

UNITED STATES GOVERNMENT

Memorandum

GNS 0605 050 HRF

TENNESSEE VALLEY AUTHORITY

TO : H. H. Mull, Director of Construction, E7B24 C-K
 J. E. Wilkins, Project Manager, Watts Bar Nuclear Plant, CONST

FROM : H. N. Culver, Director of Nuclear Safety Review Staff, 249A HBB-K

DATE : June 5, 1981

SUBJECT: WATTS BAR NUCLEAR PLANT - NUCLEAR SAFETY REVIEW STAFF REVIEW REPORT NO. R-81-09-WBN

Attached is the NSRS report for the routine review conducted at WBN during the period May 18-22, 1981, regarding the activities associated with the construction work packages as described by Quality Control Instruction 1.38, "Work Package Preparation, Processing, and Maintenance." The report is the result of a site visit described in my memorandum to you dated May 4, 1981 (GNS 810505 050).

Our recommendations, as stated in section III of this report, show seven open items requiring action by Construction for resolution. No formal response is requested for these items. NSRS will examine the corrective actions relative to these recommendations during a future review.

Cooperation at the plant was excellent at all levels. This consideration is appreciated.

If you have any questions regarding this report, contact K. W. Whitt at extension 6620.

H N Culver
 H. N. Culver

MSM
 MSM:LML

cc: MEDS, E4B37 C-K



TENNESSEE VALLEY AUTHORITY
NUCLEAR SAFETY REVIEW STAFF
REVIEW

NSRS REPORT NO. R-81-09-WBN

SUBJECT: TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT
ROUTINE REVIEW

DATES OF
ONSITE REVIEW: MAY 18-22, 1981

REVIEWERS: Martha S. Martin 6/5/81
MARTHA S. MARTIN DATE

Ronald W. Travis 6/5/81
RONALD W. TRAVIS DATE

Randy Fair 6/5/81
RANDY FAIR DATE

APPROVED BY: Marvin V. Sinkule 6/5/81
for MARVIN V. SINKULE DATE

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I. Scope

This was a routine review of selected activities at the Watts Bar Nuclear Plant. This review involved activities associated with the preparation, processing, and maintenance of the construction work packages as described by Quality Control Instruction 1.38.

II. Conclusions

A. Quality Control Instruction 1.38

1. There are weak areas in the work package program as specified by Quality Control Instruction (QCI) 1.38, "Work Package Preparation, Processing, and Maintenance," which stem from two general problems--a lack of communication and/or a lack of coordination. For example, QCI 1.38 is a QA procedure, therefore, work specified by this procedure must be done according to the QCI. Nevertheless, there are instances where attitudes and actual work packages do not reflect an acceptance of QCI 1.38 as a binding procedure.

A further example of this communication problem is reflected by the variety of opinions which exist concerning the purpose of QCI 1.38. Some personnel consider it strictly a cost and scheduling tool while others regard it as a method for systematically controlling construction work on the project. (Reference section IV.A for details.)

2. Many of the documentation and implementation problems encountered in the review resulted from confusion concerning the intended use of the QCI attachments which compose the work package. The present revision of QCI 1.38 does not provide specific guidance in this area. (Reference section IV.A for details.)
3. Because of the general nature of the QCI, several procedural practices have evolved on an informal basis. One area of particular concern is the practice of recalling all outstanding work packages at the time of system transfer, deleting through revisions any incomplete work, and adding these items to the Outstanding Work Item List (OWIL) associated with the system transfer. (Reference section IV.A for details.)

B. Preparation of Work Packages by the Responsible Engineering Unit

1. The majority of the problems associated with the work packages result from the wide variance in the preparation of the work packages which exists from engineering unit to unit.

- a. There is a lack of effective formal training initiated from upper management on how to complete packages, how detailed to make the instructions, or how to correctly use each attachment to fulfill its intended purpose. Without this training, each unit is left to their own initiative resulting in a wide variance in the quality of packages prepared by different units.
- b. There is no formal requirement for any technical review of the completed work packages before they are issued to the field.
- c. Without formal training or technical review, this method of preparation relies heavily on the experience of the engineer writing the package or on the experience of the craft upon receipt of the package. (Reference section IV.B for details.)

C. Electrical Engineering Unit's Implementation of QCI 1.38

- 1. The Electrical Engineering Unit (EEU) appears to have more difficulty in applying QCI 1.38 than other engineering units. There appears to be a particular problem with work packages required for conduit removal. (Reference section IV.C for details.)

REVIEWED TRAINING PACKAGE
T. B. BULT ASST. EE UNIT 2

III. Recommendations

A R-81-09-WBN-01, Use of Quality Control Instruction 1.38

The proper use of QCI 1.38 should be communicated from the site upper management throughout the organization in order to ensure the acceptance of this procedure as a standard practice. If the procedure cannot be used effectively, it should be revised. (Reference section IV.A for details.)

B. R-81-09-WBN-02, Purpose of Quality Control Instruction 1.38

The next revision of QCI 1.38 should better define the scope and purpose of the procedure and the intended use of the QCI attachments. A simplified block diagram, such as the one shown NSRS by site management, which illustrates the flow of the work package from development to the field might be effective. (Reference section IV.A for details.)

C. R-81-09-WBN-03, OWIL Formation from Work Packages

If the current practice of deleting incomplete work from outstanding work packages at time of system transfer and adding these items to the OWIL is determined by management

to be acceptable, it should be documented in the next revision of QCI 1.38. This practice should be cautiously managed to ensure that it does not defeat the purpose of the work package program in controlling and completing project construction. (Reference section IV.A for details.)

- D. R-81-09-WBN-04, Training on the Preparation of Work Packages for the Responsible Engineering Units

Formal training should be established for the appropriate management level to discuss the QCI and explain the purpose of each attachment. (Reference section IV.B for details.)

- E. R-81-09-WBN-05, Development of Engineering Unit Guidelines for Preparation of Work Packages

Each engineering unit should develop a sample work package typical of their unit's work, including any necessary written explanation, to use within their unit as a guideline for preparation of the work packages. Alternatively, they should develop some internal document such as Nuclear Power's Section Instruction Letters (SIL) explaining their method. These documents should be reviewed by the Review and Approval Committee (RAC) to ensure consistency throughout the project in implementation of QCI 1.38. (Reference section IV.B for details.)

- F. R-81-09-WBN-06, Technical Review of Work Packages

Each engineering unit should arrange for individual work packages to receive appropriate technical review within the unit before being released to the field. (Reference section IV.B for details.)

- G. R-81-09-WBN-07, Electrical Engineering Unit's Implementation of Quality Control Instruction 1.38

The Nuclear Safety Review Staff (NSRS) recommends that EEU's problems with implementation of QCI 1.38 be reviewed at the proper management level in order to resolve the apparent difficulties. (Reference section IV.C for details.)

IV. Details

A systematic review was conducted to examine the preparation, processing, and maintenance of the Watts Bar Construction work package program as described in QCI 1.38. This instruction covers the handling of work packages developed to finish the remaining

engineering and construction work required to complete the transfer of WBN units 1 and 2 to the Office of Power. These packages are developed by construction engineers and are assemblies of information, by discipline, which provide or list all necessary instructions, drawings, permits, etc., needed to complete each construction activity. Each construction activity is governed by a work package. These work packages are also the major control of drawings used in construction activities.

To accomplish this review, the NSRS examined the available documentation on the work package program including the new revision to QCI 1.38 which was being signed out during the review period. In addition, 43 work packages in various stages of completion and training records for craft and engineers were reviewed. The comments on specific work packages are contained in the appendix to this report. Twenty-five personnel, both in construction management and in the field, were interviewed. Meetings related to work package development were attended. A list of the documents reviewed and the personnel contacted is included in sections V and VI.

A. Quality Control Instruction 1.38

The majority of the problems identified in the work package program stem from a lack of communication and/or a lack of coordination. For example, 10CFR50, Appendix B, Criterion V, requires that activities affecting quality be documented by instructions, procedure, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with those instructions, procedures, or drawings. The WBN FSAR, section 17.1A.5, states that activities affecting quality are prescribed by documented instructions. The Quality Control Instructions partially fulfill these requirements and, thus, QCI 1.38 is a binding quality assurance procedure. As such, it is not just a guideline but requires work to be done according to the instruction. Despite this fact, the attitudes of some WBN construction personnel and actual work packages do not reflect an acceptance of QCI 1.38 as a binding procedure. This information was determined from personnel interviews and from reviews of inadequately documented work packages with the responsible engineers who developed the packages. If the procedure cannot be used properly, it should be revised and not just ignored. The NSRS recommends that the proper use of this procedure be communicated to all levels of construction management in order to ensure the acceptance of this procedure as a standard practice.

