

Memorandum

TENNESSEE VALLEY AUTHORITY

GNS '81 0817 057

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 : August 17, 1981  
 SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 1 - NUCLEAR SAFETY REVIEW STAFF REPORT  
 NO. R-81-16-WL

Attached is the NSRS report of a routine review conducted on selected dates at WBN during the period July 13-August 3, 1981 in the area of preoperational testing. This review was described in my memorandum to you dated July 2, 1981 (GNS 810706 050).

Section III of the report indicates three new open items requiring action by NUC PR for resolution. No formal response is requested. Corrective action relative to these recommendations and previously identified items will be verified in a future review.

Cooperation at the plant was commendable. This consideration is appreciated.

If you have any questions regarding this report, please contact H. R. Fair at extension 6590-K.

*H. N. Culver*

H. N. Culver

HRF: LAC

Attachment

cc (Attachment):

- C. C. Mason, Watts Bar Nuclear NUC PR
- MEDS, 100 UB-K
- A. W. Crevasse, 401 UBB-C
- F. A. Szczepanski, 417 UBB-C



TENNESSEE VALLEY AUTHORITY  
NUCLEAR SAFETY REVIEW STAFF  
REVIEW

NSRS REPORT NO. R-81-16-WBN

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

DATES OF ONSITE REVIEW: July 13 - August 3, 1981

REVIEWERS: Martha S. Martin  
Martha S. Martin

8/17/81  
Date

H. Randall Fair  
H. Randall Fair

8/17/81  
Date

APPROVED: K. W. Whitt  
Kermit W. Whitt

8/17/81  
Date

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## I. SCOPE

This was a routine review of selected activities at the Watts Bar Nuclear Plant (WBN). The review encompassed the areas of pre-operational test conduct and preoperational test data packages and the preparation of preoperational test instructions. The status of previously identified Nuclear Safety Review Staff (NSRS) items was also reviewed.

## II. CONCLUSIONS

- A. Preoperational testing conducted from preoperational test procedure change sheets and performed over a period of several months had created a problem in establishing test prerequisites. (Reference section V.B for details.)
- B. Deficiencies identified during the performance of preoperational test W.3.1D, change sheet No. 7, were not written expeditiously. (Reference section V.C for details.)
- C. Designation of test record drawings and listing of outstanding engineering change notices for preoperational test W10.7B were inaccurate. (Reference section V.D for details.)

## III. RECOMMENDATIONS

### A. R-81-16-WBN-01, Conduct of Preoperational Tests

The Division of Nuclear Power (NUC PR) should establish better control of the preparation and approval of change sheets to preoperational test procedures to ensure that adequate prerequisites are provided. (Reference section V.B for details.)

### B. R-81-16-WBN-02, Documentation of Test Deficiencies

NUC PR should stress the importance of timely completion of the documentation of deficiencies identified. (Reference section V.C for details.)

### C. R-81-16-WBN-03, Test Record Information

NUC PR should establish closer coordination with the Division of Construction (CONST) and the Division of Engineering Design (EN DES) to improve the consistency and accuracy of information provided in support of preoperational testing. (Reference section V.D for details.)

## IV. STATUS OF PREVIOUSLY IDENTIFIED ITEMS

### A. R-81-03-WBN-01, Inaccurate Plant Staffing Representation

This item remains open until the WBN NUC PR organizational chart is updated. (Reference section V.A.1 for details.)

B. R-81-03-WBN-02, Revision of Station Documents to Correspond with Current Station Organizational Structure

This item remains open until the recommended changes to the OQAM and FEAR are implemented. (Reference section V.A.2 for details.)

C. R-81-C3-WBN-03, Revision of Station Qualification Criteria for Assistant Plant Superintendent

This item remains open until the appropriate documents are changed to reflect the 10 years experience criteria for assistant plant superintendents. (Reference section V.A.3 for details.)

D. R-81-03-WBN-04, Incomplete Selective Personnel Qualification Summaries

Plant files were examined and it was found that Attachment D of Standard Practice WB 2.2.12 is now included in personnel files. This item is closed. (Reference section V.A.4 for details.)

E. R-81-03-WBN-05, Completion of Station Procedures Required for Operation and Testing

This item remains open until the appropriate procedures are written. (Reference section V.A.5 for details.)

F. R-81-06-WBN-01, Preoperational Test Data Packages and Partially Completed Tests

This item remains open until tighter management controls are fully implemented. (Reference section V.A.6 for details.)

G. R-81-06-WBN-02, Preoperational Test Section Instruction Letters

This items remains open until the Section Instruction Letters are updated. (Reference section V.A.7 for details.)

H. R-81-06-WBN-03, Employee Training in Administrative Controls

This item remains open until the recommended training is completed. (Reference section V.A.8 for details.)

V. DETAILS

A. Review of Previously Identified Items

1. R-81-03-WBN-01, Inaccurate Plant Staffing Representation

The plant has written a memorandum to NUC PR requesting that the WBN NUC PR organizational charts be updated. This will remain an open item until the changes are completed.

2. R-81-03-WBN-02, Revision of Station Documents to Correspondence with Current Station Organization Structure

The plant has written a memorandum to NUC PR requesting that the OQAM and DPM be updated to reflect the changes of recommendation R-81-03-WBN-01 be made. This will remain an open item until the changes are completed.

3. R-81-03-WBN-03, Revision of Station Qualification Criteria for Assistant Plant Superintendent

The plant has written a memorandum to NUC PR requesting that the appropriate documents be changed to reference the 10 years experience criteria for assistant plant superintendents recommended by ANSI N18.1-1971. Currently the documented requirement is 8 years. This will remain an open item until the changes are completed.

4. R-81-03-WBN-04, Incomplete Selective Personnel Qualification Summaries

Standard Practice WB 2.2.12, "Employee Processing Requirements," has been rewritten to require periodic review of its Attachment D, "Selection Position Qualification Summaries." Plant files have been updated to include Attachment D in personnel files. This item is closed.

5. R-81-03-WBN-05, Completion of Station Procedures Required for Operation and Testing

The plant has written a memorandum to NUC PR requesting that the Containment Leak Rate Testing procedure and the Containment Local Leak Detection Test procedures be written. This will remain an open item until the procedures are written.

6. R-81-06-WBN-01, Preoperational Test Data Packages and Partially Completed Tests

The Preoperational Test Section has increased management review of testing in progress. Test directors are attempting to conduct dry runs of systems prior to the running of the formal tests where this is feasible. This item remains open until NSRS can examine more testing in progress.

7. R-81-06-WBN-02, Preoperational Test Section Instruction Letters

The plant is writing revisions to the Section Instruction Letters to update the attachments. This will remain an open item until these revisions are completed.

8. R-81-06-WBN-03, Employee Training in Administrative Controls

The plant has not fully addressed this recommendation to establish systematic training for new Preoperational Test Section employees on the Section Instruction Letters. Until this is done, this item remains open.

B. Conduct of Preoperational Tests

Portions of Preoperational Test Instruction TVA-14E, "Diesel Generators and Supporting Auxiliaries," were observed. There were no problem areas identified. The test director stated that dry runs of the test had been performed prior to formal testing.

An attempt was made to observe portions of TVA-18, "Essential Raw Cooling Water Test," but equipment problems delayed the test.

Conduct of Preoperational Test Instruction W3.1D, "SIS - Safety Injection Pump and Related Injection System Performance Test," change sheet No. 7, was observed. The test had been originally performed well over a year prior to the performance of change sheet No. 7, and system configuration had changed (i.e., some equipment was inoperable or deenergized) during this period of time. It was also noted that change sheet No. 7 lacked any requirement for verifying instrument operability or documenting the calibration of temporary test instrumentation, both of which should be prerequisite to performance of the test. As a result of the above, safety injection pump 1A-A was started from the main control room with no indication of pump operating parameters in the main control room except motor current. An assistant unit operator was stationed at the pump monitoring noise and temperature. After 30 minutes of pump operation, the shift engineer directed that the pump be shut down due to the lack of instrumentation in the main control room. The test was resumed after indication was restored. It is recommended that change sheets be written either to stand alone, independent of the original procedure, or to reference appropriate sections of the original procedure to ensure that adequate prerequisite conditions are established prior to component operation.

C. Documentation of Test Deficiencies

Throughout the conduct of test W 3.1D, several deficiencies were identified. Three weeks after completion of the test the deficiencies were still not numbered or described either in the official test copy of the procedure or the test log. The only indication that a deficiency in the conduct of the test existed was a "DN" in the left-hand margin of the affected procedure page.

This was true for all deficiencies identified in change sheet No. 7. It is recommended that deficiencies be documented expeditiously in order to preclude the omission of pertinent details of test conduct.

D. Test Record Information

An indepth technical review of Preoperational Test Instruction 10.7B, "Containment Spray System," was performed to verify that the test would adequately demonstrate that this system and its components will operate as designed in all operating modes. Several comments on the test were informally presented to the Preoperational Test Section supervisor and the test director. These comments were incorporated into the test through change sheets. Due to this cooperation, these comments are considered resolved by the NSRS and are not included in this report.

A review of the test data package for Preoperational Test Instruction 10.7B, "Containment Spray System," was also performed. One problem was identified in the area of configuration control. The test record drawings issued by CONST included the schematic for the containment spray pumps, 45W760-72-1, revision 3. The current revision of this drawing at the time of the test was revision 4. The ECN's necessitating revision 4 were 2508 and 2575 as listed on revision 4 of the drawing. Step 2.3.1 of test W10.7B lists all outstanding ECN's but did not include ECN's 2508 and 2575. If these ECN's had been completed as step 2.3.1 indicates, then CONST issued an out-of-date drawing (revision 3) as the test record drawing. If these ECN's had not yet been implemented, EN DES should have provided the preop section with this information so it could have been included in step 2.3.1. Discrepancies such as these could invalidate test results. It is recommended that the Preoperational Test Section coordinate more closely with CONST and EN DES in the review of appropriate documentation establishing the as-designed/as-constructed plant configuration.

VI. PERSONNEL CONTACTED

C. C. Mason, Plant Superintendent  
M. K. Jones, Preoperational Test Section, Supervisor  
W. Byrd, Shift Technical Advisor  
D. L. Lester, Preoperational Test Director  
D. Gammons, Preoperational Test Director  
C. A. Haerr, Preoperational Test Director  
J. Nix, Preoperational Test Director  
S. Lingenfelter, Preoperational Test Director

VII. DOCUMENTS REVIEWED

A. Standard Practice WB 3.3.1, "Watts Bar Nuclear Plant Preoperational Test Program"

B. FSAR Sections 6.2 and 14.0

C. Preoperational Test Instructions

1. W 3.1D, "SIS - Safety Injection Pump and Related Injection System Performance Test"
2. W 10.7B, Containment Spray System
3. TVA 14.E, "Diesel Generator and Supporting Auxiliaries"

Memorandum

GNS '81 0824 050  
TENNESSEE VALLEY AUTHORITY

*review*

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 : August 24, 1981  
SUBJECT: BROWNS FERRY NUCLEAR PLANT - NUCLEAR SAFETY REVIEW STAFF REPORT  
NO. R-81-17-BFN

Attached is the NSRS report which resulted from a routine review at Browns Ferry Nuclear Plant during the week of August 3, 1981.

Our recommendations, as stated in section III of this report, show 11 recommendations requiring action by NUC PR. In addition, action is recommended as indicated in previously identified items IV.C, IV.E, IV.F, and IV.I of this report. We request that you take action on these recommendations in a timely manner. These will be followed up during future onsite reviews. We appreciate your continued cooperation in this effort to improve nuclear safety.

If you have any questions, please contact Paul B. Border at extension 4815-Knoxville.

*H N Culver*  
H. N. Culver

PBB:LML  
Attachment  
cc (Attachment):  
A. W. Crevasse, 401 UBB-C  
MEDS, 100 UB-K  
F. A. Szczepanski, 417 UBB-C

TENNESSEE VALLEY AUTHORITY  
NUCLEAR SAFETY REVIEW STAFF  
REVIEW

NSRS REPORT NO. R-81-17-BFN

SUBJECT: TENNESSEE VALLEY AUTHORITY  
BROWNS FERRY NUCLEAR PLANT  
ROUTINE REVIEW

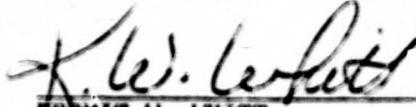
DATE OF  
ONSITE REVIEW: AUGUST 3-7, 1981

REVIEWER:

  
\_\_\_\_\_  
PAUL B. BORDER

8/21/81  
DATE

APPROVED BY:

  
\_\_\_\_\_  
KERMIT W. WHITT

8/24/81  
DATE

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## I. SCOPE

This was a routine review of plant activities with primary emphasis in the area of plant modifications and related activities. The review included an examination of management controlling documents at the corporate level and implementation of those documents through plant standard practices. The review also included discussions with members of the plant staff, work plan review, and CSSC status file review.

