TVA 64 (08-9-83)

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

GNS '841227 050

TO : J. P. Darling, Manager of Nuclear Power, 1750 CST2-C

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

DATE : DEC 27 1984

SUBJECT: WATTS BAR NUCLEAR PLANT (WBN) - OPERATIONAL READINESS REVIEW PHASE III - NUCLEAR SAFETY REVIEW STAFF (NSRS) REPORT NO. R-84-15-WBN

From August 6 to September 7, 1984, NSRS conducted the third in a series of reviews at WBN to determine the operational readiness of the facility. The series of reviews will continue until fuel is loaded in the reactor.

This particular review was conducted during the performance of the mini-hot functional testing program and focused on related Operations, Preoperational Test, Maintenance, and Engineering Sections activities. Adequacy of and adherence to procedures were stressed. Selected portions of the health physics program and actions taken in response to recommendations made in the first two operational readiness reports were also evaluated.

Eight recommendations were made in this report requiring WBN attention. NSRS requests a written response to these items by January 31, 1985. If there are any questions concerning this report, please contact G. G. Brantley or M. S. Kidd at extensions 4815-K or 7637-K respectively.

H N Culver

H. N. Culver

GGB:BJN
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NSRS FILE

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GNS '841227 051

TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

NSRS REPORT NO. R-84-15-WBN

SUBJECT: OPERATIONAL READINESS REVIEW - PHASE III

DATES OF REVIEW: AUGUST 6 - SEPTEMBER 7, 1984

TEAM LEADER: M Kidd for R. W. TRAVIS — DATE 12-24-84

REVIEWERS: M Kidd for G. G. BRANTLEY — DATE 12-24-84

M. D. WINGO — DATE 12-21-84

M Kidd for C. M. KEY — DATE 12-24-84

APPROVED BY: M Kidd M. S. KIDD — DATE 12-24-84

I. BACKGROUND

This is the third of a minimum of four reviews that will be performed by the Nuclear Safety Review Staff (NSRS) of activities at Watts Bar Nuclear Plant (WBN) to evaluate the operational readiness of that facility. NSRS report Nos. R-84-02-WBN and R-84-05-WBN were the first two in the series. Table I is an updated outline of the NSRS Operational Readiness Review Plan.

II. SCOPE

The activities to be reviewed are generally controlled by the Office of Nuclear Power (NUC PR). Each review is conducted in sufficient detail to facilitate the formulation of an NSRS opinion as to the status of the specific area being reviewed. When the series of reviews has been completed, the status of the specific review areas will be evaluated and the operational readiness of the facility determined. This particular review focused on preoperational testing, maintenance activities, conduct of licensed operations, reactor safety and criticality controls, chemistry control, and health physics. Also, review of actions taken in response to recommendations made in the first two operational readiness reports was performed. This review was performed during the mini-hot functional testing and the NSRS used the tests to serve as a framework to review other activities since these tests simulated actual operating conditions as nearly as possible without using nuclear heat.

III. MANAGEMENT SUMMARY

Within the scope of this review the six areas evaluated were considered adequate with some exceptions. The most significant of these exceptions are summarized below while the specific conclusions and recommendations relating to these program areas are contained in section V of this report.

Preoperational Testing

There appeared to be a philosophical difference when regulatory guides, industry standards, and the N-OQAM were compared with the actual testing experience. Upper tier documents indicated that the testing should be a functional final system checkout while in practice the systems were not as complete and ready for testing as might be expected. Improvement in the conduct of the testing program for unit 2 at WBN is recommended.

Conduct of Licensed Activities

Configuration controls and independent verification of system status were considered to be in need of improvement. Shift and relief turnover of some Operations Section personnel were not conducted in accordance with established requirements. While NSRS recognizes that unit 1 is not licensed for operation, improvement in these areas is recommended in accordance with good operating practices.

Health Physics

The current plant organization does not provide the Health Physics Section independence from operational pressures and the organizational authority to deal directly with all aspects of the plant health physics program. NSRS recommends that the plant organization be revised to have the health physics supervisor report directly to the plant manager.

Previously Identified Open Items

Twenty-eight items requiring WBN attention were made in NSRS reports Nos. R-84-02-WBN and R-84-05-WBN, issued in April and June of 1984. Of these 28 items 16 have been closed and the remaining items remain open pending further review by the NSRS or further action by WBN. Of those items remaining open the NSRS considers R-84-05-WBN-08, R-84-05-WBN-15, R-84-05-WBN-17, and R-84-WBN-24 to be the most significant. These open items involve high density fuel storage racks attenuation testing, material inspection during construction/modification/ maintenance activities, the two-year review cycle for procedures and instructions, and interface reviews after unit 1 fuel loading.