Another area which reflected a lack of communication through management ranks involved the purpose of QCI 1.38. Again, personnel interviews reflected a wide variety of opinions. Many viewed the procedure as only a cost and scheduling tool while others view the procedure as a systematic method for

controlling the construction work on the site and completing the project. The next revision of QCI 1.38 should better define the scope of the program in order to clarify this point.

At present, QCI 1.38 provides only general guidance regarding the QCI attachments which actually go together to comprise a work package. Several of the documentation and implementation problems encountered reflected confusion as to the proper use of the attachments. For example, attachment B is designed to list sequentially the steps necessary to complete the work specified by the work package. Some packages listed detailed step instructions, referenced governing QCP's and other documentation, and provided places for inspection signoffs. Other packages ranged from very general, one-line instructions such as "Inspect Conduit," to packages where the instructions were marked N/A. Obviously, such a variation indicates several interpretations as to the purpose of attachment B. Another example of this confusion involved the use of attachment E (a materials listing) for development of craft instructions with little regard to instructions on attachment B. The next revision should clarify the purposes and uses of the various attachments. Particular attention should be addressed to the specification of QCP's, construction specifications, etc., on attachment B. Although these specifications appear to be required, many work packages do not reference them.

The understanding of the work package program could probably be further enhanced by the inclusion of a simplified block diagram, such as the one shown the NSRS by site management, in the next revision. This diagram illustrates well the paper-work flow of the packages from development by the engineer to work in the field.

The next revision should incorporate the currently informal practice of recalling all outstanding work packages at the time of system transfer, deleting through revisions any incomplete work, and adding these items to the transfer punchlist as outstanding work items on the OWIL. The NSRS reviewed the documentation for the Component Cooling Water System which was recently transferred and determined the OWIL, though long, was reasonable. However, this current practice could be easily abused, and since this defeats part of the purpose of the work package program, it should be cautiously managed. It is important that systems be transferred to power as complete as possible and that time of transfer be determined from work progress and not from scheduling considerations. The NSRS will monitor this situation closely as additional systems are transferred.

B. Preparation of Work Packages by the Responsible Engineering Unit

The most significant problem area identified resulted from the wide variance in completion of the work package attachments which exists from engineering unit to unit. There appears to be no formal training initiated from upper management on how to complete packages, how detailed to make the instructions, or how to correctly use each attachment to fulfill its intended purpose. Lacking this guidance, the engineering units are left to their own initiative and a wide variance in methodology has resulted. Some units develop thorough work packages with detailed instructions and referenced documentation. Other units develop very general, often incomplete, packages.

In addition to no formal training, there is also no formal requirement for any technical review of the packages. Some units have informally developed a review process by routing all packages through their supervisors or by exchanging packages with other cognizant engineers. Other units have no review of packages before their release to the field. The responsibility of the RAC to review work packages is not defined. Consequentially, some engineering units erroneously rely on the RAC for technical review of the work packages. Ultimately, this method relies heavily on the experience of the engineer writing the package or on the experience of the craft upon receipt of the package. With the engineering manpower limitations and the personnel turnover present at Watts Bar, this is not a justified assumption and is unnecessary.

Lack of training and lack of review create most of the documentation and implementation problems found in the field. For instance, one conduit work package (E001G01) contained only the instructions to "Inspect Conduit" and "Document Conduit." As a result, this package relies exclusively on craft experience.

There are numerous examples of signoffs not completed, attachments referenced in the work package not being included, and work package field start dates not completed because each responsible individual believed that was someone else's responsibility. There are packages where the official Work Package Group copy contained revisions and attachments not found in the original work package being worked in the field. There are packages with more than one revision No. 1, although the work covered by each revision differed. One package contained 42 revisions issued in two months with a revision labeled as No. 31 being the first revision. A revision labeled No. 1 was the 18th revision to the package.

Obviously, these problems create documentation and tracking difficulties. Almost all of these problems stem from a lack of training on how to complete the attachments comprising a work package. The NSRS recommends that some new training be

set up for the appropriate management and that the QCI be discussed and the purpose of each attachment explained. Since there are significant differences in the work of each unit, the NSRS recommends that each unit develop a sample package typical of their unit's work with any necessary written explanation to use as a guideline for preparation of the work packages. Alternatively, the unit could develop an internal document such as Nuclear Power's SIL's explaining their method for work package development. These documents should then be reviewed by RAC to ensure consistency throughout the project on the proper use and purpose of the work package program. Individual unit problems in implementing the procedure can thus be resolved. This would eliminate one reason the NSRS was given for not fully utilizing the package concept since it did not fit the unit's work. Further, new personnel in an engineering unit will have more explicit guidelines for developing work packages in addition to the general requirements of QCI 1.38. These guidelines would help clarify the process without creating a more cumbersome procedure.

C. Electrical Engineering Unit's Implementation of Quality Control Instruction 1.38

The final problem area identified concerned the EEU. The EEU appeared to have more difficulty in applying QCI 1.38 than other units. It was noted by the NSRS that recent work packages appeared to show some improvements in completing the necessary attachments, but significant difficulties were still being encountered. From this review, all of the reasons for this difficulty are not clear, but the NSRS recommends this situation be reviewed at the proper management level. It is possible the EEU needs more manpower, more technical review of work packages, more guidance on the purpose of the QCI 1.38 attachments, or perhaps more flexibility in applying the procedure. This information was gathered from personnel interviews and from a review of EEU work packages. There particularly appears to be a problem with excessive work package paperwork delaying relatively simple construction tasks. The need for work packages to be written for conduit removal appears to be another problem. This area appears to be covered by the Conduit Removal Sheets in QCP 3.3. One possibility might be to incorporate these removal sheets into the work package encoding process. Although these specific areas were not reviewed in depth, the NSRS does believe there should be some special review of the EEU with regard to implementation of QCI 1.38.

Several problems relating to the master drawing status computer program used to control drawings in the work packages have been identified by onsite personnel and are being handled appropriately in an effort to initiate corrective action. The NSRS believes this problem area is being handled satisfactorily at the site, and therefore it was not considered indepth

during this review. Once specific corrective action is identified, the NSRS will review this area to ensure the adequacy of the amended program.

The work package program may be evolving in the right direction. Recent work packages seem more complete and better written. Acceptance of the work package program concept appears to be reasonably good, particularly by the craft. The NSRS believes that the work package concept represents a meaningful method for completing and documenting construction activities. However, to assure its successful implementation, all personnel must understand their roles in the overall program.

V. Personnel Contact

- *R. W. Olson, Construction Engineer
- H. J. Fisher, Assistant Construction Engineer
- G. Kirkland, Work Package Group Representative
- C. Selewski, Electrical Engineer
- T. Schumper, Electrical Engineer
- W. E. McNair, Management Systems Supervisor
- A. W. Rogers, Quality Assurance Supervisor
- M. L. Boone, Assistant Structural Ironworker Superintendent
- J. Burke, Civil Engineer
- J. Weinbaum, Quality Control and Records Supervisor
- M. Debusk, Quality Control and Records
- D. Wade, Quality Control and Records
- W. S. Bessom, Civil Engineer
- P. A. Elia, Area Planner
- *D. Clift, Mechanical Engineering Unit Supervisor, Group A
- *J. A. Thompson, Startup and Coordination Supervisor
- M. Dunn, Hanger Engineer
- R. A. Strickland, Boilermaker Superintendent
- J. H. Perdue, Electrical Engineering Unit Supervisor
- C. D. Nelson, Assistant General Construction Superintendent
- M. A. Harper, Training Officer
- J. E. Shipe, Electrical Foreman
- P. Bellamy, Electrical Inspector
- K. Keneley, Hanger Engineer
- *C. O. Christopher, Assistant Construction Engineer
- *W. C. English, Assistant General Construction Superintendent
- *S. Johnson, Assistant Construction Engineer
- *J. E. Treadway, General Construction Superintendent
Craftsmen

*Attended exit meeting.

VI. Documents Reviewed

- A. Quality Control Instruction 1.38, R2, "Work Package Preparation, Processing, and Maintenance."