## II. CONCLUSIONS

- A. BFN Standard Practice (SP), BF 8.3, does not fully implement the Office of Power Quality Assurance Procedure (OP-QAP) 3.1 on plant modifications.
- B. BFN SP BF 8.3, does not provide adequate document control in the area of record storage over work plans during the implementation cycle.
- C. BFN SP BF 8.3, does not provide a requirement for review of all proposed modifications for radiation exposure impact as required by the OP-QAP 3.1.
- D. Modification control forms are not adequate to implement the requirements of SP BF 8.3.
- E. Due to the excessive number of work plans in progress, management control of work activities has been diluted.
- F. It is difficult to be sure that a work plan package is intact during the review/approval cycle and during implementation.
- G. Training and documentation of training required due to modification needs improvement.
- H. Required shift engineer signatures are not being obtained as required by SP BF 8.3
- I. Status of CSSC alignment is not being maintained in status files as required by SP BF 12.5.
- J. The plant corrective action system as outlined in SP BF 10.1 is not being implemented.
- K. The method of making non-intent changes to instructions as recommended in ANSI N18.2-1976 is not being completely implemented in plant instructions.

## III. RECOMMENDATIONS

- A. R-81-17-BFN-01 - SP BF 8.3 on plant modifications should be revised to comply with OP-QAP 3.1 or OP-QAP 3.1 should be revised to bring it into agreement with the plant implementing document, BF 8.3. See section V.A, B, C, and D for details.

- B. R-81-17-BFN-02 - SP BF 8.3 on plant modifications should be revised to provide adequate management control of work plans during the implementation cycle. See section V.B., C, D, E, and F for details.
- C. R-81-17-BFN-03 - A NUC PR division procedure and SP BF 8.3 should establish who has the responsibility for review of all proposed modifications to determine radiation exposure impact, and the modification control forms in SP BF 8.3 should provide a point of control by signature for this responsible individual. See section V.C for details.
- D. R-81-17-BFN-04 - A procedural control should be established to assure that work plan packages for proposed modifications contain, to the extent practicable, all post modification testing procedures and all instruction changes required due to the proposed modification prior to the review/approval cycle. See section V.D for details.
- E. R-81-17-BFN-05 - A procedural control should be established to assure that work plan packages become controlled documents, as other approved procedures are, following approval by the plant superintendent and should be maintained as quality assurance (QA) documents in fire-proof cabinets with working copies issued to the cognizant engineer. See section V.E for details.
- F. R-81-17-BFN-06 - SP BF 8.3 on modifications should be revised to establish a timeframe for completion of the paper work when modifications have been completed in the field. See section V.E for details.
- G. R-81-17-BFN-07 - SP BF 8.3 on plant modifications should be revised to provide a table of contents or check sheet which would list all possible forms or documents that should normally be in a work plan package so that the cognizant engineer could identify what should be contained in that work plan package, thus providing a reference for all those reviewing and later using the work plan package to ensure it is intact. See section V.F for details.
- H. R-81-17-BFN-08 - BFN should revise SP BF 2.3 to assure that non-intent changes to plant instructions are made in accordance with the guidance of ANSI N18.1-1976. See section V.G for details.
- I. R-81-17-BFN-09 - The plant CSSC alignment status should be maintained as required by plant operations SP BF 12.5 or a clarification with NRC should be obtained and SP BF 12.5 revised. See section V.H for details.
- J. R-81-17-BFN-10 - The plant outage group should be required to resolve in a timely manner the more than 100 outstanding Corrective Action Reports (CAR's) assigned to them to resolve. See section V.I for details.

- K. R-81-17-BFN-11 - The BFN plant training review committee should review and evaluate both the information being provided for training on plant modifications and the present method of training documentation. See section V.J for details.

#### IV. STATUS OF OPEN ITEMS

Through an offsite review of documented administrative controls, the status of a number of previously identified items of concern have been updated as discussed below.

A. Item 79-10-01-D, Implementation of the DPM's Into Plant Procedures

In reference VII.R of this report NSRS recommended that NUC PR should establish controls to ensure that DPM's are implemented into plant standard practices in a timely manner.

This item is closed out based on a review of upgraded requirements of reference VII.W of this report.

B. Item 79-10-01-F, Define "Emergency Condition"

Both in the DPM and standard practice (references VII.S and VII.T) "Emergency Condition" has been defined in regard to use of temporary alterations.

This item is considered closed.

C. Item 79-10-01-G, Logging of "Emergency Conditions"

NSRS recommended that initiation and termination of each declared emergency condition be recorded in the shift engineer's log and submitted to PORC for review at the next scheduled meeting. While this recommendation has been fully implemented in a standard practice at BFN (as indicated in reference VII.T), NUC PR has not implemented into its DPM (reference VII.S) a generic requirement which is that the shift engineer log the initiation and termination of declared emergencies requiring use of temporary modifications. Failure to log such emergencies could lead to inadequate exchange of information at shift change or failure to obtain a timely determination by PORC whether an unreviewed safety question exists.

This item remains open pending revision of DPM N73011 as recommended.

D. Item 79-10-01-H, Investigation of Reason for Unexplained Trip of Reactor Recirculation Pumps

In reference VII.R of this report NSRS recommended that NUC PR should resolve the unexplained cause of a simultaneous trip of both recirculation pumps when a jumper was placed on the recirculation pump control circuit logic on unit 2 at BFN.

DCR 1665 has been initiated and the modification completed on unit 2 and units 1 and 3 are scheduled to be modified in FY83.

This item is considered closed.

E. Item 3 of NSRS Memorandum Concerning Primary Containment Closure

NSRS recommended (reference VII.U) that written procedures should be prepared for installation and removal of primary containment hatches at Sequoyah and subsequent nuclear plants. This has been completed at Sequoyah; however, the division procedures manual does not address the need at future plants.

NSRS recommends that a DPM requirement be established to ensure that future plants have an installation and removal procedure for primary containment hatches.

This item remains open pending development of a DPM procedure.

F. Items A, B, D, and E of NSRS report dated April 30, 1980, "Causes of Reactor Scrams" which occurred on February 10, 12, 15, and March 9, 1980

Items A, B, and E of the above report have been closed out based on NUC PR's response in memorandum to H. N. Culver from H. G. Parris (reference VII.V) on BFN's plans for implementation of NSRS recommendations.

Item D remains open pending modification resulting from DCR 1802.

G. Item R-80-10-BFN-02, Implementation of DPM N73011, Revised 2/14/80

This item is closed based on a review of references VII.S and VII.T of this report.

H. Item R-80-10-BFN-03, Extended Usage of Temporary Alterations

Based on the 60-day time limit imposed on temporary alterations in references VII.S and VII.T of this report, this item is considered closed.

I. Item R-80-10-BFN-04, Misuse of Temporary Alteration Control Form "Justification Block"

Based on instructions specified in references VII.S and VII.T, action on this item appears to be satisfactory. Implementation of the new specification will be reviewed during a future site visit.

This item remains open.

J. Item R-EO-10-BFN-D, Tickler System for Implementation of DPM's

This item is considered closed based on a review of upgraded requirements in reference VII.W of this report.

V. DETAILS

- A. The Office of Power (OP-QAP 3.1, section 5.1.9) assigns responsibility of initiating technical specification and Final Safety Analysis Report (FSAR) changes resulting from proposed modification to NUC PR.

\*Appendix D of the BFN FSAR states that the TVA-TR-75-1, chapters 17.0 and 17.2, present an accurate and complete description of the QA program for operation of Browns Ferry. In the TVA-TR-75-1 on page 17.2-20 the following statement appears: "Modification work will normally be performed by NUC PR personnel in accordance with Office of Power quality assurance requirements."

Neither BFN-OQAM nor plant SP BF 8.3 on plant modifications address revision of the FSAR due to a proposed modification.

- B. OP-QAP 3.1, paragraph 6.1.4, contains the following statement: "Safety related modifications are forwarded to the Nuclear Safety Review Board (NSRB) for review." NSRB is to verify adequacy and correctness of USQD evaluation. NSRB concurrence is a prerequisite to implementation of a safety related modification.

BFN-OQAM and SP BF 8.3 do not implement this requirement.

- C. OP-QAP 3.1, paragraph 5.1.8, contains the following statement: "NUC PR has the responsibility to review all proposed modifications for radiation exposure impact and determine that they meet the as low as reasonably achievable objectives of the OP-QAP, Section 3, "Modification Control"."

BFN-OQAM and the SP BF 8.3 do not implement this requirement.

- D. OP-QAP 3.1, paragraphs 6.5.2 and 6.5.4, contain the following statements: 6.5.2--"Modifications shall be implemented in accordance with written instructions which have been subjected to a predetermined review/approval cycle. These instructions shall contain requirements for inspection hold points, final inspection, and post modification test as appropriate." 6.5.4--"Modifications packages, including drawings and instructions, shall be approved by the plant superintendent prior to implementation. Safety related work packages shall also be reviewed by PORC prior to implementation. During the review PORC shall ensure that any drawing procedure or instruction changes made necessary by the proposed modification have been accomplished."

\*There are some minor exceptions to TR-75-1 which did not have to be considered in this NSRS review.

DPM No. N74M7 contains the following statement: "The modification and control unit shall review the ECN transmittal from the Division of Engineering Design and prepare a work plan. This plan details the procedure for executing the work, the inspection required, and retests to be performed."

SP BF 8.3 does not implement this requirement. Post modification tests are written and procedure changes are made generally after the modification is implemented. They are not subjected to a predetermined review/approval cycle as are other elements of the work plan package.

- E. Work plan document control does not provide protection for the document until the modification is complete and all paper work signed off. At that time the work plan package becomes a QA document stored in fire-proof cabinets.

There are presently at BFN approximately 685 work plans in some status. Approximately 225 are presently in progress and are maintained by the people in the field doing the work.

There are approximately 192 approved work plans in a hold status due to various reasons. They are not maintained as QA documents. There are approximately 88 work plans in the approval cycle. These are not required to be maintained as controlled documents by those reviewing them.

There are approximately 180 work plans out being maintained by various plant sections for various reasons where all the modification field work has been completed, but the paper work in the work plan packages has not been completed.

None of the approximately 685 work plans now in the mill at BFN have any QA storage requirements. There are over 400 work plans that have been approved by the plant superintendent where the modification is in progress or has been field completed but have no QA document storage requirements. Some of the 180 work plans still out, and where the modification has been completed, are over a year old and the paper work has yet to be completed.

All other plant instructions on CSSC are considered controlled QA documents when approved and issued by the plant superintendent. Work plans should be handled in the same manner

- F. In reviewing several work plan packages, the NSRS evaluator found it difficult to ensure that the work plan packages were in fact intact. There are different forms and procedures used in each work plan depending on what the work involves. There is no controlling coversheet or table of contents to reference at time of review and while working with it in the field.
- G. In reviewing how temporary changes are made, the NSRS evaluator noted that ANSI N18.7-1976, paragraph 5.2.2, contains the following statement: "Temporary changes which clearly do not change

the intent of the approved procedure, shall as a minimum, be approved by two members of the plant staff knowledgeable in the areas affected by the procedures." At least one of these individuals shall be the supervisor in charge of the shift and hold a Senior Reactor Operator license on the unit affected.

SP BF 2.3 contains the statement that "non-intent changes will be made in accordance with form BF6." Form BF6 does not specify that the shift supervisor in charge of the shift but that any SRO can approve the non-intent change to an instruction.

- H. In reviewing modification work in progress on unit 1, the NSRS evaluator noted that most CSSC alignment status was not being consistently and thoroughly maintained.

SP BF 12.5, page 3, contains the following two statements.

System alignment status will be maintained on all CSSC.

Changes in CSSC alignment will be noted in the system status folder within the working shift.

