fittings, were stored so as not to come into contact with any nonstainless material. Pipe was color coded with different color of paint to indicate the ASTM specification for traceability.

Receiving clerks were instructed to check the contract for QA level and if material was permanent direct charge or inventory material. After inspection of material to see if the contract specifications were met and proper documentation was received

and checked by the responsible engineer, the material was stored in designated areas. Ledger cards for inventory material were checked to ensure the material being stored was stored with material having the same specifications.

B. Q-85-369-001-02: "Training of Warehouse Clerks"

"Warehouse clerks should be trained in the applicable QA requirements of their jobs. This training should be formal, documented, and completed under the QA program."

The intent of the training program established for material control clerks is to rotate personnel from one phase of warehousing, such as receipt and issue, to other areas, such as the ledger office. By doing this TVA's goal is to lessen the impact of attrition by having all SB-4 personnel who can easily move into another job if a sudden vacancy is created.

As a clerk is trained in a particular area whether he/she be a SB-2, -3, or -4, he/she becomes eligible to perform in that area independently.

Prior to 1980 the training program was directed at stores clerks and stores record clerks as described in W. F. Baker's memo to Those listed dated March 16, 1971 (attached). After 1980 the program for the material control clerks came into existence (see attachment).

Neither of the programs were intended to take the place of specific training in the appropriate quality control procedures. At the time of the QTC investigation, our records show that each of the "trainee" clerks mentioned in his report had been trained in the procedure of storage and housekeeping and the procedure of receiving. These procedures outline the witnessing of receipt by the inspection organization and their concurrence on storage level assignments. It also includes their review of the appropriate paperwork and markings.

Once again, after a clerk has been trained in a function of the warehouse and in the appropriate procedure, he/she has been allowed to make issues. It is not necessary to work in the ledger office and all other aspects, as required for a SB-4, to become proficient in receipt and issues; yet the clerk is still termed a "trainee."

We do feel that our training program can be strengthened. Plans to do this will be outlined under the summary for recommendations. Since receiving this concern, we have reviewed the procedures again with each clerk to make sure they understand their responsibilities.

To ensure an understanding of the issue of permanent material, I will outline the process. This begins with the craft expeditor bringing a properly prepared and authorized TVA 575 to the warehouse ledger office. From the description given on the 575, the ledger office clerk locates the storage location of the material and notes it on the

575 so the issue clerk will know where to go to get the material. After this is done, the ledger office gives the 575 to the issue counter clerk, who in turn will give the 575 to the issue clerk for that day.

All issues made outside of the main warehouse are always accompanied by an issue clerk, and issues within the main warehouse are gathered by a warehouseman and taken to the issue counter clerk to be checked before issuing.

All issues involving steel, nuts, and bolts, which do not bear an inspector's mark are made with an inspector present to verify the issue. In the case of steel, each piece must be die stamped with the heat number and validated by an inspector's die stamp before it can be issued to the craft. Heat numbers are verified by the use of the heat code log file. If heat numbers are not listed, the inspector and issue clerk will take the contract number from the item to be issued and return to the warehouse to pull the file on the contract and verify that it is a good heat number and proper documentation is on file before making the issue.

In issuing nuts and bolts, an inspector is required along with the issue clerk to check for manufacturer's identification markings and to check heat number traceability as well as die stamp validate each one prior to issuance in accordance with the material specifications.

On issuing ASME Code pipe, an inspector and issue clerk are both required when the code pipe does not already bear the inspector's validation stamp. When issuing code pipe fittings, an issue clerk is all that is needed since each code fitting is validated by the inspector prior to its being stored upon initial receipt. All issues involving code pipe, pipe fittings, nuts and bolts (with heat numbers), and steel will show the heat number that was issued so that traceability can be maintained after it has left warehouse storage. The issue clerk is responsible for documenting the heat number(s) on each 575 upon issue to the craft.