B. Quality Control Instruction 1.38, R3 - Pending Approval,
"Work Package Preparation, Processing, and Maintenance."

C. Construction Work Packages

1. E001F01
2. E001G01
3. E067A04
4. E234B02
5. E293A03
6. M024C03
7. E292A68
8. E003E01
9. I277A01
10. E30K01
11. E77E004
12. C191I13
13. C192I02
14. M024C03
15. M001D02
16. M006A07
17. M030K08
18. M026A47
19. M062M23
20. M026A64
21. M026A86
22. H062B04
23. M000A01
24. H067HJ2
25. H082A03
26. H070C03
27. H070B20
28. H070A13
29. H070A04
30. H070A14
31. H070A01
32. H070A03
33. H070A11
34. H070A12
35. E43G02
36. C193B03
37. M026A20
38. I030L02
39. E030K01
40. E003E02
41. E292A69
42. E063G01
43. E030K05

D. 10CFR50, Appendix B, "Quality Assurance Criteria for Nuclear
Power Plants and Fuel Reprocessing Plants"

- E. Watts Bar FSAR, Chapter 17, "Quality Assurance"
- F. TVA Interdivisional Quality Assurance Procedures
- G. Division of Construction Quality Assurance Program Manual Policies and Procedures
- H. OEDC QA Program Requirements Manual
- I. Quality Assurance Branch Manual - Division of Construction
- J. OEDC Quality Assurance Manual for ASME Section III Nuclear Power Plant Components

Appendix A

Work Packages Reviewed - Specific Comments

The following lists work packages examined and deficiencies identified:

1. E001PG1 Instructions were given to install equipment per drawings listed in attachment E yet there was no request for drawings on attachment D.

Attachment E, sheet 3, reference drawings, but no drawings are requested on attachment D.

PCU estimator indicates work in package was completed before issuance yet the package is indicated as in work and has no crosscut sheet completed.

Logic is marked on attachment B as attached but is not included.
2. E001G01 The work package scope included "Install, inspect, and Document Conduit," but the instructions covered only inspecting conduit and documenting conduit.

Instructions contained only "Inspect Conduit" and "Document Conduit."
3. E067A06 Incomplete attachment A.

Package was issued under R2 of QCP 3.33 which is approved on January 21, 1981, but the package contained a revision issued under R1 of QCP 3.38. The revision was dated November 1980, although the package was not issued until January. Although it appears there are reasons for this from discussions with responsible engineers, these reasons are not clear from the package.
4. E234B02 Incomplete documentation of attachments A and/or B.
5. E293A03 Incomplete documentation.

Instructions were given to buy out battery pack but no form 575 was included.

Instructions indicated a visual inspection per QCP 3.3, but QCP 3.3 was not referenced as a necessary document.

RAC representative had not signed off on this package. Otherwise it was a closed out package.

6. M024C03 Documentation list on attachment B, page 1 of 3, should reference attached FCR drawing.
Logic is included but not marked as attached.
7. E292A68 Incomplete documentation.
Equipment was in warehouse but no form 575 was included.
Work Package Group (WPG) copy included two revisions labeled No. 1.
Neither revision is included in original package issued to field.
Four permanent cable tray segment removal sheets are in WPG copy but are not included in original package. These sheets were added as revisions but no attachment F is included.
8. E003E01 Reviewed in engineering unit by NSRS. No comments.
9. I277A01 Reviewed as being worked in field. No comments.
10. F30K01 Incomplete documentation.
Indicates logic is attached but is not included.
QCP 3.5 is referenced but work to be done should have required QCP 3.3 to be specified.
11. ~~E77E04~~ Instructions done well.
Signouts on attachment A not complete.
12. C191H13 Attachment A incomplete.
13. C192A02 No comments.
14. M024C03 Attachment A incomplete.
Does not reference any documentation such as QCP's or G Specs.
15. H001DC2 No comments.
16. M006A07 No comments.
17. M020K08 Certain documentation is marked through. Although not required, it would be helpful if this was initialed and dated to indicate who made the change.

Form 575 was not included though it appears needed.

Logic was marked as attached but is not included.

18. M026A47 Documentation does not list QCP's referenced in attachment B, page 2 of 3.

Deletion made was initialed. This was good.

No logic, permits, or releases are included as indicated on attachment B, page 1 of 3.

19. M062M23 Material is indicated as available but location is not given.

20. M026A64 Location is extremely general.

Holdpoints are indicated. This is good.

Includes a Q&A sheet but does not indicate where it came from or what it is for. It is not referenced as technical information on attachment B, page 1 of 3.

Logic is included but is not marked as attached.

21. M026A86 Form 575 is not included or referenced.

Procedures for welding should be listed.

22. M000A01 No comments.

23. H062B04 Documentation does not list QCP's.

24. H067M02 FCR's are referenced as attached but are not included.

25. H082A03 Location of equipment not given.

26. H070C03 Step Instructions marked N/A.

Attachment E indicates work to be done.

27. H070B20 Step Instructions marked N/A

Contains 42 revisions not in sequential order.

28. H070A13 There was no original in WPG copy.

29. H070A14 References QCP 4.23 but this is not in Step Instructions.

Drawing revisions had been changed although no explanation was apparent.

Many documents are attached but are not referenced.

Revisions 7 and 19 are not included in copy. Although this package had been pulled incomplete from the field, it is not clear what construction stage the work was in when removed.

30. H070A01 Incomplete attachment A.
Revision 3 is not included.
31. H070A03 Incomplete attachment A.
Instruction Sheet, attachment B, page 2 of 3, marked N/A.
32. H070A11 No comments.
33. H070A12 Forty-one revisions to package not in sequential order.
34. E43G02 No QCP's referenced although they appear to be needed.
35. C193B03 Revision 1 in original work package in field is not included in WPG copy.
36. M026A20 Form 575 is not included although appears to be needed.
Logic was listed as attached but was not in WPG copy; original package included logic.

This package has a part I and a part II. The revisions in the part I package are revisions to part II. This is very confusing.
37. I030L02 Incomplete attachment A.
38. E030K01 Scope of package references QCP's and G Specs but these are not referenced elsewhere in package (for example, in Step Instructions).
39. E003E02 No form 575 is included although appears to be needed.
40. E292A69 Logic is attached but is not indicated as attached.
41. E063G01 Attachment A incomplete.

Four cable removal sheets were issued to field but copies of these are not in WPG copy.
42. E030K05 Documentation does not list QCP's.

First two steps of attachment B, page 2 of 3, were good. Other steps could have been made more specific.

Project control representative has signed package but not dated it.

43. H070A04 Step Instructions, attachment B, page 2 of 3, marked N/A.

Attachment I in package does not indicate whether drawing is needed.

DCC representative did not sign off as disposition implemented.

UNITED STATES GOVERNMENT

Memorandum

GNS '81 0717 052
TENNESSEE VALLEY AUTHORITY

TO : H. J. Green, Director of Nuclear Power, 1750 CST2-C

FROM : H. N. Culver, Director of Nuclear Safety Review Staff, 249A HBB-K

DATE : July 16, 1981

SUBJECT: BROWNS FERRY NUCLEAR PLANT - NUCLEAR SAFETY REVIEW STAFF REPORT
NO. R-81-10-BFN

Attached is the NSRS report for a routine review conducted at BFN during the period June 8-12, 1981. This report results from a review described in my memorandum to you dated May 29, 1981 (GNS 810601 001).

Our recommendations, as stated in section III of this report, show one recommendation requiring action by NUC PR. In addition, action is recommended as indicated in previously identified items IV.B.1 and IV.B.2. These will be followed up during future onsite reviews. No formal response is required.

Cooperation at the plant was excellent at all levels. This consideration is appreciated.

If you have any questions regarding this report, contact L. F. Blankner at extension 4814 in Knoxville.


H. N. Culver

LFB:LML
Attachment
cc (Attachment):
MEDS, 100 UB-K
F. A. Szczepanski, 417 UBB-C

READING FILE



TENNESSEE VALLEY AUTHORITY
NUCLEAR SAFETY REVIEW STAFF
REVIEW

NSRS REPORT NO. R-81-10-BFN

SUBJECT: TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT
ROUTINE REVIEW

DATES OF
ONSITE REVIEW: JUNE 8-12, 1981

REVIEWERS: *L. F. Blankner* 7/14/81
LEONARD F. BLANKNER DATE

Paul B. Border 7/14/81
PAUL B. BORDER DATE

APPROVED BY: *K. W. Whitt* 7/15/81
KERMIT W. WHITT DATE

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I. Scope

This was a routine review of selected activities requiring examination of documentation and discussions with personnel at the Browns Ferry Nuclear Plant (BFN). The review consisted primarily of followup to ascertain the status of open items from past reviews and to refamiliarize a newly assigned reviewer with the plant and its staff. The reviewers also discussed with the compliance staff supervisor his responsibilities, objectives, and methods for performance of his work. A total of 70 man-hours was spent onsite.