Eight CSSC status files were reviewed. Status of alignment within the eight files varied from one or two discrepancies to complete disagreement with existing system status.

DPM BF7901 dated April 8, 1980, paragraphs 3.b.(3), (4), and (5) establish the requirements implemented in SP BF 12.5. The option is not provided for discontinuing the maintenance of these CSSC status files during a shutdown condition. Also, off-normal valve positions are to be logged in the operator's journal (log entry should include justification for the change and any actions required by technical specifications) per DPM BF7901.

On April 14, 1979 IE Bulletin No. 79-08 was issued by the NRC requiring written response to safety-related valve positions, positioning requirements, and positive controls to assure that valves remain positioned. TVA's response to item 6 in a letter to J. P. O'Reilly from J. E. Gilleland dated April 14, 1979 requires CSSC status to be maintained at all times. DPM BF7901 and the resulting SP BF 12.5 do not provide the latitude needed to ignore system status folders during shutdown and/or when the safety-related systems are not required or needed.

- I. As a result of review of modification, the NSRS evaluator became aware of the considerable number of outage group related CAR's. During the January to June period of 1981 there were 91 CAR's required as a result of the outage group performing modifications and maintenance work.

In a two year period from July 1979 to June 1981 there had been more than 200 CAR's required as a result of the outage group performing modification and maintenance.

A high percentage of the CAR's were a result of the outage group failing to follow procedures for maintenance or modification work and as a result of performing unauthorized maintenance and modification work. There are presently 100 outstanding CAR's which have not been resolved by the outage group. Some of the CAR's which have not been completed are several months old. One was dated December 20, 1978.

There were nine CAR's over 30 days old that the plant QA section had not processed and sent out to the responsible section supervisor.

The plant QA section also had a backlog of 30 to 35 CAR's to review that had been returned from the assigned sections.

In talking with the plant QA staff, it was indicated that the heavy workload due to unit outages had prevented their timely processing of the CAR's.

SP's BF 10.1 and 10.6 provide management control of corrective action. The presence of 100 unresolved CAR's is in itself a significant condition adverse to quality.

- J. In reviewing plant modification, the NSRS evaluator discussed with the training shift engineer how information on modifications is received and how training is accomplished and documented.

The monthly list of CSSC modifications sent to the PORC is sent out to each licensed operator for review. He/she initials that the listing has been reviewed.

Classes are scheduled periodically and lectures are presented on some of the major modifications.

The listing of CSSC modifications was very brief and did not appear to provide adequate detail on each modification to use as a tool for licensed operator upgrading of completed modifications.

The method of documenting training was fragmented and it was difficult to establish that each licensed operator had in fact been provided adequate training on safety related modifications.

## VI. PERSONNEL CONTACTED

- \*H. L. Abercrombie, Plant Superintendent
- \*T. L. Chinn, Compliance Section Supervisor
- W. A. Roberts, Compliance Engineer
- \*C. J. Rozear, Compliance Engineer
- Ray Hunkapiller, Operation Supervisor
- J. H. Miller, Assistant Outage Director
- \*J. D. Ferguson, Assistant Outage Director
- J. D. Glover, Shift Engineer

B. K. Kiep, Work Plan Coordinator  
E. G. Thornton, Shift Engineer, Training  
A. L. Burnett, Operation Supervisor  
R. E. Edmondson, Electrical Engineer  
J. A. Teague, Electrical Maintenance Section Supervisor  
R. G. Metke, Engineering Section Supervisor  
T. G. Jones, Shift Engineer  
R. T. Smith, Quality Assurance Section Supervisor  
E. E. Holder, Quality Assurance Engineering Aide  
\*Ray Cole, OPQA Coordinator  
Unit Operators - Unit 1, 7-3 shift, 8/6/81

\*Denotes those present at exit meeting.

#### VII. DOCUMENTS REVIEWED

- A. 10CFR50, Appendix B
- B. Regulatory Guide 1.33
- C. ANSI N18.7-1976
- D. TVA Topical Report (TVA-TR-75-1)
- E. BFN FSAR, Appendix D
- F. Office of Power Quality Assurance Procedure (OP-QAP) 3.1 on Plant Modifications
- G. BFN Operational Quality Assurance Manual (OQAM)
- H. DPM N74M7A
- I. DPM N74A17
- J. DPM BF76M12
- K. BFN Standard Practice BF 8.1
- L. BFN Standard Practice BF 8.3
- M. BFN Standard Practice BF 8.4
- N. BFN Standard Practice BF 9.2
- O. BFN Standard Practice BF 12.5
- P. BFN Work Plans
- Q. BFN Standard Practice 10.1 and 10.6 on corrective action

- R. NSRS report dated October 18, 1979, "Employee Concern Over Operating Practices Where Protective Signals are Bypassed"
- S. DPM N73011 (revised 11/5/80), "Control of Temporary Alterations"
- T. BFN Standard Practice BF 8.2 (revised 2/18/81), "Temporary Alterations"
- U. Memorandum dated January 9, 1980 from E. G. Beasley to W. F. Willis, "NSRS Investigation of Browns Ferry Unit 3 Containment Leakage Problem - December 6-9, 1979"
- V. Memorandum dated July 12, 1980 from H. G. Parris to H. N. Culver, "Browns Ferry Nuclear Plant - Plant for Implementation of NSRS Recommendations"
- W. DPM N71A1, "Division Procedure Manual (Nuclear)"

UNITED STATES GOVERNMENT

## Memorandum

TENNESSEE VALLEY AUTHORITY

GNS '81 0902 051

TO : G. H. Kimmons, Manager of Engineering Design and Construction, W12A9 C-K

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

DATE : September 2, 1981

SUBJECT: WATTS BAR NUCLEAR PLANT - NUCLEAR SAFETY REVIEW STAFF REPORT  
NO. R-81-18-WBN

Attached is the NSRS report for a followup review conducted at Watts Bar on August 20, 1981 concerning the work package program. This review was described in my memorandum to H. H. Mull dated August 10, 1981 (GNS 810812 051).

NSRS Report No. R-81-09-WBN dated June 5, 1981 (GNS 810605 050) lists seven recommendations to be resolved by CONST. The review conducted on August 20 revealed that corrective action for four of the items had been accomplished. The site is requested to provide information to this office by October 19, 1981 concerning plans and schedules for correcting the three remaining items.

The excellent cooperation at the plant is appreciated. If you have any questions regarding this report, contact H. R. Fair at extension 6590 in Knoxville.

*H. N. Culver*  
H. N. Culver

*HRF's*  
HRF:LML  
Attachment

cc (Attachment):  
MEDS, 100 UB-K  
H. H. Mull, W7D24 C-K

10-16-81

SEE JAC & RF COMMENTS MARKED ON THE ATTACHED REPORT. IT APPEARS THAT WBN MAY BE IMPLYING THAT THE WORK PACKAGE SYSTEM IS QA WHEN THEY WRITE TO NRC, BUT WHEN THEY WRITE TO NSRS THEY IMPLY IT IS NOT QA. REFERENCED LETTERS TO NRC AND 50.55(e) REPORT ARE FILED BEHIND THE REPORT. CHECK ON FUTURE REVIEWS.

*Jac*

TENNESSEE VALLEY AUTHORITY  
NUCLEAR SAFETY REVIEW STAFF  
REVIEW  
NSRS REPORT NO. R-81-18-WBN

Subject: Tennessee Valley Authority  
Watts Bar Nuclear Plant - CONST  
Routine Review

Date of Onsite Review: August 20, 1981

Reviewers: H. Randall Fair 9/2/81  
Martha S. Martin for Date

H. Randall Fair 9/2/81  
H. Randall Fair Date

Approved: M V Sinkule 9/2/81  
Marvin V. Sinkule Date

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## I. SCOPE

This routine review examined corrective action initiated at the Watts Bar Nuclear Plant in response to NSRS Review Report No. R-81-09-WBN. The referenced report involved the review of activities associated with the preparation, processing, and maintenance of the construction work packages as described by Quality Control Instruction 1.38, "Work Package Preparation, Processing, and Maintenance."

## II. CONCLUSIONS

Since the initial review, Quality Control Instruction (QCI) 1.38 has been superseded by Watts Bar Field Instruction (WBFI) G-15. However, the recommendations of Review Report No. R-81-09-WBN were determined to be applicable to WBFI G-15. Upon Examination of corrective action implemented by plant personnel four items were closed, and three items remain unresolved (reference section III for details).

During the course of this review it was observed that two related QCI's (QCI 1.1, "Print Room Procedure," and QCI 1.25, "Control of As-Constructed Drawings") had not been updated to reflect the change of QCI 1.38 to WBFI G-15. Since revisions to these procedures had been initiated no further action regarding this matter is planned by the NSRS.

## III. STATUS OF PREVIOUSLY IDENTIFIED ITEMS

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

This item remains open until further training on WBFI G-15 is completed. (Reference section IV.A for details.)

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

WBFI G-15 redefined the scope and purpose of QCI 1.38 and included a simplified block diagram illustrating the flow of the work package from development to the field. This item is closed. (Reference section IV.B for details.)

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

WBFI G-15 documents the practice of deleting incomplete work from outstanding work packages at time of system transfer and adding these items to the OWIL. This item is closed. (Reference section IV.C for details.)

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

This item remains open until formal training on WBFI G-15 is conducted. (Reference section IV.D for details.)

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

This item remains open until individual engineering unit guidelines for preparation of work packages are developed. (Reference section IV.E for details.)

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

The engineering units have established various methods for technical review of the work packages within the units. This item is closed. (Reference section IV.F for details.)

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

The Electrical Engineering Unit has addressed this recommendation regarding work package implementation. This item is closed. (Reference section IV G for details.)

#### IV. DETAILS

A systematic review was conducted to examine the corrective action implemented in response to the NSRS recommendations of Review Report No. R-81-09-WBN. This report concerned activities associated with the preparation, processing, and maintenance of the construction work packages as described by Quality Control Instruction (QCI) 1.38, "Work Package Preparation, Processing, and Maintenance."

To accomplish this review, available documentation on the work package program was examined and personnel in construction management were interviewed. Lists of documents reviewed and the personnel contacted are included in sections V and VI.

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

This recommendation suggested that the proper use of QCI 1.38 be communicated from site upper management throughout the organization in order to ensure the acceptance of the procedure as a standard practice. If the procedure cannot be used effectively, it should be revised.

While the importance of the work package program has been verbally emphasized, this item remains open until additional training on WBFI G-15 is completed.

B. R-81-09-WBN-04, Purpose of Quality Control Instruction 1.38

This recommendation stated that 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 which illustrates the flow of work package from development to the field might be effective.

This recommendation has been incorporated into WBFI G-15. This item is closed.

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

This recommendation stated, "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."

Formulation of the OWIL from work packages and system walkdown was still being practiced. This process is documented in WBFI G-15. This item is considered closed.

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

This recommendation stated, "Formal training should be established for the appropriate management level to discuss the QCI and explain the purpose of each attachment."

The work package program is now controlled by WBFI G-15. Field instructions (FI's) are administrative procedures and do not contain quality related items. Therefore, field instructions are not a part of the formal QA training program. However, due to the importance and magnitude of the work package program, site personnel indicated training should be conducted in this area. The NSRS concurs with this conclusion. This item remains open until the training is completed.

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

This recommendation stated, "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."

SEE LETTER TO NRC  
DATED 9-3-81  
(A21 81 0703 014)  
WHERE WBN REPORTED  
AS A 50-SS(C) PROBLEM  
THE BREAKDOWN IN  
THEIR WORK PACKAGE  
SYSTEM.

Joe 9-10 81

ALSO SEE WBN NCR  
3579 WHICH TAKES  
CREDIT FOR THE  
WORK PACKAGE SYSTEM  
TO PRECLUDE THE  
POSSIBILITY OF  
BYPASSING HOLD POINTS

This item had not been addressed by the plant. Further review indicates there is still a need for these guidelines. This item remains open until implemented.

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

This recommendation stated, "Each engineering unit should arrange for individual work packages to receive appropriate technical review within the unit before being released to the field."

This recommendation has been implemented by the engineering units. This item is closed.

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

It was recommended that EEU's problems with implementation of QCI 1.38 be reviewed at the proper management level in order to resolve the apparent difficulties.