IV. STATUS OF PREVIOUSLY IDENTIFIED OPEN ITEMS

A. R-84-02-WBN-01, Noncompliance with TVA Commitments and NUC PR Requirements for GET Training

In a plant-level document, NUC PR had exempted the plant superintendent and the assistant plant superintendents (the wording did not reflect the most recent reorganization) from certain General Employee Training (GET) courses required by ANSI 18.1. The NSRS recommended that this exception either be removed or a formal exception be obtained from established requirements. NUC PR and NSRS still are in disagreement on this concern. This item will remain open pending further discussion. See section VI.A.1 for details.

B. R-84-02-WBN-02, Expansion of the FQE Survey No. 3QT(a)

NSRS recommended that the FQE Survey No. 3QT(a) checklist be expanded in scope. It was also recommended that the survey be put into compliance with the plant-level document (AI-10.1) regarding an acceptable timeframe for initial training. Based on revision of the survey checklist this item is closed. See section VI.A.2 for details.

C. R-84-02-WBN-03, Problems with Scheduling and Recordkeeping Associated with the Health Physics and Security Bypass Examinations (GET 2.35 and 3.15)

The NSRS had found a large number of personnel delinquent in the bypass exam for health physics and security. Most of the delinquencies were caused by people taking the training again instead of the bypass exams because the failure rate of the bypass exams

was too high. These people should not have been listed as delinquent. This was only a recordkeeping error and NUC PR took proper corrective action. The other delinquencies were caused by too few classes being scheduled. The schedule was changed in accord with NSRS recommendations. This item is closed. See section VI.A.3 for details.

D. R-84-02-WBN-04, Enhanced Employee Awareness of TVA's Policy on Expression of Staff Views and Preferred Methodology for Reporting Nuclear Safety Concerns

The NSRS concern was that TVA employees interviewed did not know that they were encouraged by TVA management and policy to take nuclear safety concerns to the NSRS before taking them to the NRC. NUC PR responded that no corrective action was required as the information is given to employees during General Employee Training (GET). However, the GET courses contained no reference to NSRS. The NSRS contends that a GET course should include the stated TVA management policy concerning the NSRS and its role in employee concerns. This item remains open. See section VI.A.4 for details.

E. R-84-05-WBN-01, Definition of Responsibilities and Authorities for Administration of the STA Program

AI-2.16 had been revised to clearly establish the authority and duties for administering the STA program, as recommended by NSRS. This item is closed. See section VI.A.5 for details.

F. R-84-05-WBN-02, Station STA Training

The station Shift Technical Advisor (STA) training had not been completed. STAs were undergoing station training with September 1 as the projected completion date. This item remains open until the training is completed and the NSRS reviews the training records. See section VI.A.6 for details.

G. R-84-05-WBN-03, Annual STA Retraining

Formal records to indicate the status of retraining had been added to STA training records as recommended. This item is closed. See section VI.A.7 for details.

H. R-84-05-WBN-04, Certification of WBN STAs

Certification records had been placed in STA training files. This item is closed. See section VI.A.8 for details.

I. R-84-05-WBN-05, STA Plant Familiarization Walkthrough

The Engineering Section Instruction Letter was revised to upgrade the walkthrough portion of the STA program. This item is closed. See section VI.A.9 for details.

J. R-84-05-WBN-06, Divergence from the Intent of the STA Program to Provide a STA Corps Independent of Commercial Operations

AI-2.16 indicates that the primary responsibility of the STA on shift is the performance of STA duties. Administratively the NSRS concern has been satisfied. The STA program performance will be evaluated during the startup of unit 1. This item is closed. See section VI.A.10 for details.

K. R-84-05-WBN-07, Two-Party Verification For Fuel Loading

TI-1 has been revised to delineate "separate and independent parties" and the NSRS concern is satisfied. This item is closed. See section VI.A.11 for details.

L. R-84-05-WBN-08, High Density Fuel Storage Racks Attentenuation Testing

EN DES has yet to respond to the requested justification of the 15-percent sample size. This item remains open. See section VI.A.12 for details.

M. R-84-05-WBN-09, Surveillance Requirements for Changing Modes of Operation

Subsequent review and discussions with the WBN staff on their response indicated that the NSRS concern was adequately addressed by the present system. This item is closed. See Section VI.A.13 for details.