II. Conclusions

Plant employees may not be receiving general employee training in a timely manner following a significant change to a controlling document. There is no timeframe established within which to provide retraining following a significant change to a General Employee Training (GET) controlling document. For example, an evaluation of changes in BF 8.2 and BF 14.25 had not been done in respect to providing retraining because of a significant change to these standard practices. Management control may not be adequate in this area. Refer to item V.A for details.

III. Recommendations

R-81-10-BFN-01, Management Control of Clearances and Temporary Alterations (E) [For details refer to section V.A.]

- A. The plant training coordinator should be provided some guidance from plant management (the responsible assistant superintendent) in determining when a change in a controlling document is significant enough to require retraining on the subject.
- B. A reasonable timeframe should be established to provide retraining following a significant change in a GET controlling document.
- C. Periodic retraining for GET 11 (SP BF 8.2, "Temporary Alterations") should be required by Standard Practice (SP) BF 4.5.

IV. Status of Open Items

A. New Items

1. Card Key Power Supply

NUC PR should continue in its present efforts to correct the causes of power interruptions in the card key system power supply. This item remains open pending further review. For details refer to section V.B.5.

2. Contaminated Waste in a Dempster Dumpster

NUC PR should continue in its present efforts to prevent disposal of contaminated waste in the noncontaminated trash. This item remains open pending further review. For details refer to section V.B.6.

B. Previously Identified Items

1. R-80-12-BFN-08, EECW Flow Verification

EECW flow rates to the diesel generators should be readjusted if less than adequate flow has been provided. This item remains open pending resolution of causes for EECW flow deficiencies. (Refer to item V.B.1 for details.)

2. R-80-12-BFN-01, Main Steam Vault Access Doors

NSRS continues to recommend that the steam vault doors be closed unless justification is provided for their being opened. This item remains open pending disposition by NUC PR. (Refer to V.B.2 for details.)

3. Primary Containment Atmosphere Monitors

This item is closed out. (Refer to item V.B.3 for details.)

4. Excess Feedwater Flow

This item is closed out. (Refer to item V.B.4 for details.)

5. Containment Leakage Rate Problems

Items 1 and 2 of reference M are closed out. Item 3 of reference M remains open. (Refer to item V.B.7 for details.)

6. R-80-07-BFN-01, Plant Decontamination Program

This item remains open pending further review. (Refer to item V.B.8 for details.)

7. Items R-80-13-BFN-01, -02, -03, -04, -05, -06, and -07, Scram Discharge Header Water Level Monitor (SDHWLM System)

These items have been closed out due to the placement of effective automatic SDHWLM systems in all BFN units. (Refer to item V.B.9 for details.)

8. Items R-80-15-BFN-A through -D, Monitoring of Scram Discharge Header Water Level Monitoring (SDHWLM) Systems

These items have been closed out due to placement of effective automatic SDHWLM systems in all BFN units. (Refer to item V.B.10 for details.)

9. R-80-12-BFN-06, Performance of Core Spray Pump 1A

The performance of core spray pump 1A was found satisfactory. This item remains open pending a future review of instrument calibration data. (Refer to item V.B.11 for details.)

10. R-80-12-BFN-07, BWR Jet Pump Assembly Failure

This item is closed out. (Refer to item V.B.12 for details.)

11. R-80-12-BFN-09, High Worth Control Rod

This item is closed out. (Refer to item V.B.13 for details.)

12. R-80-12-BFN-04, Protective Barriers for Sensitive Instrument Panels

This item remains open pending modification per ECN P-0039. (Refer to item V.B.14 for details.)

13. Item III.D from NSRS Report dated April 29, 1980, Installation of a Computerized Transient Event Recording System

This item remains open pending installation of the RTDAS system at Browns Ferry. (Refer to item V.B.15 for details.)

V. Details

A. Management Controls

In reviewing the management controls in the areas of temporary alterations and clearances, the program on GET was reviewed since each of these programs represent a portion of the GET.

The NSRS reviewer looked at the documentation of GET and discussed the training with the plant training coordinator. The course outlines used for teaching temporary alterations and clearance procedure were both reviewed and found adequate.

The SP BF 4.5 describing the general employee training states under "Plant Training Coordinator Responsibilities" that he/she evaluates the need for retraining when significant changes to controlling documents occur or surveys or other indicators reflect the need. Both SP BF 8.2, "Temporary Alterations," and SP BF 14.25, "Clearance Procedure," were revised in February and March of 1981, respectively. The training coordinator indicated that no evaluation had been made as to the need for retraining due to these changes. The NSRS reviewer did not try to establish whether significant changes had or had not been made. The training coordinator stated that the training would be provided the next time it was required. In the case of temporary alterations no retraining is required after the initial training.

B. Status of Open Items

1. R-80-12-BFN-08, EECW Flow Verification

This review involved examining performance data and discussions with plant personnel. Major efforts have been taken to upgrade the performance of the EECW system. They include several pending and proposed modifications, a special performance test (STEAR 81-03), and a design evaluation to determine precisely the configuration and flow requirements of the EECW system, upgraded preventive maintenance efforts, and an accelerated test schedule to prevent serious deterioration of EECW capacity.

Following a review of the results of tests performed per MRI-303 (reference L) in November 1980 and February and May 1981, the reviewer discussed the following concerns with plant personnel.

- a. By procedure, flow rates of approximately 200 gal/min per supply header were being provided to each of the eight emergency diesel generators. Since the design basis of the EECW system includes totally redundant EECW headers, the flow per supply header should have been the 400 gal/min required by each diesel generator. The reviewer concluded that the flow provided to the diesels did not appear to meet the design basis.
- b. As-found data from quarterly flow tests performed in November 1980 and May 1981 indicated that significant deterioration in flows to various components was occurring. Plant personnel stated that an accelerated test schedule that doubles the quarterly test frequency previously applied had been recently established. At the same time, NUC PR was pressing for a design evaluation and modifications to resolve the most significant flow deficiencies found. The reviewer concluded that NUC PR was making significant progress in its efforts to upgrade EECW flow capabilities.

A review to follow up these findings will be made during a subsequent site trip.

2. R-80-12-BFN-01, Main Steam Line Vault Access Door

The review involved visual observation of plant conditions and verification of status of modifications. Modifications made to reduce steam vault temperatures had been completed on all three units. However, the steam vault door on unit 3 was found open while the unit was operating at power. This was contrary to a previous commitment (reference K) made by NUC PR based on the design basis for a steam line break in the main

steam vault, which was intended to vent steam from a pipe rupture into the turbine building through a blow-out panel rather than into the reactor zone. The consequences of having the steam vault door open coincident with a steam line failure may range from hazard to personnel to failure of equipment critically important to shutting down the reactor and maintaining it in a safe condition.

3. Primary Containment Atmosphere Monitors

The reviewer followed up a concern from May 1980 that hydrogen sensors installed inside primary containment were not qualified properly to withstand temperature and radiation effects under post-LOCA conditions. It was determined that a replacement system installed per ECN L1079 had been completed on units 2 and 3 and was scheduled for completion on unit 1 during the current refueling outage.

This concern is closed out.

4. Excess Feedwater Flow

The reviewer followed up a concern identified in response to IE Bulletin 79-27 in June 1980. Discussions were held with outage and instrument maintenance personnel. Interim administrative measures appeared adequate. A final fix per ECN P-0426 should be completed on unit 1 during the present refueling outage and on units 2 and 3 during their next outages.

This item is closed out.

5. Card Key System Power Supply

The reviewer followed up on a concern first raised in June 1980 in an Operational Event Report. Discussions were held with site instrument maintenance personnel and I&C personnel from NUC PR's central office. It was concluded that considerable resources had been committed to an ongoing effort to resolve power supply problems resulting in periodic failure of the card key security system. The reviewer was told that a substantial improvement in system reliability was pending under DCR 2534. However, there is an ongoing effort required to investigate and correct an additional power supply deficiency.

This item remains open for monitoring the status of DCR 2534 and any further efforts required to resolve card key power supply problems.

6. Contaminated Waste in a Dempster Dumpster

The reviewer followed up on program activities upgraded in August 1980 upon discovery that contaminated C-zone clothing has been deposited in a dempster dumpster provided

for trash from uncontrolled areas. Discussions were held with health physics personnel. The plant's efforts to prevent release of contaminated articles in uncontrolled waste appeared to be successful.

This item remains open for a more indepth review at a later date.