The work packages now written by the Electrical Engineering Unit are more comprehensive and better prepared. Discussions with EEU management indicated significant improvements had been made in handling and processing work packages. This item is closed.

V. PERSONNEL CONTACTED

- A. W. Rogers, Quality Assurance Supervisor
- J. Weinbaum, Quality Control and Records Supervisor
- D. Clift, Mechanical Engineering Unit Supervisor, Group A
- \*J. E. Wilkins, Project Manager
- L. J. Johnson, Mechanical Engineering Unit Supervisor, Group B
- F. Smith, Jr., Civil Engineering Unit Supervisor
- E. J. Austin, Electrical Engineering Unit
- \*T. W. Hayes, Instrumentation & Controls Engineering Unit
- J. Knight, Procedures & Training Supervisor
- R. Anderson, Procedures & Training
- D. Reed, Electrical Engineering Unit
- H. Fletcher, Electrical Engineering Unit
- \*R. Pierce, OEDC Project Manager

\*Attended exit meeting

VI. DOCUMENTS REVIEWED

- A. Watts Bar Field Instruction G-15, "Work Package Preparation, Processing, and Maintenance"

B. Construction Work Packages

1. M070C05
2. M063A10
3. M077L14
4. E077L03
5. I032C01
6. C198L10
7. E292A62
8. E293A02
9. E293A04
10. E249A04
11. E211P04
12. E001F04
13. E061B01
14. I068A31
15. I062Q04
16. I077N02
17. I090F02
18. I090F07
19. I090G02
20. I090G03
21. I077R06
22. M084A13
23. H003A03
24. H003A13
25. H003F01
26. H003F04
27. M077R07
28. C001F01
29. C001F02
30. C001F03
31. C001F04
32. P061M01

UNITED STATES GOVERNMENT

## Memorandum

TENNESSEE VALLEY AUTHORITY

GNS '81 0930 051

TO : W. F. Willis, General Manager, E12B16 C-K

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

DATE : September 30, 1981

SUBJECT: OVERVIEW OF QUALITY ASSURANCE PROGRAM IN TVA *R-81-19-NPS*

In response to your request that the NSRS review the existing system within TVA to provide quality, NSRS has taken a number of steps to examine both the quality performance by the line organizations and the quality assurance activities by the independent audit groups. We have also examined how other utilities have organized to obtain quality in their organizations.

The basic findings of our overall review are set forth in the attached report. This report, supplemented by the major management reviews that have been accomplished during 1981, provide our basis for concluding that major changes in the QA organization are not warranted at this time. We do, however, indicate specific actions that are required by the line and quality assuring organizations to improve the overall program. Some of these recommendations are basically the same as recommendations included in the management reviews or in special reviews that have been completed by NSRS. The recommendations are repeated here since these recommendations apply to all line organizations and to all segments of their programs unless otherwise indicated.

If you concur with the basic findings of this report, the report should be transmitted to OEDC and POWER for implementation. NSRS will then follow the progress on implementation of the recommendations in this report and in the management reviews that were made of POWER, OEDC, H&S, and PURCH. In addition, NSRS will perform a followup review of the activities described in this report in 15 to 18 months to determine whether or not the implementation of the recommendations has been successful in improving the overall quality assurance program. Additional recommendations will be made at that time as considered necessary to assure organizational and functional effectiveness of quality activities performed throughout the TVA nuclear program.

*H. N. Culver*  
H. N. Culver

HNC:LML  
Attachment  
cc: MEDS, 100 UB-K

**NSRS FILE**

TENNESSEE VALLEY AUTHORITY  
NUCLEAR SAFETY REVIEW STAFF

REVIEW

NSRS REPORT NO. R-81-19-NSP

SUBJECT: SPECIAL REVIEW OF THE TVA QUALITY ASSURANCE PROGRAM

DATES OF  
REVIEW: July and August 1981

Reviewer: H. N. Culver 9/24/81  
Date

Reviewer: K. W. White 9/24/81  
Date

Reviewer: M. Skidell 9/24/81  
Date

Approved: H. N. Culver 9/29/81  
Date

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## **1. SCOPE**

This report has been prepared in response to a request by the General Manager of TVA, that the Nuclear Safety Review Staff overview the TVA quality assurance activities, to specifically examine organizational effectiveness, degree of independence of review, record of performance and to recommend any changes that are deemed necessary.

In order to respond to this request by the General Manager, NSRS has deemed it essential to examine the relationships and functioning of the entire organization, including the line (quality performing), quality control (the inspection arm of the line organization), and quality assurance organizational units. NSRS has utilized its normal review and audit programs where possible to obtain much of the information required to examine the QA activities in TVA. Consequently, in section II of this report the findings from these other reports are provided in a summary manner without directly providing the factual information upon which these findings have been developed. Supporting documentation is referenced where appropriate. Information developed as a part of the NSRS management reviews for each of the Office of Power, Health and Safety, Engineering Design and Construction, and the Division of Purchasing was directed at identifying:

- °Adequacy of or specific weaknesses or deficiencies in line programs.
- °Degree of compliance with established programs or specific problem areas associated with implementation.
- °Organizational problems, including structure, communications, staffing, training.
- °Recommended actions by the line organizations.

As a part of this review, QA was examined at other utilities. This examination was, by necessity, limited in scope to several key areas including:

- °Overall utility organization structure.
- °QA organization structure.
- °Assignment of responsibility to QA.
- °Staffing levels and qualification of QA staff.
- °Management attitudes toward QA

Discussions were held with management representatives of four utilities. Other utilities were examined by review of pertinent information in FSAR's provided to NRC. This information is presented in section III of this report.

This review also included an examination of the various means of organizing to achieve an improved level of quality assurance in TVA. The examination is essentially the cross-breeding of the information presented in sections II and III indicating possible ways to change what already exists to solve some of the problems that have been identified in the present system. This information is presented in section IV.

Section V consists of an evaluation of the findings of the overall review including a limited comparison of the quality effort in TVA and other utilities, as well as the audit level by the NRC.

Finally, in section VI, a recommended course of action is identified.

## II. TVA QUALITY ASSURANCE PROGRAM

### A. INTRODUCTION

A quality assurance program has a number of basic objectives and requirements. The requirements are directed toward having a utility (NRC licensee) perform work in accordance with accepted methods, rules, or practices which have been identified and to also have the licensee establish and implement an independent audit process that provides assurance that the tasks have in fact been completed as intended. Thus, a quality assurance program contains two important aspects: (1) the quality performing function of the line organization and (2) the quality assuring function which is the responsibility of the independent group established by the licensee to provide surveillances, audits, checks, and other processes as necessary to determine that the original tasks were completed as required. The assignment of performing functions in TVA, as in most utilities, follows the general practice of grouping design, construction, and operating functions in organizational units typically at the division level. Prior to the requirement for the quality assuring function as established by the NRC, the line organization had the responsibility to perform their tasks in an acceptable manner. The requirement for the independent quality assuring function over these activities was never intended to diminish the line responsibility to perform the tasks correctly. The quality assuring function was added as an additional check of the quality of activities being performed in a potentially hazardous industry. The examination of the TVA organization included an assessment of both the quality performing (line) and quality assuring (QA) functions and effectiveness of these functions in assuring the overall quality of the nuclear program.

### B. DIVISION OF RESPONSIBILITIES

The responsibilities for the quality assurance program within TVA has been assigned to three major offices. The Office of Engineering Design and Construction (OEDC) and the Office of Power (POWER) have the major responsibility for the design, construction, and operation of nuclear plants. The Office of Health and Safety (H&S) has a significant support role. Each of these offices is geographically separated from the others by more than a hundred miles. The assignment of responsibility and authority to these offices has resulted in a large degree of decentralization in TVA's nuclear program. This decentralization exists at a very high level in the organization. One of the direct results of decentralizing is the inherent problem of interfacing between the various offices. Geographical separation of the offices involved with the nuclear program further contributes to the interfacing problem. Long separations in time and distance tend to encourage the competitive nature rather than the spirit of cooperation. The TVA organization exemplifies the highly decentralized concept and thus suggests a necessity to recognize and actively deal with the interfacing problems.

The quality assurance program of each of the major organizational units within TVA that impacts upon the nuclear program is discussed in the following paragraphs. Included is a description of both the performing and assuring groups and their interrelationships.

#### 1. OFFICE OF POWER

The Office of Power has been designated as the holder of the NRC operating license for the TVA nuclear plants and is responsible for developing and implementing an overall quality assurance program for operation of the plants. The primary responsibility for the operation of the nuclear plants has been delegated to the Division of Nuclear Power (NUC PR). These responsibilities include the development and implementation of a quality performing program for all activities associated with the operations of TVA's nuclear plants.

There are three organizational units at various levels within POWER that have been identified as performing a quality assuring function. However, as indicated in the following discussions of the three groups, only one (OPQA&A) has the responsibility to audit the QA program to assure compliance with the 18 criteria of Appendix B to 10CFR50. There is an onsite quality assurance group reporting to the plant superintendent, NUC PR has a separate quality assurance group, and POWER has still another group responsible for the overall audit program. Each of these organizational units is discussed below in sufficient detail to describe its relationship to the overall quality program in the POWER.

##### a. Plant QA Staff

Industry practice and regulatory requirements specify that QA personnel be assigned responsibility for assuring that operating nuclear plant activities are effectively implemented. Each TVA nuclear plant in the preoperational test or operational phase has been staffed with QA personnel. The onsite QA staff reports to the plant superintendent. This organizational chain is supported by ANSI N18.7-1976, but the NRC has indicated a preference to have the onsite QA organization report to the central office staff to help assure independence. Thus far, this has been a suggestion and not a regulatory requirement. The QA staff includes both the QA and QC functions. The overall QA function is accomplished through a survey program which serves the same purpose that an audit program would. The basic goal is to critically assess on a sampling basis the activities being performed by plant personnel and to assure that identified deficiencies are brought to the attention of plant management. The QC function is accomplished through the inspection process. The inspections are performed for special processes and other essential activities by trained and qualified QC inspectors. The QA staff serves as a tool

to aid plant management in the overall operation and control of the plants. In this respect, the activities performed by the plant QA staff very closely approach a line function. This service to plant management is, to a large extent, lost when onsite QA reports to offsite management. Loss of plant control over QC would be especially difficult for plant management since QC is functionally a line activity. It is not the practice of the plant to depend totally on the QA function to assure the quality of plant operations. Line management and staff are responsible for getting the work done correctly. The QA staff is only an additional check. If the plant QA staff was removed, plant responsibility for quality of operations would be unchanged.

b. Division of Nuclear Power - QA Staff

Organizationally, the NUC PR QA staff reports to the director of NUC PR and is responsible for identifying and defining the requirements and commitments which form the operational boundaries within which TVA must perform while operating its nuclear power plants. These requirements and commitments are then translated by the QA staff into a set of QA instructions that are implemented by the plant procedures. The NUC PR QA staff is also responsible for the preservice inspection program, and the vendor inspection program for TVA nuclear plants. There are no regulatory requirements that mandate a QA group within NUC PR. The NUC PR QA staff was established to provide NUC PR management with a higher confidence level that a quality program is being implemented which satisfies the regulatory requirements and commitments. With the exception of the vendor inspection program, the functions performed by the NUC PR QA staff are primarily line organization functions.

c. Office of Power QA and Audit Staff

The Office of Power Quality Assurance and Audit (OPQA&A) Staff represents the only actually independent quality assuring organization within POWER. It reports to the Manager of Nuclear Regulation and Safety and is responsible for defining and measuring the effectiveness of the overall Office of Power QA program and its implementation. This group has authority to assess all areas involved directly or indirectly with the operation of the TVA operating nuclear plants. The OPQA&A Staff responsibilities and authority are generally described in the TVA QA Topical Report. The program for carrying out those responsibilities is contained in the POWER QA Manual. To put the function of the OPQA&A Staff in proper perspective, it could be stated that this staff performs the quality assuring function which the Division

of Nuclear Power, including the two quality assurance groups within the division, has responsibility for the quality performing function.

2. Office of Engineering Design and Construction

OEDC is responsible for developing and implementing an overall quality assurance program for the activities involved with design, procurement, and construction associated with nuclear plants, including the activities up until turnover of systems and components to POWER.

The responsibility for these activities has been delegated by the Manager of OEDC to the Division of Engineering Design (EN DES) and the Division of Construction (CONST). These two division managers are responsible for the quality performance and quality assuring aspects of the overall quality assurance program within their divisions.