After completion of issue is made, the issue clerk has the craft expediter to sign for the material that was issued to him/her. The issue clerk will then date and initial the 575, give the craft expediter copy number 4 of the 575, and return the completed 575 to the issue counter clerk where the issued 575 is checked off the log so that a continuity record is maintained. The issue counter clerk then returns the 575 to the ledger office where the ledger office will deduct the quantity that was issued on the ledger card, assign a serial number to the 575 and note that on the ledger card, then file the 575 in sequence under the appropriate account number file.

By following the preceding steps, we are able to maintain traceability from the time material arrives in warehouse storage until it leaves warehouse storage.

All permanent material that is not ASME Code is bought to ASTM specifications. It is for this reason that we go to special efforts on the issue of ASME Code realizing that the other permanent material issues will always meet the ASTM requirement.

C. Q-85-369-001-03: "Adequacy of Issued Material"

"Since warehouse clerks were not properly trained and materials were found mislabeled and mislocated, an evaluation of the adequacy of material issued needs to be made and documented under the QA program."

Again the heart of this issue is not the training of the clerks, but the controls on procurement, receipt, and installation. We procure all permanent material as ASME or ASTM. At receipt we identify and check material in with the assistance of the quality control inspector. Once issued, the material enters the project, and the installation procedures along with the expertise of the engineers, craftsmen, and inspectors ensure the proper material is installed for its appropriate use.

Since the inspector must verify the heat number on the material, any ASTM substitute for ASME would be caught. All other installations would at a minimum meet ASTM. This also applies to cable since the inspector must verify the cables and appropriate reel numbers at the beginning of each pull. We cannot agree that any problems in this area can be based on the training of clerks.

We do feel that the process can be improved, and we will address what enhancements will be put in place.

1. A standard operating procedure (SOP) on materiel clerk responsibilities will be written. This will include detailed information on how they are to carry out their responsibilities.

This will be completed by April 7, 1986.

2. The training program will be more formalized and written exams developed to measure training effectiveness. (This is dependent on approval by the Division of Personnel.)

This will be in place by May 5, 1986.

3. A checkpoint manned by a materiel clerk will be placed at the entrance to the warehouse yard. The clerk will check all incoming and outgoing traffic for proper documentation for material returned or issued.

This will be in place by April 7, 1986.

4. A special crew of crafts, engineering, and warehouse people will be set up to identify areas and schedule their clean up of discarded material. This applies to scrap areas and lay down areas both inside and outside the warehouse yard.

A schedule for this effort will be put together by April 14, 1986.

5. Watts Bar site will request the Knoxville staffs to do an analysis of computerizing our ledger system and placing it online to avoid inherent lag time for updating.

This request will be made by March 24, 1986.

6. The warehouse and quality control will set a schedule for the review of all inventory. During this review, ASME material will be checked for proper markings and validated. During the interim period, all ASME issues will be accompanied or checked at the gate for compliance.

A start date for each of these has not been set but will be no later than March 24, 1986.

7. An overall consolidation schedule will be developed with the intent of placing all like materials together.

This schedule will be finalized by April 14, 1986.

8. All material will be reviewed for useability. Where corrosion has made the use of the material questionable, it will be surplused and segregated. This will be incorporated in item F.

9. Lay down areas will be identified and separated from the warehouse yard. These areas will be fenced in and used to carry out item D above.

Areas will be established to begin receipt of material by April 14, 1986.

10. Requirements for caps and plugs will be reviewed. Where required, these will be secured with tape to prevent them from falling out.

This will be complete April 7, 1986.

11. All nonconforming cable is being segregated where there is no question of accidental use.

This will be complete March 24, 1986.

12. A revised organizational chart has been presented to the Manager's Office for review. The proposal realigns duties in the warehouse to ensure responsibilities for various warehouse operations are clear. It also establishes a position to review warehouse facilities, training progress, procedural requirements, and housekeeping.

Implementation is pending this review.