7. Containment Leakage Rate Problems at BFN Unit 3, December 6-9, 1979

This review followed up recommendations 1 and 2 of an NSRS report (reference M) which resulted from an NSRS investigation of the subject event. Data and procedures were reviewed. Discussions were held with containment leak test, outage, and results personnel. Recommendations 1 and 2 are closed out on the basis of revisions to MMI-95 and SI 4.7.A.2 (references N and O). Test data from SI 4.7.A.2.g-2 (reference P) verified that the drywell equipment access hatches for units 1, 2, and 3 had retained their leakage characteristics throughout the previous operating cycle on each unit.

In addition, both hatches on unit 1 had exhibited no increase in local leak rate test results following an integrated leak rate test conducted in February 1980. It was learned that plant personnel had performed an additional primary containment leak rate verification test following each of the two previous refueling outages at Browns Ferry. This testing gave final verification that the primary containment boundary was intact prior to startup.

It was concluded that the plant's program to prevent leakage through primary containment equipment hatches was comprehensive and successful. Items 1 and 2 of reference M are closed.

8. R-80-07-BFN-01, Plant Decontamination Program

This review followed up recommendation 1 of a special NSRS investigation report dated July 18, 1980 (reference Q). The reviewer held discussions with health physics personnel and examined monthly summary reports for the interval from December 1980 through May 1981. The number of contamination zones had remained relatively constant (141-157) during the period reviewed despite the recent adverse impact of two major unit outages in progress at the end of May. The reviewer was informed that a draft DPM for control of decontamination efforts was in preparation.

This item remains open pending future reviews of decontamination efforts at Browns Ferry.

During the present unit 1 refueling outage, NUC PR had reported considerable delay in the refuel floor critical path in part from delays due to health physics considerations. The reviewer discussed the causes (i.e., hose coupling failure, monitoring techniques and criteria, leakages of tent seals, and moisture in HEPA filters) and extent of these delays with outage and health physics personnel. On the basis of modifications recently made and pending on contamination control tents and efforts made to assure viability of HEPA filtration systems used for ventilation of in-vessel work, it appeared that the site was dealing effectively with this concern.

9. Scram Discharge Header Water Level Monitoring (SDHWLM) System

The reviewer followed up recommendations R-80-13-BFN-01 and -02 from a previous report by reviewing procedures (references R, S, and T) and data and from discussions with a NDE inspector. Recorder charts from the USL-38 SDHWLM (water sleuth) system installed on BFN unit 2 were reviewed for display of two scrams that occurred on May 27, 1981. The reviewer observed the physical configuration of the SDHWLM systems in units 1 and 2 and verified pending status for the installation of the USL-38 systems to replace the Kraut-Kramer systems presently installed in units 1 and 3.

Items R-80-13-BFN-01 and -02 are closed out.

The reviewer discussed followup on recommendations R-80-13-BFN-03 and -04 with an NDE inspector and by contacting off-site EN DES and NUC PR personnel to determine what qualification requirements had been established for the two SDHWLM systems currently in use. The applicable procedures (reference R) were also reviewed. It was concluded that periodic calibration tests performed on the sensors and the available documentation regarding instrument qualification provide assurance of the continued operability of the SDHWLM systems.

Items R-80-13-BFN-03 and -04 are closed out.

Item R-80-13-BFN-05 is closed out. Independent monitoring systems for each SDH have been placed in service on all BFN units.

Based on review of FCR 185, recommendations R-80-13-BFN-06 and -07 are closed out. Temporary modifications have been made to the CRD scram discharge header vent lines to assure positive venting through a path independent of the CRW system.

10. R-80-15-BFN-A through -D, Monitoring of Sram Discharge Header Water Level Monitoring (SDHWLM) Systems

The reviewer verified that periodic monitoring of SDHWLM systems had been discontinued due to installation of upgraded systems having automatic annunciation in the main control rooms. From discussions with site personnel, it was learned that actions based on recommendations A through D from NSRS report R-80-15-BFN had been instituted on an interim basis prior to modification of the SDHWLM systems.

Items R-80-15-BFN-A through -D are closed out.

11. R-80-12-BFN-06. Performance of Core Spray Pump 1A

The reviewer examined results for 1981 of performance tests conducted on the four unit 1 core spray pumps. Concern for the performance of core spray pump 1A is closed out.

Item R-80-12-BFN-06 remains open pending a future review of instrument calibration data (refer to item IV.B.5.d of NSRS report No. R-80-12-BFN).

12. R-80-12-BFN-07, BWR Jet Pump Assembly Failure

The reviewer examined documentation of recently obtained test results (reference V) from ultrasonic testing and visual inspection of the jet pump beams installed in unit 1. Interim inspections made by NUC PR appeared to be satisfactory pending installation of improved replacement beams under ECN P-0450 scheduled for the next outage on unit 3.

Item R-80-15-BFN-07 is closed out.

13. R-80-12-BFN-09, High Worth Control Rod

The reviewer examined a data sheet provided by the NUC PR central office on April 7, 1980 to the plant. This sheet demonstrated a large calculated reduction in the worth of control rod 46-19 for the modified startup sequence which was made subsequent to a fast period event caused by this rod previous to the analysis.

Item R-80-12-BFN-09 is closed out.

14. R-80-12-BFN-04, Protective Barriers for Sensitive Instrument Panels

The reviewer was informed by outage and instrument maintenance personnel that a major revision to ECN P-0039 was

being made in order to improve access to the instrument panels and adjacent passageways affected by the protective screens.

Item R-80-12-BFN-04 remains open for monitoring of ECN P-0039. Recommendation III.C of a report dated April 19, 1980 on scrams in unit 2 has been closed out by consolidation into item R-80-12-BFN-04.

15. Item III.D from NSRS Report Dated April 19, 1980, Installation of Computerized Transient Event Recording System

The reviewer was informed by instrument and control personnel from NUC PR central office that a proposed transient recording system (RTDAS) would be installed no earlier than the fall 1981 refueling outage on unit 3. The RTDAS system may not provide the depth of surveillance recommended for the APS system by NSRS.

Item III.D of the NSRS scram report dated April 19, 1980 remains open for a more indepth review at a future date.

VI. Personnel Contacted

*H. L. Abercrombie, Plant Superintendent
Joe R. Bynum, Assistant Plant Superintendent
*J. L. Harness, Assistant Plant Superintendent
Terry L. Chinn, Supervisor, Compliance Section
*W. A. Roberts, Compliance Engineer
Joy Price, Training Officer
J. B. Studdard, Supervisor, Operations Section
Ray Hunkapillar, Assistant Supervisor, Operations Section
E. G. Thornton, Shift Engineer
Roy Smallwood, Shift Engineer
R. G. Metke, Supervisor, Results Section
W. C. Thomson, Assistant Supervisor, Results Section
R. G. Cockrell, Reactor Engineer
M. D. Wingo, Nuclear Engineer
Dwight Mims, Lead Mechanical Test Engineer
Roger McPherson, Mechanical Test Engineer
Joe Ferguson, Assistant Outage Director
Johnny Miller, Assistant Outage Director
Betty Kiep, Assistant Work Plan Coordinator
Pat Crabb, Work Plan Coordinator
David Nye, Outage Engineer
Joe Savage, Outage Engineer
Jim Martin, Refuel Floor Coordinator
*R. E. Smith, Supervisor, QA Section
Larry Parvin, QA Specialist (NDE)
J. R. Pittman, Supervisor, Instrument Maintenance Section
R. E. Burns, Senior Instrument Engineer
Howard Green, Senior Instrument Maintenance Foreman
J. D. Thompson, Senior Instrument Maintenance Foreman

Chris Cummings, Assistant Supervisor, Health Physics Section
Wayne Simpkins, Assistant Supervisor, Health Physics Section
*Warren D. Poling, Assistant Manager, OPQA Staff
*Ray Coles, OPQA Resident

*Attended exit meeting.