Within the OEDC organization there are three quality assurance groups at two levels. These are the OEDC QA staff, the EN DES Quality Assurance Branch (QAB), and the CONST QAB. In contrast to the manner in which the QA audit program is implemented by POWER, all three QA organizations have responsibility for meeting 10CFR50, Appendix B, requirements. Each of these organizational units is discussed below in sufficient detail to describe its relationship to the overall quality program in OEDC.

a. Office of Engineering Design and Construction Quality Assurance Staff

The Quality Assurance Manager reports to the Manager of OEDC on significant matters related to quality, while reporting to an Assistant to the Manager on day-to-day matters. The prime functions of his staff are to define requirements which the OEDC QA program is to meet, provide guidance to the divisions of EN DES and CONST, and to oversee the effectiveness of the divisions' programs.

The overview of the divisions' program and their implementation is primarily through management audits and through joint audits conducted with OPQA&A. OEDC QA audits are concentrated on the activities associated with Criteria I, II, and XVIII of Appendix B to 10CFR50. The audit program appeared to have been conducted in adequate scope and depth based on previous audits reviewed. A reduction in the scope of OEDC QA audits was made in early 1981. Ability to effectively monitor the division programs with a reduced scope should be closely evaluated.

The QA Manager, Chief of EN DES QAB, and Chief of CONST QAB are to interface to help assure uniformity of

interpretation of policies and requirements. They also coordinate in organizing and planning the divisions' programs. This interface should provide a valuable tool in bridging the gap between divisions and between the divisions and OEDC. Appreciable contact between these three principals was evident during the NSRS management review. It should be noted, however, that the degree of interfacing is somewhat personnel dependent in that definitive, written procedures or guidelines for its achievement were not evident except for the area of joint audits.

OEDC QA maintains the TVA Interdivisional Quality Assurance Manual which contains procedures (ID-QAP) for certain functions affecting the quality of nuclear plants. This provides another mechanism for effecting better interfacing among TVA offices and divisions.

b. Division of Engineering Design Quality Assurance Branch

As a part of the reorganization of quality assurance within OEDC in 1980, a quality assurance branch was established in EN DES. The Chief, QAB reports administratively and on routine matters related to quality to an Assistant Manager. On significant matters related to quality, he reports directly to the Manager of EN DES. The Chief, QAB directs the development and maintenance of the QA program. As will be discussed in more detail later, this includes direct involvement in developing the implementing procedures for the division QA program. This staff also evaluates the effectiveness of the program by audits internal to EN DES and external audits of TVA vendors. For an internal audit, the staff audits for compliance with 15 criteria of Appendix B to 10CFR50 not covered by OEDC QA.

c. Division of Construction Quality Assurance Branch

The CONST QA Staff was also elevated to branch status as part of the OEDC QA reorganization of 1980. As in the case of EN DES QAB, the CONST QAB Chief reports to an Assistant Manager administratively and on routine matters. For more significant matters, he reports directly to the Manager of CONST.

The Chief, QAB, and a small staff in Knoxville develop and maintain the definition of QA program requirements which the various projects are to meet. These requirements are then translated by the line organization into detailed implementing procedures for use at the earlier projects. For the later projects, the QAB has developed some of the implementing procedures as well to provide a more uniform program. The Knoxville staff also coordinates the conduct of an audit program at each project to evaluate the effectiveness of the

QA program for that project. An independent quality assurance unit (QAU) reporting to the Chief, QAB is stationed at each project and implements this audit program. These units audit activities in the construction phase for compliance with the 15 criteria of Appendix B to 10CFR50 not covered by OEDC QA. Based upon the recent management review by NSRS, the audit function at Bellefonte appeared generally adequate to meet TVA commitments and requirements.

1. quality control function (inspection/surveillance) is provided at each construction site as part of the construction engineer's organization. This function, as well as that of the crafts, is audited by the QAU.

3. Office of Health and Safety

There is a small staff located within H&S designated the Quality Assurance/ALARA Staff (QAAS) that reports to the Chief, Radiological Hygiene Branch (RHB). The QAAS is responsible for auditing and evaluating the activities of the RHB in the areas of health physics, including procedures development and implementation. It is also responsible for conducting annual audits of outside organizations involved in health physics, environmental monitoring, radiological emergency planning, and radiological instrumentation calibration.

4. TVA Quality Assurance Steering Committee

The TVA Quality Assurance Steering Committee was established in April 1978. The committee was established to assure uniform interpretation and application of the quality assurance policies of TVA and requirements established by regulations, codes, and standards. In carrying out these objectives, the committee functions are to include: keeping members mutually informed on nuclear industry-related quality issues; recommending new quality assurance policies; reviewing quality trends and recommending corrective action; considering and recommending solutions to interdivisional quality assurance problems; arranging independent management reviews of selected parts of the POWER and OEDC quality assurance programs to meet regulatory requirements; and recommending ways of improving the effectiveness of these QA programs.

The committee is comprised of executive, line, and QA management members from POWER and OEDC and the various divisions within those offices.

Although this committee offers a means for assuring uniform interpretation and application of quality assurance policies within TVA, it is not evident from the NSRS reviews that committee activities had been successful in meeting intended objectives.

## C. PROBLEMS RELATED TO QA ORGANIZATION

NSRS has performed major management reviews of POWER, OEDC, H&S, and PURCH during the past year. [See NSRS Reports R-81-08-BFN, R-81-14-OEDC(BLN), and R-81-15-PURCH(BLN)]. The purpose of the management reviews was to assess the management control systems that have been established to provide management reasonable assurance that TVA nuclear plants are being designed, constructed, and operated in a safe and efficient manner. The scope of these reviews was broad in reviewing the organizations at the corporate level but was limited in the case of POWER to an examination of Browns Ferry and in the case of OEDC to Bellefonte. Quality assuring activities is one of the areas that was critically assessed during each review. Several QA problem areas were identified during these reviews. In addition, a number of weaknesses in the QA program have been identified through the NSRS routine and special reviews of programs. A brief description of the more significant specific problems is provided in the succeeding paragraphs.

### 1. Office of Power

- a. The most significant problem identified within POWER relates to the apparent lack of management support for QA. One indication of this was the organizational position of the OPQA&A Staff. The management point for resolution of QA problems was too far removed from the levels of management dealing with the problems. Four levels of negotiations were required before the accountable manager for both QA and line functions became involved. NSRS recommended that an accountable manager be designated that would be responsible for both NUC PR (line) and QA.
- b. There was a possible conflict of interest built into the OPQA&A Staff management structure. The supervisor of the OPQA&A Staff reported to the Manager of Nuclear Regulation and Safety (NRS). The Manager of NRS was also responsible for TVA licensing activities. Licensing activities and QA activities can easily represent conflicting positions. NSRS recommended that POWER evaluate this potential conflict of interest and consider revising the management structure to separate the licensing and QA functions.
- c. The audit staff resources appeared to be inadequate to properly implement the identified audit program. It was concluded that the scope or depth of the audits would probably have to be compromised in order for the available staff to perform the audits required by technical specifications. NSRS recommended that POWER evaluate the required audit program and available audit personnel and determine the staff size required to perform an effective audit program.

- d. The OPQA&A Staff had an undesirable concurrence authority over the procedures that made up portions of the Nuclear Operational Quality Assurance Manual (N-OQAM). The OPQA&A Staff had the authority and responsibility to audit the NUC PR QA program and to recommend corrective action. If OPQA&A Staff had the desirable level of management support, corrective action could be effected through the audit process without getting involved in the procedure approval process which is a line responsibility. Such involvement in line responsibility inflicts a possible conflict of interest for the OPQA&A Staff. It approaches the point of requiring the OPQA&A Staff auditors to audit themselves. The necessary independence appears to have been compromised. The fact that OPQA&A Staff desired such a concurrence was an indication that the group was operating from a weak position. NSRS recommended that the TVA QA Topical Report be revised to delete the commitment for the OPQA&A Staff to concur with the NUC PR procedures (N-OQAM procedures).
- e. The N-OQAM did not contain all the QA requirements and commitments and therefore did not constitute the entire QA program. Many of the requirements and commitments were contained in procedures of the Division Procedures Manual. Not all personnel involved with the QA program and its implementation had a full knowledge of where all requirements and commitments were covered. The NUC PR QA staff and NUC PR management appeared to be aware of this condition and were working to correct it. NSRS recommended that NUC PR develop a matrix or similar system to define regulatory requirements and TVA commitments pertinent to each nuclear plant, along with the bases for the requirements and commitments and the method of satisfying them.
- f. The plant QA staff was not handling corrective action reports as required by Criterion V of Appendix B to 10CFR50 and the applicable plant procedures. The corrective action reports were not being processed in a timely manner. NSRS recommended that plant management initiate action to improve the timeliness of corrective action for deficiencies identified through the corrective action process.

## 2. Office of Engineering Design and Construction

- a. Regarding the role of OEDC QA in defining and maintaining the definition of requirements which the divisions are to meet, NSRS found several instances wherein this was not being accomplished. (Review Report R-81-14-OEDC(BLN), section IV.A.) NSRS recommends that more resources be applied to this function.

- b. Based on information obtained during the recent management review of OEDC (Review Report R-81-14-OEDC(BLN), section V.B.5), NSRS concluded that the internal audit function in EN DES prior to the reorganization in 1980 was largely ineffective. This conclusion was supported by interviews of several dozen EN DES employees. The audit program was quite limited in scope and depth, with very limited technical input, and with less than adequate resources being applied. This indicated lack of management support for QA.

The review disclosed that significant improvements had been made since the reorganization but that the effort was still in a transient stage. NSRS concluded that the direction of change was appropriate but that overall adequacy of the audit function could not be ascribed at the time of the review. NSRS recommended that the attempts to apply additional resources to this effort be continued.

- c. OEDC QA uses ID-QAP's to define interfaces between divisions and offices for activities involving nuclear plants. NSRS concluded during its recent review that this mechanism was underutilized. For example, control procedures were not developed delineating interface responsibilities between EN DES and CONST for: handling of design changes; performing constructability and operability reviews; controlling vendor manuals; and reviewing operating plant procedures. Additionally, NSRS believes that improvements are needed in the EN DES/PURCH interfaces and the EN DES/NSSS interfaces. Findings in this area appear to be consistent with concerns of the NRC involving interdivisional activities.
- d. Corrective action programs established were generally adequate to meet regulatory requirements; however, NSRS did not believe the programs had been effective in eliminating recurring problems. A review of the nonconformance reports generated at Bellefonte during 1981 indicated many of the same type of problems had been occurring since 1975. NSRS was also concerned that the program that was established to communicate possible generic problems between TVA construction sites was very narrow in scope. The program did not, for example, provide for communication of OEDC audit findings between the various nuclear plant projects. NSRS believes prime responsibility for the corrective action program rests with the line organization; however, inability of the program to detect and correct recurring problems should be reasonably expected to be found through an audit process.

The EN DES and CONST QA groups are charged with trend analysis programs for adverse quality indicators and reporting of results to management. Usefulness of the products of the trending for Bellefonte were questioned by project management. Although considerable effort had been expended in EN DES during the past year, the EN DES trending program was not functional as of the conclusion of the NSRS review. It was noted that the Bellefonte FSAR had contained a commitment to a fully operational trending program for about four years.

3. Common to POWER and OEDC

A problem that NSRS has observed over an extended period is that there does not appear to be a clear-cut distinction between the responsibilities and functions of QA groups and line organizations. A number of activities that have historically been performed by the line organizations in industry appear to be performed by the QA groups within TVA.

Criterion I of Appendix B to 10CFR50 states that "The applicant shall be responsible for the establishment and execution of the quality assurance program. The applicant may delegate to others, such as contractors, agents, or consultants, the work of establishing and executing the quality assurance program, or any part thereof, but shall retain responsibility therefor. The authority and duties of persons and organizations performing activities affecting the safety-related functions of structures, systems, and components shall be clearly established and delineated in writing. These activities include both the performing functions of obtaining quality objectives and the quality assurance functions." The remainder of this long criterion discusses the quality assuring function and how its independence must be assured.