N. R-84-05-WBN-10, Workplan Quality Assurance (QA) Requirements

The NSRS had discovered discrepancies between Engineering Change Notices (ECNs) and workplans to implement the ECN. The site response to correct these discrepancies appeared adequate. Review of a limited number of workplans issued since June 25, 1984 did not reveal any discrepancies where the ECN was marked "QA" and the workplan was marked to indicate that "QA" did not apply. This item will remain open until more workplans are initiated and can be reviewed for compliance with the corrective action. See section VI.A.14 for details.

O. R-84-05-WBN-11, Workplan Functional Tests

The NSRS did not believe that adequate functional tests were being performed after workplan completion. The site response did not indicate any corrective action to be performed. Furthermore, a review of approximately ten workplans by the NSRS did not indicate any additional problems. This item will remain open pending a more detailed review of additional workplans to ensure that they contain instructions for functional tests (when required) or references to approved instruction. See section VI.A.15 for details.

P. R-84-05-WBN-12, Supplemental Information Added to Workplans

The NSRS review had discovered workplans with information added in ink without a date or initials. Review of workplans indicated that supplemental information added to workplans was being initiated by the responsible engineer and was being dated. This item will remain open until a more thorough review of additional workplans can be performed to ensure continued compliance. See section VI.A.16 for details.

Q. R-84-05-WBN-13, Plant Modifications Made by Use of a Maintenance Request (MR)

The NSRS reviewed an MR which appeared to be installing a plant modification, a practice which is not allowed. However, the MR in question was issued to install a temporary alteration in accordance with AI-2.15. The temporary condition was then made permanent by the issuance of an ECN. This item is closed. See sections VI.A.17 and VI.B.2 for details.

R. R-84-05-WBN-14, Inspector Certification Records

Inspection certification records were either not onsite or were incomplete. The site response indicated that an interactive computer system would be obtained to improve the certification documentation process. The response appeared adequate. This item will remain open until implementation of corrective action can be reviewed. See section VI.A.18 for details.

S. R-84-05-WBN-15, Material Inspection

The NSRS did not believe that inspection activities for plant modifications were equivalent to the plant construction inspections. The response to allow a cognizant individual to verify material in lieu of a QC holdpoint is unacceptable. In addition, the use of surveys by FQE to verify installation of material does not meet the requirements cited in NSRS report R-84-05-WBN. This item will remain open. See section VI.A.19 for details.

T. R-84-05-WBN-16, Records

The NSRS reviewer found that there was a problem with record retrieval. An As-Constructed Drawing Task Force is scheduled to review this problem in December 1984. Any recommendations made by the As-Constructed Drawing Task Force will be evaluated upon completion of the task force's review for identification and retrievability of CONST workplan records. Also, the site, with the aid of OQA, has implemented a record retrieval procedure. This item will remain open pending NSRS review of the procedural implementation. See section VI.A.20 for details.

U. R-84-05-WBN-17, Two-Year Review Cycle for Procedures and Instructions

The NSRS did not believe that the WBN procedure review program was adequate in that a successfully documented performance of an instruction was considered to be an instruction review. NUC PR stated they believed it met the intent of the review requirements but that once the QA reorganization was completed a response would be made by QA. NSRS believes that the NUC PR position is in contradiction to regulatory and corporate document requirements. This item will remain open until AI-3.1 is revised to comply with the requirements to upper-tier documents. See section VI.A.21 for details.

V. R-84-05-WBN-18, Field Quality Engineering (FQE) Review of Procedures and Instructions

A quality assurance program instruction (AI-3.1) had been written by FQE. The required FQE review of this instruction was performed by the same individual who had written it. The NUC PR response was basically correct. The NSRS position is that in the future FQE procedures and instructions should have the documented review performed by someone other than the author. This item is closed. See section VI.A.22 for details.

W. R-84-05-WBN-19, Operator Response to Critical Alarms Before Licensing

The NSRS did not believe that operator response to an alarm indicating water in the spent fuel pit was adequate. The operators were instructed on response to alarms. The NSRS is satisfied with this response to the concern. This item is closed. See section VI.A.23 for details.

X. R-84-05-WBN-20, Interface Study Report

The NSRS recommended that a new interface study be conducted. The plant disagreed. The NSRS was aware that the Interface Study Report was not the controlling document and described the controlling documents for interface control in its report. The NSRS found enough problems in the interface control to believe another study should be performed. The NSRS, however, considers the response to other unit interface control concerns at the plant to be adequate to consider this item also closed. See section VI.A.24 for details.

Y. R-84-05-WBN-21, Interface Hold Orders

The NSRS agreed with the statement made in the response. However, this statement did not address the NSRS concern. The NSRS noted several instances of test procedures not installing interface points that were recommended in the interface study report. Valves were closed but no interface control was used. Since the

NSRS review these points had been put under the interface control. The written response was inadequate but the actions were adequate. This item is closed. See section VI.A.25 for details.