VII. Documents Reviewed

- A. DPM N73011, "Control of Temporary Alterations"
- B. Standard Practice BF 8.1, "Temporary Alterations"
- C. DPM N7203, "Clearance Procedures"
- D. Standard Practice BF 14.25, "Clearance Procedure"
- E. Shift Engineer's Clearance Log
- F. Shift Engineer's Temporary Alterations Log
- G. System 6 listing of approved Temporary Alterations
- H. Standard Practice BF 4.5, "Plant General Employee Training Program"
- I. Documentation file (form BF-45) for General Employee Training - Clearances and Temporary Alterations
- J. Operating Instruction 64, "Primary Containment"
- K. Memorandum dated April 3, 1980 from H. G. Parris to H. N. Culver, "Browns Ferry Nuclear Plant - Employee Concern 79-10-01 - Operating Practices Where Protective Systems Signals Are Bypassed," (L51 800325 855)
- L. Mechanical Results Instruction (MRI) 303, "EECW Flow Verification," (Test results dated 11/80, 2/81, and 5/81)
- M. Report dated January 9, 1980, "Nuclear Safety Review Staff Investigation of Browns Ferry Unit 3 - Containment Leakage Problem - December 6-9, 1979"
- N. Mechanical Maintenance Instruction 95, "Closure of Primary Containment Hatches - X-1A, X-1B, Etc."
- O. Surveillance Instruction 4.7.A.2, "Primary Containment Integrated Leak Rate Test"
- P. Surveillance Instruction 4.7.A.2.g-2, "Primary Containment Testable Penetrations"

- Q. NSRS Report No. R-80-07-BFN, "Browns Ferry Nuclear Plant Contamination Control"
- R. Technical Instruction 58, "Equipment Requirements, Operation, Periodic Testing, and Calibration of Continuous Monitoring Fluid Detectors"
- S. General Operating Instruction 100-1, "Integrated Plant Operations"
- T. Operating Instruction 85, "Control Rod Drive Hydraulic System"
- U. "Pump Record" Data Sheets from SI 3 1.1, "Core Spray Pump Performance"
- V. Test results for unit 1 from Special Mechanical Maintenance Instruction 14.3-A, "Reactor Vessel Internals Visual and Ultrasonic Inspection," (included Data Sheet TP 508.0654, Rev. D)
- W. Informal work sheet demonstrating the calculated integral rod worth of 1-CRD-46-19 as used in two alternate control rod withdrawal sequences on Browns Ferry unit 1.

UNITED STATES GOVERNMENT

Memorandum

HRF
GNS '81 0701 051
TENNESSEE VALLEY AUTHORITY

TO : Those listed

FROM : H. N. Culver, Director of Nuclear Safety Review Staff, 249A HBB-K

DATE : July 1, 1981

SUBJECT: WATTS BAR NUCLEAR PLANT - NUCLEAR SAFETY REVIEW STAFF REPORT
NO. R-81-11-WBN

Attached is the NSRS report for the special review conducted at WBN during the period June 8-12, 1981 of selected events and activities associated with the quality assurance programs. The report is the result of a site visit described in my memorandum to H. J. Green and H. H. Mull dated June 3, 1981 (GNS 810603 050).

Our recommendations, as stated in section III of this report, show four open items requiring action by CONST and/or EN DES for resolution. We request that you provide information on your plans and schedule for implementing these recommendations by August 1, 1981.

Cooperation at the plant was excellent at all levels. This consideration is appreciated.

If you have any questions regarding this report, contact K. W. Whitt at extension 6620.

H. N. Culver
H. N. Culver

H. H. Mull, E7B24 C-K
M. N. Sprouse, W12A9 C-K
J. E. Wilkins, Watts Bar Nuclear CONST

MSM
MSM:LML

Attachment

cc (Attachment):

R. W. Cantrell, 204 GB-K
H. J. Green, 1750 CST2-C
MEDS, 100 UB-K



TENNESSEE VALLEY AUTHORITY
NUCLEAR SAFETY REVIEW STAFF
REVIEW
NSRS REPORT NO. R-81-11-WBN

SUBJECT: TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT UNIT 1
SPECIAL REVIEW

DATE OF ONSITE REVIEW: JUNE 8-12-1981

REVIEWERS: Martha S. Martin July 1, 1981
for RONALD W. TRAVIS DATE

Martha S. Martin July 1, 1981
MARTHA S. MARTIN DATE

H. Randal Fair July 1, 1981
H. RANDAL FAIR DATE

APPROVED: K. W. Whitt July 1, 1981
K. W. WHITT DATE

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I. Scope

This was a special review of the quality assurance (QA) program and its implementation at the Watts Bar Nuclear Plant (WBN). The review was made to evaluate the Nuclear Regulatory Commission (NRC) concerns regarding weaknesses in the implementation of the QA program. The review was concentrated on construction activities since it was determined early in the review that the NRC concerns applied primarily to the Division of Construction (CONST) and the support provided to CONST by the Division of Engineering Design (EN DES). The one item involving the Division of Nuclear Power (NUC PR) was determined to be an isolated incident and not related to the perceived QA weaknesses.

II. Conclusions

The causes of NRC enforcement action against TVA at WBN relate to inadequate programs to implement NRC requirements and failure of TVA to follow procedures. TVA commitments to NRC requirements are contained in section 17.1 of the FSAR. This section of the FSAR is not in an up-to-date condition (see section IV.B). Further, the program to implement TVA commitments is not adequate (see section IV.A and .B). Assignment of responsibility for meeting regulatory requirements is not well defined.

Limitations on resources has caused quality problems at WBN. In order to maintain schedules, construction activities have proceeded without adequate technical information from EN DES. Procedures were lacking or were vague regarding need for specific technical input, or procedures were not followed. The independent check by the QA organization has not been effective in preventing these quality problems.

Steps have been taken by OEDC management to address many of these problems (see section IV.F). However, until these steps are completed, quality problems will continue at WBN.

III. Recommendations

R-81-11-WBN-1 - The review of the QA program description contained in section 17.1 of the FSAR should be completed in a thorough and timely manner. A matrix should be developed showing the regulatory requirement, the TVA commitment to satisfy the requirement, and how the commitment is satisfied. (See section IV.A and B for details.)

R-81-11-WBN-2 - The QA program should be upgraded as indicated by the results of recommendation R-81-11-WBN-1. (See section IV.A and B for details.)

R-81-11-WBN-3 - Section 17.1 of the FSAR should be updated to reflect the present TVA program that satisfied the TVA commitments made in that section. (See section IV.B for details.)

R-81-11-WBN-4 - OEDC management should communicate the TVA policy regarding the accomplishment of quality activities in accordance with written instructions, procedures, or drawings to all personnel involved in quality activities (both in line and in the QA organizations) and take appropriate action to hold management responsible for program performance. (See section IV.C for details.)

IV. Details

A. Statement of Condition

By a letter dated May 14, 1981, the NRC transmitted IE inspection reports 50-390/81-03 and 50-391/81-03 along with a notice of violation which was based on the findings of the inspection reports. The notice of violation contained five specific violations identified as A through E. Violation A was classified as a severity level IV which represents a moderate degree of safety significance; violations B, C, and D were severity level V items which indicates a low level of safety significance; and violation E was a severity level VI and indicates little or no safety significance when considered as an individual item. A brief statement of each of the violations and its regulatory basis is provided below.

Violation A - The TVA (OEDC) quality assurance program did not provide control over design, construction, and testing of the Essential Raw Cooling Water (ERCW) pump motor coolers' freeze protection system.

Section 17.1A.2.1.1 of the FSAR states that the TVA QA program satisfies the requirements of 10CFR Part 50, Appendix B, "Quality Assurance Program Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." Criterion II of Appendix B to 10CFR50 requires applicants for construction of nuclear plants to establish and document a QA program which complies with all requirements of appendix B. The QA program must provide control over activities affecting the quality of identified structures, systems, and components. Section 17.1A.2.1.1 also states that the TVA QA program provides control over activities affecting quality to an extent consistent with importance to safety. Therefore, since the ERCW pump cooler freeze protection was not included in the QA program and since it was considered by NRC and had been identified by TVA as a safety related system, TVA was cited for having an inadequate QA program.

Violation B - This was a three part violation with each part representing an example of the same violation.

1. TVA failed to follow its instructions during the modification of several upper head injection valves which was performed in accordance with FCN WAT 10529.
2. Inspection and testing records resulting from the work performed in accordance with FCN WAT 10529 and WAT 10521 were not reviewed to ensure that they complied with contractual requirements as specified by WBNP-QCP-1.16. TVA had been cited for violations similar to this on three other occasions during the preceding year.
3. A quality control release was not provided on reworked upper head injection valves prior to shipment from Anchor/ Darling as required by FCN WAT 10521.

All three of these examples of violations are for failure by TVA to follow its own procedures. Criterion V of Appendix B to 10CFR50 requires that activities affecting quality be accomplished in accordance with instructions, procedures, or drawings. Section 17.1A.5 of the FSAR states that assurance is provided that activities are accomplished in accordance with instructions. The regulatory requirement to follow procedures existed and TVA committed to the requirement, but TVA failed to satisfy the requirement and their commitment and was, therefore, cited by NRC.