Criterion II of Appendix B to 10CFR50 states that "The applicant shall establish at the earliest practical time, consistent with the schedule for accomplishing the activities, a quality assurance program which complies with the requirements of this appendix. This program shall be documented by written policies, procedures, or instructions and shall be carried out throughout plant life in accordance with those policies, procedures, or instructions." The program identified and required here by the criterion is a program to be established and implemented by the line (performing organization). The effectiveness of the program must be measured by QA (assuring organization). Therefore, QA should not develop the program since this would require QA personnel to be put in the position of auditing themselves. The QA organization is equally responsible for assuring program adequacy and program implementation. This was also indicated by NRC during the August 19, 1981 enforcement conference. It appears to NSRS that the clear distinction between QA and

line responsibilities is not being made within TVA. We have noted examples of QA performing classical line functions in both POWER and OEDC, but the examples are more prominent within OEDC.

- a. NUC PR QA identifies the commitments made to NRC in the QA Topical Report (chapter 17.2 of the FSAR) and translates them into requirements in the N-OQAM to be implemented by plant procedures. This, in the opinion of NSRS, is clearly a line function. However, NSRS is not overly concerned about this use of QA staff because, with the exception of the vendor inspection groups, NSRS considers NUC PR QA to be a line organization performing line responsibilities. The fact that it has been labeled by a QA title doesn't diminish the reality of its line functions. However, in considering the total QA effort, this unit cannot be considered as contributing to the independent audit/review function. This same type of activity is being performed by QA groups within OEDC. This gives NSRS more concern because, unlike NUC PR QA which has no audit function within TVA, the OEDC QA groups also audit the line organizations implementing the requirements and procedures identified and developed, at least partially, by the QA groups themselves. A prime example of this in OEDC is the engineering procedures (EP) system within EN DES. The EP's form the EN DES QA program for design and procurement to satisfy 10CFR50, Appendix B, requirements. The EN DES QAB and formerly the Quality Assurance Staff have been heavily involved in the development of this system of implementing procedures. As a result, NSRS questions whether the QAB has the independence and objectivity necessary to effectively audit the adequacy of the EP's and their implementation.

Although not a part of NSRS' reviews, it was noted that for the later TVA construction projects, CONST QAB has developed many of the implementing procedures for the sites. This was done to assure more uniform programs at these sites. The question of independence and objectivity of the auditors to effectively examine the program as well as its implementation arises in this instance also.

- b. Responses to review reports that NSRS has written regarding line activities and transmitted to line organizations within OEDC have been developed to a large degree by QA. NSRS sees nothing technically wrong with QA coordinating the responses for the line and reviewing the accuracy and completeness of the responses. However, discussions with OEDC personnel regarding the responses indicate that substantial portions of the responses were actually prepared by QA with only limited participation by the line organizations.

- c. Another example which perhaps indicates an improper focus on QA groups relative to the overall corrective action system was noted during the NSRS review. The procedures for effecting corrective action in response to audit findings within EN DES and CONST discussed the role of the audit groups at length, but only a minimal effort was directed toward discussing the actions to be taken by the audited organizations.

### III. QUALITY ASSURANCE ORGANIZATIONS AT OTHER UTILITIES

In order to fully assess the quality assurance activities at TVA, it was deemed necessary to examine the TVA system and then to examine what other utilities are doing to establish effective quality assurance programs. Within the timeframe established for completing the review of quality assurance in TVA, it was not possible to examine all other utilities in any kind of detail. Consequently, as a compromise, four utilities were selected to examine in some detail and the remaining utilities were only examined in a cursory manner.

The four utilities that were selected for study were Commonwealth Edison Company, Northern States Power Company, Duke Power Company, and Carolina Power and Light Company. These utilities were selected since they were considered a good cross-section of utilities representing a utility (Duke) that has both construction and design organizations comparable to TVA's situation, and utilities with varying degrees of design and construction activities directly under their control. The selection of these utilities was not made on the basis of a preconceived conclusion regarding the manner in which they were organized to meet quality requirements.

In examining the selected utilities, discussions were held with utility representatives. Generally, this consisted of discussions with the manager of the QA organization. Discussions in some cases also extended to the line organization or to the level above the QA manager. The discussions were limited to examination of the overall utility organizational structure, the interfacing of the QA units to the line organization, the staffing levels of the QA organization, responsibilities of the QA organization, qualification of QA staff, level of technical detail the QA organization becomes involved with, and the management attitude and support to QA within the organization. Information obtained pertaining to each utility is summarized below.

#### A. DUKE POWER COMPANY

##### 1. Utility Organizational Structure

The basic organizational structure at Duke Power is shown in figure III-1. Legal and financial activities report through a senior vice president to the chairman and CEO. A vice president and senior vice president for communications and public offices also reports to the CEO. All other activities report to the president and chief operating officer.

Considering the nuclear activities within Duke Power, all nuclear activities are contained with the parts of the organization shown in figure III-2. In effect, all construction and engineering activities report to a senior vice president for engineering and construction, and all production and transmission activities report to a separate senior vice president for production and transmission. Nuclear operating activities report to the vice president of operations.

Quality assurance at the corporate level is under the direction of a corporate quality assurance manager. The QA Manager reports directly to a senior vice president. In effect, at Duke Power the corporate QA manager is on the same level as the vice presidents that direct construction, design, and nuclear operations.

## 2. Quality Assurance Organization

The quality assurance organization for Duke Power is shown in figure III-3. As indicated in the figure, there are six basic organizational units under the corporate manager. The two large groups provide QA/QC surveillance and inspection for the operating plants and for plants under construction. The QA manager for technical services provides the QA function relating to design, purchase orders, requisitions, and preparation of QA manuals. The QA manager for administrative services provide the training of all QA/QC staff for the entire company. The QA manager for vendors is responsible for the periodic surveillance and audit of vendors. The audit group provides for the auditing of activities within the company.

In effect, there are two basic levels of quality assurance provided within the organization. There is a surveillance activity performed by the project QA groups at a construction site or by the QA staff at an operating site. Then there are audits of all activities by the senior QA supervisor for audit. These audits are performed twice a year.

The quality assurance organization interfaces with the line organization at all levels. The quality assurance organization has authority to stop work but generally works with the line organization at the appropriate level to have differences resolved. Where resolution cannot be made at lower levels, differences are resolved at the vice president or senior vice president level. The location of the vice presidents all in one building facilitates such resolution.

The quality assurance organization includes both QA and QC functions. Consequently, the organization does routine surveillance of activities, monitors documentation, observes work in process, does inspection and audits in a broad scope.

The present organization for QA was developed in 1974. Prior to that time QA at Duke had been fragmented, and problems developed in adequate implementation of the QA program. The existing system is considered by Duke Power Company to be functioning in a more efficient and effective manner. Combining QA and QC into one independent organization was cited as resulting in efficiencies. It was also indicated that line managers like the existing system better since it removes the conflict that used to exist when the line manager had dual responsibility for quality performance and assurance.

At Duke Power the QA organization is considered an equal with line organizations. QA staff members are considered technical specialists in the same sense as those line specialists that they are working with. The QA staff is expected to provide meaningful technical evaluation, not just satisfy paper requirements.

Staffing levels for the QA organization at Duke are discussed in section V.

## B. CAROLINA POWER AND LIGHT COMPANY

### 1. Utility Organizational Structure

The basic organizational structure at Carolina Power and Light is shown in figure III-4. Two executive vice presidents report directly to the chairman/president of the utility. There are no direct nuclear activities in either of these parts of the organization. A third executive vice president reports to the vice chairman. Three senior vice presidents, a vice president for safety and research, and the corporate QA manager report to the third executive vice president. Thus, all of the nuclear activities of the firm are basically contained within this part of the organization. Within the engineering and construction group, there is separation of nuclear activities with a vice president for nuclear plant engineering and a vice president for nuclear construction. In a similar way, the power supply group has all nuclear operations under one vice president.

The quality assurance manager therefore reports to the same level of management as the group managers and is organizationally equivalent to the senior vice presidents.

The interfacing of various groups and departments at a given plant is shown in figure III-5. In this figure it is indicated that at a given project, as for example the Brunswick project, there is technical support at the site that is derived from six different departments. Only one of these departments has responsibility for plant operations. The other departments, however, do provide technical support to the overall program, either in the form of engineering, construction, training, quality assurance, or safety review. Schematically, the manner of coordinating all these interfaces at the site is shown in figure III-6.

### 2. Quality Assurance Organization

The quality assurance organization at Carolina Power and Light is shown in figure III-7. Four functional sections report to the manager of corporate quality assurance. The engineering and construction section includes both QA and QC functions. At the present time, this section includes QA

surveillance of the engineering activities, QA surveillance of construction activities (including QC activities under site management), and QA surveillance and audit of vendors. Also shown in figure III-7 is QA surveillance at the Mayo Plant (a fossil plant). At the present time, QC other than welding is under plant management. Management is studying to determine if all QC activities should be placed in the QA organization.

In the operating part of the organization, all QA and QC activities are included within the QA organization. As shown in figure III-5, at each site there is a QA/QC director of quality assurance that interfaces directly with the line at the site and is an integral part of the interface organization as shown in figure III-6.

Two other sections report to the corporate manager of quality assurance. One group is responsible for the training and procedures within the QA organization. The other group provides for the performance evaluation of the overall QA activities within the utility. This group conducts all the audits.

The present quality assurance organization was established in March 1981. Prior to this time QA was fragmented within the utility. QA at the plants reported to the plant manager. This method of reporting appeared to work well in the early part of the 1970's as Carolina's system was growing. The reorganization was brought about for a number of reasons. As the system got larger, there was duplication of effort, and management was not getting the results that were desired. There was also increased indication that line managers had increased pressure when they were held accountable for both the performing function and the independent assurance function. There was a problem of obtaining a good evaluation when deadlines were required to be met.

Several steps have been taken at Carolina Power and Light to increase the effectiveness of the QA organization. The QA manager reports at a very high level in the organization. In effect, the corporate QA manager is reporting at the same level as the senior vice presidents. The QA organization has been organized to provide for technical capabilities and experience within the organization comparable to those required within the line that are being audited, inspected, or placed under surveillance. As a consequence, the QA organization is considered an equal both in pay levels and status within the overall organization. These objectives have been achieved in part by an intentional interchange of QA and line personnel to benefit each part of the organization.

As evidence of the support that Carolina Power and Light has in QA, the QA organization has increased its activities associated with fossil plants and also applies QA to the

balance of the plant on nuclear projects. Carolina Power and Light considers QA as a means of reducing costs and believes it has a favorable cost benefit ratio.

## C. NORTHERN STATES POWER COMPANY

### 1. Utility Organizational Structure

The basic organizational structure of Northern States Power Company is shown in figure III-8. Two senior vice presidents and one vice president report to the president and chief operating officer of the utility. One of these senior vice presidents is responsible for power supply and has three vice presidents reporting to him as well as the corporate manager of quality assurance. All nuclear activities, except purchasing functions and security are directed by the senior vice president for power supply. Within the existing organizational structure there is a vice president in charge of engineering and construction and a vice president responsible for power production. The power production organization is shown in figure III-9. From figures III-8 and 9 it may be seen that quality assurance is fragmented within the power supply organization with one QA staff reporting to the vice president of engineering and construction, another group reporting to the vice president of power production and the corporate manager of QA reporting to the senior vice president. During the discussions we were informed that NSP intends to modify its present structure to have all of the QA groups except the QA at the plants, reporting to the corporate manager of QA.

### 2. Quality Assurance Organizations

With the existing organizations at NSP, quality assurance responsibility is somewhat fragmented within NSP; however, all QA activities are within the part of the organization directed by the Senior Vice President-Power Supply. The QA organization associated with operations are shown in Figures III-9 and III-10. The QA staff at the plants report to the plant manager. Both QA and QC activities at the plants are closely coupled to line functions. There is no attempt to allow QA at operating plants to be independent. When problems develop between QA and the line such problems become resolved at the Senior Vice President level. Plant Engineering and Construction is responsible for design/construction activities for new plants or for major changes at operating plant as shown in figure III-8. Plant Engineering and Construction has its own QA organization that presently reports to the Vice President-Engineering and Construction. This QA group may be moved to the corporate QA organization.

The corporate QA organization at present has responsibility for QA audit of the entire QA program and for QA review of purchasing. Additionally the corporate QA staff provides

generalized criteria to the other QA organizational units through the senior vice president responsible for all of these units.