Violation C - TVA engineering personnel did not initiate a nonconforming condition report for a sandy textured condition in the oil systems of the unit 1 and 2 steam driven auxiliary feedwater pumps as required by WBNP-QCP-1.2.

This is another example of failure to follow established procedures. The performance of safety related activities in accordance with written procedures is a requirement of Criterion V of Appendix B to 10CFR50 and commitment by TVA through section 17.1A.5 of the FSAR. TVA had been cited for violations similar to this on three other occasions during the preceding year.

Violation D - The results of the upper head injection pre-operational test were misinterpreted because measures had not been established to assure that preoperational test program instrumentation was adjusted to compensate for elevation effects. Criterion XII of Appendix B to 10CFR50 requires measures to be established to ensure that instruments used in activities affecting quality are properly adjusted to maintain accuracy within necessary limits. Section 17.1A.12 of the FSAR states that instruments are adjusted according to written procedures. The regulatory requirement existed and TVA had committed to satisfy it. However, TVA (NUC PR) had not incorporated the necessary instructions into their preoperational test program.

Violation E - Inspection documentation of the installation of fire doors had not been completed as required by WBNP-QCI-1.39.

This is still another example of failure to follow procedures as required by Criterion V of Appendix B to 10CFR50 and as committed to by TVA through section 17.1A.5 of the FSAR.

From this brief evaluation it can be seen that all five of the violations cited in the notice of violation resulted from two basic weaknesses--Failure to establish and maintain an adequate program for performing activities important to safety and failure to follow the procedures that have been established and represent the existing program.

In addition to the notice of violation, NRC stated in their transmittal letter that they were concerned about the implementation of the QA program that permitted their occurrence. NRC directed TVA to describe the actions taken or planned to improve the effectiveness of the QA program. This NRC concern and their expectation that the effectiveness of the overall OEDC QA program will be improved provided the basis for this review by NSRS.

In a letter from L. M. Mills to James P. O'Reilly of the NRC dated June 11, 1981, TVA adequately addressed each of the five violations, but the NRC concern regarding the QA program was not discussed. The information presented in the June 11, 1981 response to the violations was described as an interim report and TVA committed to provide NRC with additional information by September 17, 1981. It is assumed that the QA program weaknesses will be addressed at that time. In a letter from James P. O'Reilly of the NRC to H. G. Parris dated March 10, 1981 which transmitted the report, another NRC inspection at WBN, and another notice of violation, NRC stated a similar concern regarding TVA's management control systems and a similar desire that TVA describe their plans for improving these systems. TVA responded to the violations in an enclosure to a letter from L. M. Mills to James P. O'Reilly dated April 6, 1981, but the NRC concern about the management controls system was not addressed.

A discussion of the basic problems of inadequate program and failure to follow procedures along with a few other peripheral topics that might represent contributing factors to the WBN program weaknesses as well as the overall TVA program are presented in the following paragraphs.

B. Inadequate Program

All five of the violations contained in the notice of violation transmitted on May 14, 1981, and all the violations transmitted on March 10, 1981 referenced section 17.1 of the FSAR as the

bases for the citations. A review of regulatory history indicates that for the past five years almost all violations against activities performed by TVA at nuclear plants prior to the issuance of technical specifications for licensed facilities have been issued against chapter 17 of the FSAR. This is because chapter 17 represents an agreement between TVA and the NRC on how activities important to safety will be conducted during the design, construction, and testing of nuclear power plants. The NRC Office of Nuclear Reactor Regulation (NRR) reviews the TVA quality assurance program as described in chapter 17 and, when satisfied with the content, accepts it as an adequate method for fulfilling the requirements of the NRC regulations, particularly the 18 criteria of Appendix B to 10CFR50. The NRC Office of Inspection and Enforcement (OIE) is responsible for enforcing the program that NRR approves. While OIE may not be legally bound to stay within the confines of the NRR-approved program, they are at least professionally obligated to inspect the approved program. OIE is not likely to cite directly against the NRC regulations unless they are of the opinion that an immediate safety problem is involved. Therefore, if TVA wishes to satisfy its commitments and to minimize NRC violations during the design and construction phase, a detailed review of section 17.1 of the FSAR should be made to identify all commitments and then assure that each commitment is covered in the QA program. In making such a review and upgrading the program, it should be recognized that the QA program consists of both the performing function of the line organization and the measuring function of the QA organization. The line organization is responsible for the development and implementation of the program, while the QA organization is responsible for measuring the program effectiveness and for providing feedback to the line to allow for improvement. The line organization may choose to have another group develop or assist in the development of the program, but the line has the ultimate responsibility for the program and its implementation.

During the onsite portion of the review, NSRS learned that a QA group is presently working toward the accomplishment of this goal. NSRS recommends that this effort be continued and intensified where practical. Also, as part of this effort or a separate endeavor, chapter 17 of the FSAR should be updated to assure that it properly describes the current TVA QA program. Chapter 17 appears to be rather badly out of date at the present. As an example, table 17.1.A-1 presents a cross-reference showing how each of the criteria of Appendix B to 10CFR50 is satisfied by the QA program. NSRS found that the numbers of most of the QA program procedures had been changed. Some procedures had been deleted or combined with others such that the system of cross-references had very little meaning and was difficult to interpret. In the introduction to the QA Program Manual under the "1977 Management Planning Objective," the following information was presented.

"There seems to be excessive and often conflicting policies, procedures, guides, code requirements and standards in the Quality Assurance area. We must condense all this information and direction into a single-source, workable reference document for line managers to use."

Working toward this objective, QA representatives from CEDC, EN DES, and CONST formulated a proposal for management consideration. Office- and division-level management reviewed and endorsed the proposal for restructuring the OEDC Quality Assurance Manual for Design and Construction--OEDC DCM Volumes 1, 2, and 3. The proposal consisted of planned events, manpower requirements, and schedules divided into two major blocks of work--Phase I and Phase II.

PHASE I

OEDC deleted the OEDC Quality Assurance Manual for Design and Construction (DCM) Volume 1 and established a single-source document containing or referencing applicable office-level quality assurance policies, requirements, and commitments. EN DES and CONST personnel participated in the evaluation of the DCM Volume 1 and contributed to the establishment of the OEDC Quality Assurance Program Requirements Manual for Design, Procurement and Construction (PRM).

PHASE II

EN DES and CONST reviewed their respective division-level quality assurance policies and procedures (OEDC Quality Assurance Manual for Design and Construction (DCM) Volumes 2 and 3) for possible adjustments in light of the newly established "OEDC Quality Assurance Program Requirements Manual for Design, Procurement, and Construction (PRM)."

EN DES deleted the DCM Volume 2 by transferring QA policy and procedures into appropriate "EN DES Engineering Procedures."

NSRS finds no problems with the changing, updating, consolidating, or otherwise revising of the QA program, but we believe the FSAR should be updated to provide the NRC with consistent information to avoid unnecessary regulatory problems that could result from outdated information in the QA program description.

C. Failure to Follow Procedures

The largest, single reason for NRC violations at TVA nuclear plants is the failure to follow procedures. An NSRS review of NRC violations at specific sites indicates that failure to follow procedures is cited as the basis for violation more

often than all other reasons combined. Information contained in a Quality Assurance Analysis Report (WB-TASR-81-01) dated April 22, 1981 indicates that approximately 57 percent of the NRC violations current at that time were for failure to follow instructions, procedures, or drawings.

Assurance that procedures are followed is the responsibility of TVA management. CONST management policy, as stated by the Manager of Construction in QAPP, reflects a sincere commitment to the accomplishment of activities affecting quality in accordance with written instructions, procedures, or drawings. However, information obtained by NSRS during reviews at WBN and other TVA nuclear facilities indicate that some managers consider written procedures to provide guidance for performing various tasks but feel that it is not necessary to have the procedures in hand during the performance of the tasks or to follow them step by step.

NSRS believes that the solution to the problem of failure to follow procedures is a total commitment to procedure adherence by all TVA management and TVA enforcement of the commitment at worksites.

D. Schedule-Quality Interrelation

Discussions with NRC resident inspectors at WBN and unofficial discussions with NRC Region II management indicate that the NRC believes that there is an interfacing problem between CONST and EN DES that is contributing to the QA problem. One of the contributing factors to this problem is perceived to be a lack of support for construction activities by EN DES. WBN CONST personnel share this perception to some degree. Based on discussions with CONST and EN DES personnel, NSRS determined that EN DES priorities differ from those of WBN site construction management. Work on SQN and BEN have a higher priority for available EN DES manpower resources than does WBN. WBN site construction management sometimes make decisions without the benefit of all the needed EN DES information input in order to meet the construction schedule. Some of these decisions are evaluated "after the fact" and determined to be inappropriate by ORDC management. A number of factors, including an unexpectedly larger number of nonconformance reports and analyses of mislocated piping at WBN, has created an additional demand on EN DES resources.