The Senior Vice President-Power Supply exercises considerable influence over all QA activities. He provides criteria for the overall program to each of the organizational units, plant QA is authorized to go directly to this Senior Vice President with problems and the Senior Vice President also meets regularly with plant QA staff. Thus, there are relatively short lines of communication between responsible QA units and the Senior Vice President-Power Supply.

The QA/QC staff at the operating plants have equivalent experience and background to those members of the line that they review or audit. The plants issue status reports and trend review reports that indicate both to line management and to corporate QA which areas require additional attention. The corporate QA audit teams utilize QA/QC staff from the operating plants to supplement their staff on the overall QA audits.

There have been no new construction projects at NSP recently, thus the QA activities are primarily those associated with operation. Thus there was not a good indication of how well the existing system would work if activities covered design, construction and operation.

#### D. COMMONWEALTH EDISON COMPANY

##### 1. Utility Organizational Structure

The basic organizational structure at Commonwealth Edison Company is shown in figure III-11. Basic activities associated with the design, construction, and operation of existing facilities report directly to the chairman and president through the executive vice president of construction, production, and engineering. All engineering and construction for new facilities is under the manager of projects who also reports directly to the chairman and president. The manager of projects directs the design, construction, and preoperational testing activities involving the project during the initial design and construction of the nuclear unit after the unit has been placed in operation. The project engineering, project construction, and project operations groups are formulated respectively from the Station Nuclear Engineering and Station Construction Departments, and the Production Nuclear Division which have functional responsibility and control of the corresponding Project Department organizations. The project groups for a respective unit will revert back to their originating organization when the nuclear unit is placed in commercial operation. Continuity is brought about by the reassignment of the project team for a new unit into the operation organization, thus facilitating the transfer

of information and expertise. The director of nuclear safety activities reports directly to the president. Also reporting to the president are an executive vice president and the vice chairman. The quality assurance activities in Commonwealth are under the direction of the manager of quality assurance that reports directly to the vice chairman.

As may be seen from figure III-11, the nuclear safety and quality assurance functions are completely separated from the line organizations. The director of nuclear safety reports directly to the chairman and president, whereas the quality assurance manager reports to the vice chairman.

## 2. Quality Assurance Organization

The quality assurance organization at Commonwealth Edison Company is shown in figure III-12. The manager of quality assurance directs the quality assurance activities for the design, procurement, construction, and operation of the company's nuclear power facilities. He or his designated alternate has been delegated responsibility and authority to stop unsatisfactory work and plant operations as well as further processing or unsatisfactory material during design, engineering, and construction of the plant, and during plant modification, maintenance and inservice inspection.

If conditions which are adverse to quality and which require prompt action are found by quality personnel at the site or station and required corrective measures cannot be agreed upon, the manager of quality assurance or his designated alternate will be notified promptly.

The director of quality assurance (engineering-construction), the director of quality assurance (operating) and the supervisor of quality assurance (maintenance) report directly to the manager of quality assurance. The director of quality assurance (engineering-construction) has responsibility for administering design, procurement, and construction quality assurance activities; the director of quality assurance (operating) has responsibility for administering operating quality assurance activities; and the supervisor of quality assurance (maintenance) has responsibility for quality assurance activities covering maintenance, modification, inservice inspection and stores activities. They have authority and organizational freedom to identify problems and to initiate, recommend, or provide solutions. The quality assurance organization is independent of the groups and individuals directly responsible for performing specific activities to which such quality assurance is applicable.

In the development of the QA organization, Commonwealth has taken steps to assure that the capabilities of the personnel

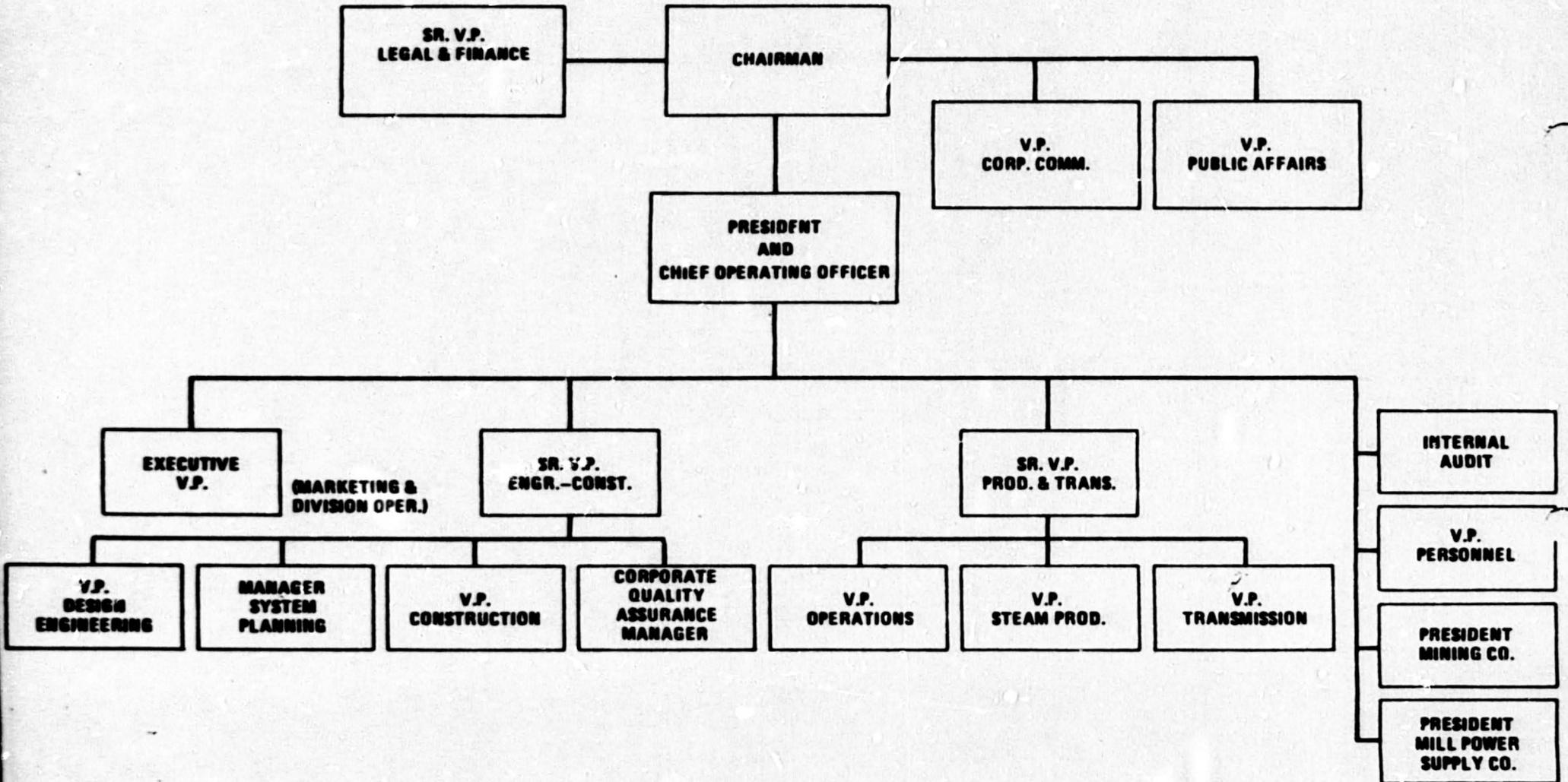
in the QA organization are comparable to those that the QA staff is reviewing or auditing. There is a recognized program to interchange line and QA personnel to assure capability is maintained in both organizations. As a consequence, QA staff are recognized as being a capable organization. This strengthens the position of the QA organization in dealing with the line organization.

The QA organization provides both continuous surveillance of activities as well as audits of the overall activities. Audits are conducted by a group of eight auditors with the audit group made up of personnel from the QA organization at the plants (other than the plant being audited).

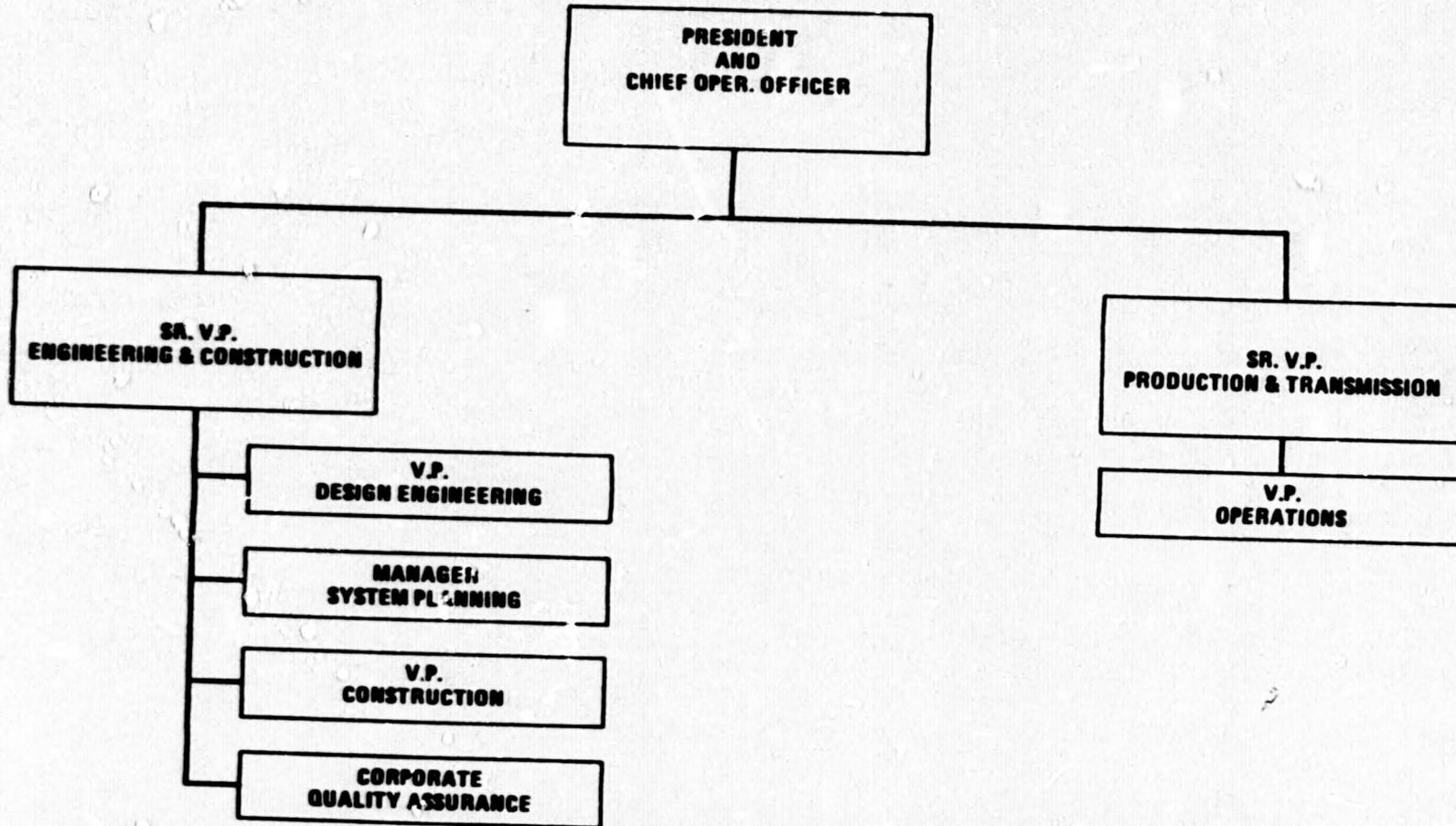
#### E. OTHER UTILITIES

The organizational structure and placement of the quality assurance function within the overall organization was examined for all those utilities with nuclear power stations. This examination was made by reviewing appropriate sections of the Final Safety Analysis Reports that have been submitted to the NRC. In examining these documents it has also been necessary to examine a large number of amendments to these reports that have been filed by the various utilities. From this review of some 32 utilities, it appears that 22 utilities have QA activities that are organized under one QA manager. Four utilities have not consolidated the QA function into one part of the organization. Information was not adequate to clearly identify the QA function and its interface with the organization for 6 utilities. These cases represented submittals that had been provided to NRC prior to the QA requirements; thus, there was inadequate information in these submittals.