It is the position of NSRS that scheduling of activities and allocation of resources is the responsibility of line management so long as the final product performs its intended function in a manner that will provide an adequate level of protection to the public and plant personnel. In cases where the expediting of the schedule could adversely affect the quality of activities important to safety, the schedule should be slipped to satisfy safety considerations. This is in fact

consistent with the safety-first policy of the TVA Board. The realization of a schedule objective cannot be considered as satisfactory justification for degrading quality or safety of critical structures, systems, or components that become a part of an operational nuclear plant.

E. Improvements in Progress

It should be pointed out that TVA design and construction personnel have not been placidly inactive while the NRC writes violations against their performance. During the last four to six months a number of worthy efforts have been initiated to improve the quality of work and the relationship between the divisions. The NSRS reviewers and NRC resident inspectors believe that definite signs of improvement are becoming evident. Some of the more significant of the efforts that are contributing to this perception are summarized below.

1. Program Upgrading - A review of the TVA commitments and the QA program procedures that implement the commitments is being performed by a group of QA personnel. This review could result in a procedures matrix which would identify the regulatory requirements, TVA's commitments, and the implementing procedures that satisfy them. A QA program upgrading to correct any deficiencies identified by the review should minimize future enforcement items and improve the potential for the realization of quality activities. This project deserves the attention of management to assure a thorough and timely completion.
2. Implementation Upgrading - WBN site management has initiated a "work package" concept for controlling work activities. This concept was designed to pull together all the documentation, including drawings and work instructions, needed for a specific job. A work package will be developed for each quality activity performed by CONST. The work activity will be performed in accordance with the instructions provided in the work package, and the data collected through the completion of the work package will serve as the basis for equipment turnover to NUC PR. NSRS believes that this work package concept could develop into a meaningful tool for controlling work activities. One sour note that dampened the enthusiasm of the reviewers was statements by a number of site personnel, including a few members of site management, indicating that the controlling procedure for the work package process was for guidance only and did not require strict adherence. The findings of the NSRS review of the work package program was reported in NSRS Report R-81-09-WBN issued June 5, 1981.

3. FSAR Upgrading - It is the understanding of NSRS that a QA topical report applicable to all construction projects is being developed by OEDC. This will probably correct the problem of outdated information contained in chapter 17 of the FSAR when it is submitted to and approved by the NRC. However, in the interim the NRC is inspecting to and enforcing the content of the QA program described in the present chapter 17.
4. Interdivisional Cooperation - Efforts are being made to improve relations between the divisions within OEDC. Meetings have been held between OEDC, EN DES, and CONST QA groups to address the problems and the possible methods of resolution. A Sequoyah and Watts Bar Design Project (SWP) representative visits the site each week to discuss mutual concerns. EN DES has 22 people onsite working on hanger problems which has been a source of scheduling problems. Two more individuals are scheduled to be transferred to the hanger group shortly.

V. Personnel Contacted

CONST

*J. E. Wilkins, Project Manager
 *R. W. Olson, Construction Engineer
 *S. Johnson, Assistant Construction Engineer
 *T. W. Hayes, Instrumentation Engineer, Unit Supervisor
 *Tim Trail, Management Systems
 *W. E. McNair, Management Systems Supervisor
 H. J. Fischer, Assistant Construction Engineer
 L. D. Clift, Mechanical Engineering Unit A Supervisor
 F. Smith, Civil Engineering Unit Supervisor
 J. M. Perdue, Electrical Engineering Unit Supervisor
 L. J. Jackson, Mechanical Engineering Unit B Supervisor
 A. W. Rogers, Quality Assurance Supervisor
 Joel Weinbaun, QC&RU Supervisor
 M. A. Harper, Training Officer
 R. M. Williams, HEU - Engineer
 L. D. Blansit, HEU - Engineer
 M. L. Miller, HEU - Inspector
 D. E. Fauerly, IEU - Engineer
 L. F. Presley, IEU - Engineering Associate
 J. K. Minzy, IEU - Inspector
 D. E. Norton - IEU - Inspector
 E. C. Johnson, MEU - B - Inspector
 Jack Foster, MEU - B - Inspector
 W. G. Hensley, MEU - A - Inspector
 L. P. Pauley, CEU - Inspector
 J. B. England - CEU - Inspector
 Paul Huffman, WEU - Engineer

Craig Kirpatrick, MEU - Inspector
Mike Searcy - QA Auditor
Doug Spangler, QA Auditor

OTHERS

J. P. Knight, OEDC Quality Assurance
Ted Heatherly, NRC

*Attended Exit meeting (CONST)

EN DES

R. M. Pierce, Assistant Manager of Engineering Design
E. H. Cole, Assistant to Sequoyah & Watts Bar Design Projects
Manager
W. I. Dothard, Project Control Section - SWP
J. C. Key, Mechanical Design Project Engineer - SWP

NUC PR

*J. E. Cross, Engineering Supervisor
*R. L. Lewis, Assistant Plant Superintendent
*W. L. Byrd, Shift Technical Advisor
*B. S. Willis, Quality Assurance Supervisor
C. C. Mason, Plant Superintendent
M. K. Jones, Preoperational Test Section
J. J. Erpenback, Assistant Engineering Supervisor
C. H. Whittmore, OPQA - Site Representative

*Attended Exit Meeting (NUC PR)

NOTE: Two exit meetings were held, one with CONST and one with
NUC PR.

VI. Documents Reviewed

- A. NRC Inspection Reports 50-390/81-03 and 50-391/81-03
- B. Memorandum from J. E. Wilkins to R. W. Cantrell, "Watts Bar Nuclear Plant - Critical EN DES Restraints (week of March 23, 1981)" WBN 810330 007
- C. Memorandum from J. E. Wilkins to R. W. Cantrell, "Watts Bar Nuclear Plant - Meeting Between EN DES and Watts Bar Nuclear Plant CONST Held in Knoxville February 23, 1981" WBN 810226 007
- D. Memorandum from J. E. Wilkins to H. H. Mull, "Watts Bar Nuclear Plant - NRC Exit Meeting - January 29, 1981 - Report Numbers 390/81-01 and 391/81-01" WBN 810202 009

- E. Construction Specification N3G-881
- F. NRC Inspection Reports 50-390/80-36 and 50-391/80-28
- G. Memorandum from J. E. Wilkins to R. W. Cantrell, "Watts Bar Nuclear Plant - Critical EN DES Restraints (Week of April 6, 1981)" WBN 810416 008
- H. Letter from L. M. Mills to J. P. O'Reilly, "Watts Bar Nuclear Plant Units 1 and 2 - Confirmation of Action Letter - Second Interim Report" A27 810403 037
- I. Letter from J. P. O'Reilly to H. G. Parris, "Confirmation of Action - Docket Nos. 50-390 and 50-391" NEB 810211 351
- J. Memorandum from C. A. Myers to NEB Files, "All Nuclear Plants - NRC-OIE Concerns - Telecon Notes" NEB 810602 268
- K. Memorandum from C. A. Chandley to R. W. Cantrell, "Watts Bar Nuclear Plant - Essential Raw Cooling Water System (ERCW) - Heat Tracing" MEB 810603 022
- L. Watts Bar Nuclear Plant Quality Control Manual for Construction
- M. Quality Assurance Procedures for Manager's Office
- N. Division of Construction Quality Assurance Program Manual
- O. Division of Construction Quality Assurance Branch Manual
- P. Memorandum from R. W. Cantrell to J. E. Wilkins, "Watts Bar Nuclear Plant - Critical EN DES Restraints (Weeks of March 23, 1981 and March 30, 1981)" SWP 810508 036
- Q. Memorandum from R. W. Cantrell to J. E. Wilkins, "Watts Bar Nuclear Plant - Critical EN DES Restraints (Week of April 6, 1981)" SWP 810508 019
- R. Quality Trend Analysis Report WB-TASR-81-01 for January-March 1981
- S. Memorandum from E. H. Cole to the SWP Files, "Meeting at Watts Bar Nuclear Plant on Action Item List" (SWP 810612 074)
- T. Letter from L. M. Mills to J. P. O'Reilly, "Watts Bar Nuclear Plant Units 1 and 2 - OIE Inspection Report 50-390/81-03 and 50-391/81-03, First Interim Report" (A27 810611 013)