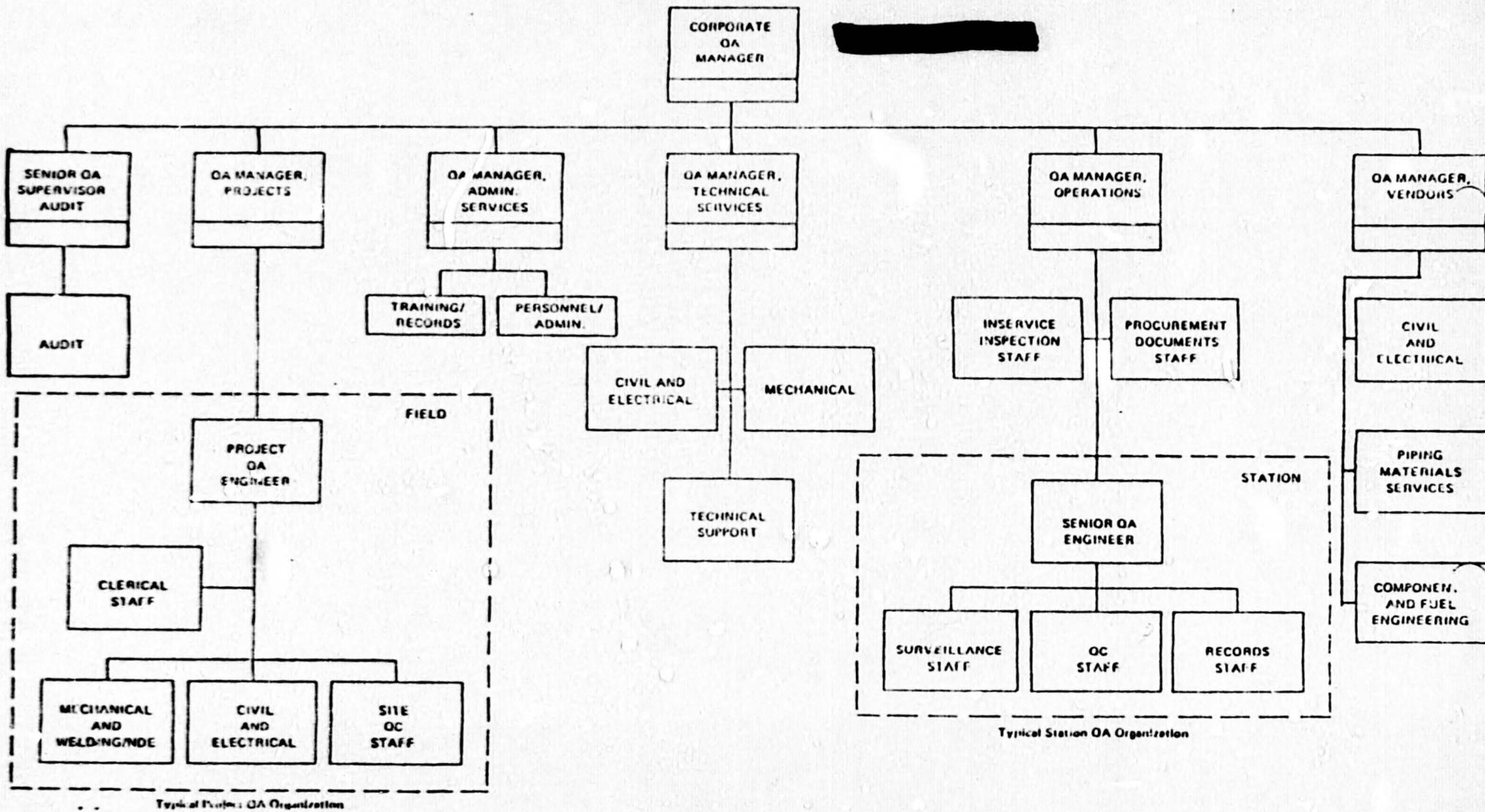
**FIGURE III - 1  
DUKE POWER COMPANY  
CORPORATE ORGANIZATION**



**FIGURE III - 2  
DUKE POWER COMPANY  
CORPORATE ORGANIZATION (NUCLEAR)**



**FIGURE III-3  
DUKE POWER COMPANY  
QUALITY ASSURANCE DEPARTMENT ORGANIZATION CHART**



**FIGURE III - 4  
CAROLINA POWER & LIGHT COMPANY  
CORPORATE ORGANIZATION**

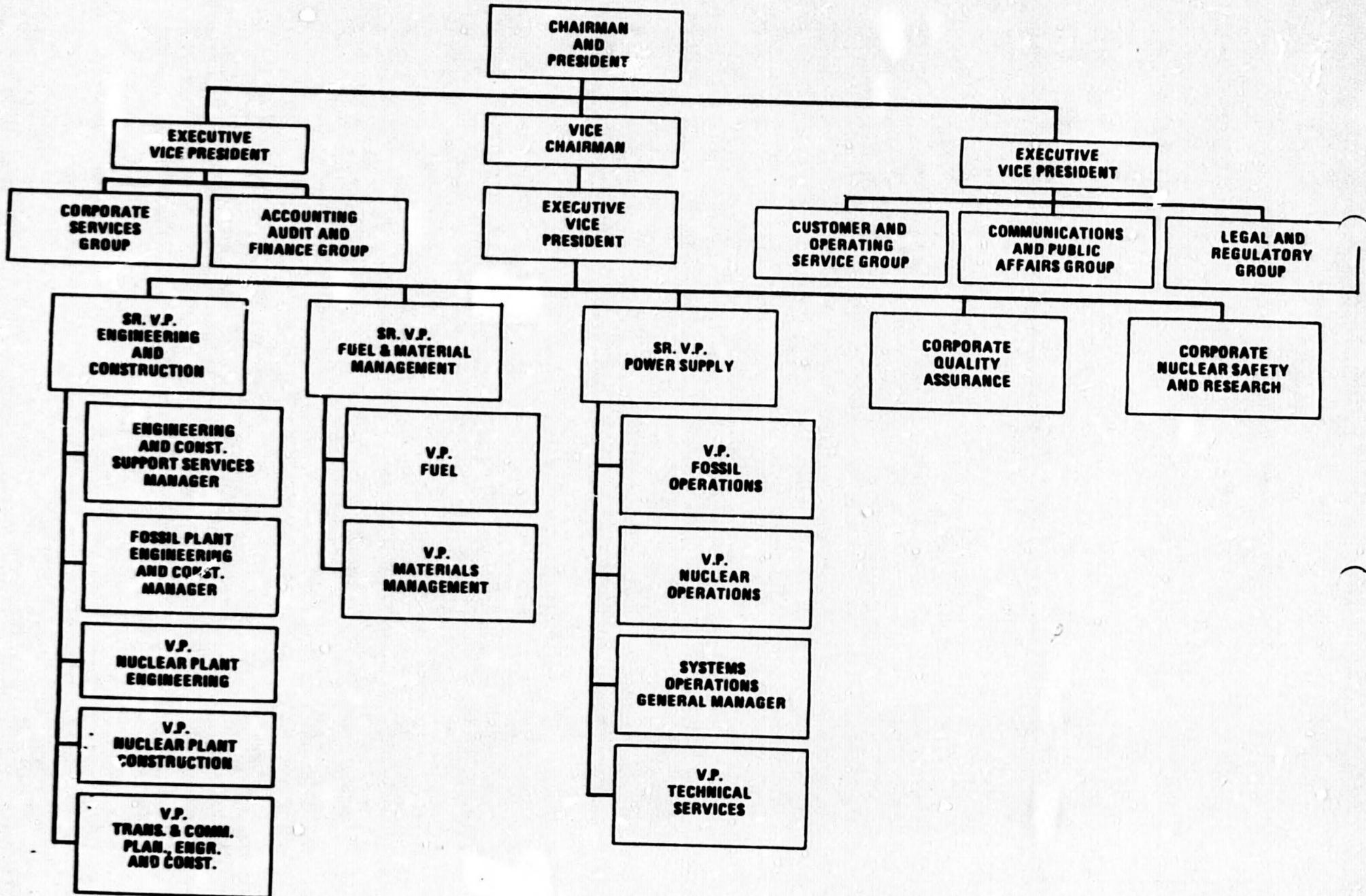




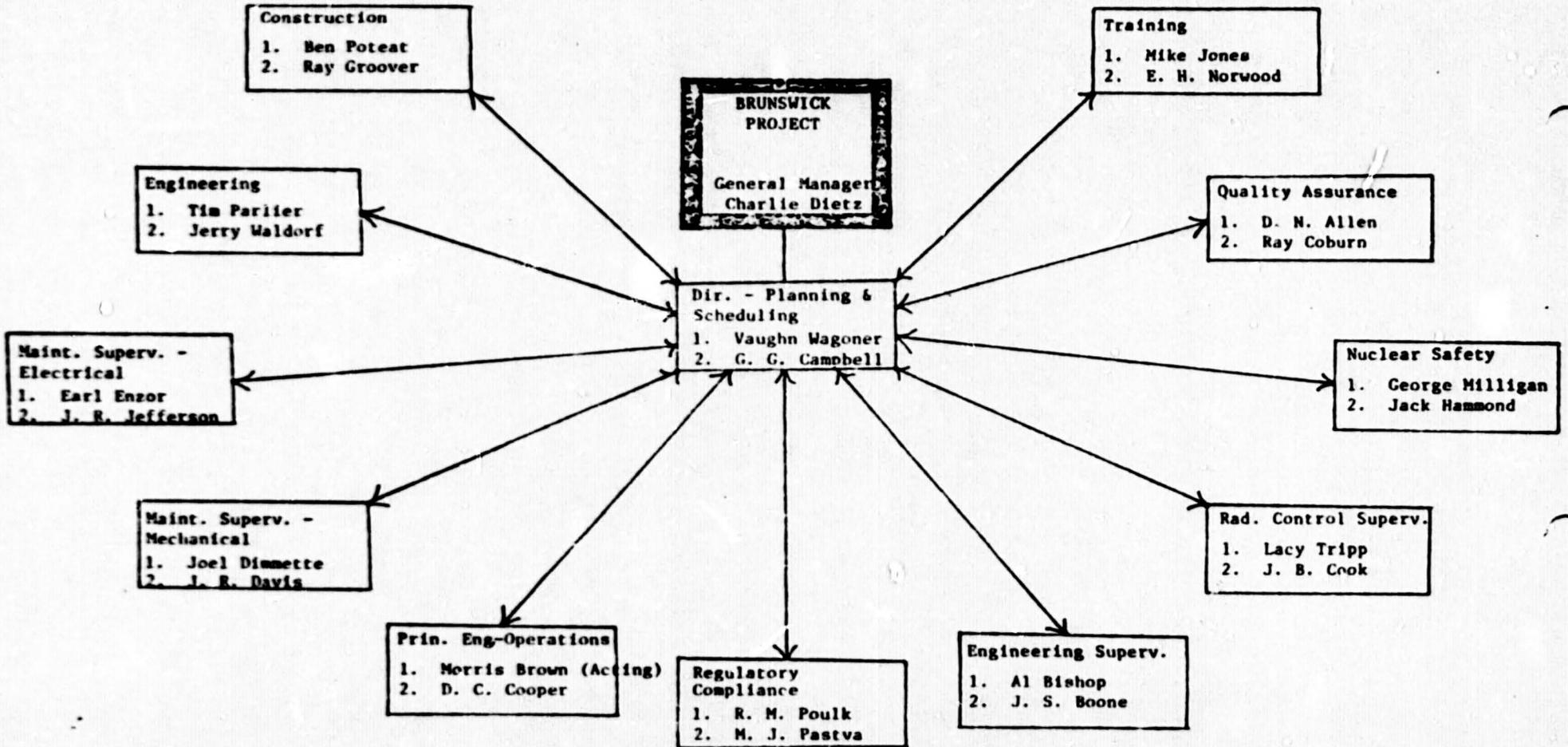
FIGURE III-6

CAROLINA POWER AND LIGHT COMPANY

BRUNSWICK PLANNING & SCHEDULING INTERFACE ORGANIZATION

3-6-81

NOTE: Person listed as number 1 is primary contact;  
number 2 is alternate contact.



**FIGURE III - 7  
CAROLINA POWER & LIGHT COMPANY  
QUALITY ASSURANCE ORGANIZATION**