Z. R-84-05-WBN-22, Marked-up Drawings for Interface Points

The NSRS had twice requested the shift engineer (SE) to find the interface drawings that were required to have been submitted to him. The SE searched his office and could not find them. From the response, the drawings were in the SE office and the problem appeared to be with the awareness of the SE and not with the preoperational section. The drawings are now in a well-marked book and at least two SEs are aware of the interface drawings. This item is closed. See section VI.A.26 for details.

AA. R-84-05-WBN-23, Interface Points in Unit 2 Reactor Protection Cabinets

NSRS recommended unit 2 reactor protection cabinet be transferred to NUC PR as was also recommended in the Interface Study Report. The plant responded that they had been. Upon further review, the NSRS discovered that the unit 2 SSPS cabinets had not been transferred. Some wiring inside the cabinets had been, but NUC PR did not have control of these cabinets. The transfer was made the week of August 20, 1984. This item is closed. See section VI.A.27 for details.

BB. R-84-05-WBN-24, Interface Review After Unit 1 Fuel Loading

The NSRS agreed that controls had been put in action to ensure that interface points will be properly established for the unit 1 fuel loading. However, the NSRS concern was with keeping them in place for the timeframe between unit 1 and unit 2 fuel loading (approximately two years). Due to the importance of the interface system to plant and personnel safety the NSRS continues to recommend that physical reviews of interface points be formally scheduled and accomplished on a periodic basis (at least every six months) after unit 1 fuel loading. This item remains open. See section VI.A.28 for details.

V. CONCLUSIONS AND RECOMMENDATIONS - NEW REVIEW AREAS

A. R-84-15-WBN-01, Preoperational Testing

Conclusion

The preoperational testing was being conducted by qualified personnel in accordance with established test instructions. Test instructions were adequate and administrative controls were being properly applied, but there were more deficiencies, changes to procedures, and inoperable equipment than would be expected with the optimum program as described in the upper tier documents

governing the testing program. A possible root cause that promotes these type of problems is the philosophy of testing as soon as possible any part of a system that can be tested even if much simulation is required. See section VI.B.1 for details.

Recommendation

To improve the quality and efficiency of testing activities NUC PR should assure that systems are essentially completed, checked out, and tested by QC prior to transfer. System operability and test instruction adequacy should be verified before conducting the formal testing activity. These actions should enhance compliance with the intent of upper tier governing documents.

B. Maintenance Activities

1. Instrument Maintenance

Conclusion

Implementation of the Instrumentation Section surveillance program was checked during this review by observing the performance of Surveillance Instructions (SIs). The activities associated with the conduct of the surveillance program appeared adequate. NSRS was concerned that there were many instrument maintenance surveillance instructions that must be corrected and performed before fuel load but site management was aware of the problem and was taking appropriate action.

2. Mechanical Maintenance

R-84-15-WBN-02, Storage of Maintenace Requests (MRs)

NSRS reviewed the MR process in the Mechanical Maintenance Section for compliance to procedural requirements. It appeared that MRs were being handled in accordance with those requirements. However, the NSRS reviewer did identify an item of concern involving MRs awaiting final review.

Conclusion

Completed MRs (awaiting final review) were being kept at the field quality engineering (FQE) reviewer's desk for up to three days without any precautions being taken to prevent possible damage to the documents or their loss. See section VI.B.2 for details.

Recommendation

MRs (and other quality-related documents) should be stored in a suitable environment to prevent possible damage or loss while awaiting final FQE review.

C. Conduct of Licensed Operations

1. R-84-15-WBN-03, Configuration Control and Independent Verification by Operations Section

Conclusion

The configuration control and independent verification procedures were adequate to maintain the required status of the plant systems. However, the execution of those procedures was lax and faulty. The actual status of some systems was not recorded and verified by the required checklists and signoffs. See sections VI.B.3.a and VI.B.3.b for details.

Recommendation

NSRS recommends that OSL-2A be reviewed with all operations staff in conjunction with the performance of SOIs, GOIs, and other plant procedures to maintain 100 percent control of system alignments.

NSRS recommends that AI-2.19 be reviewed with all operations staff to stress the requirements and importance of independent verifications of required equipment.

2. R-84-15-WBN-04, Shift and Relief Turnover of Operations Section

Conclusion

The shift and relief turnover procedure, AI-2.10, was adequate to maintain the transfer and flow of information between working shifts. The execution of this procedure was adequate between the AUOs and UOs. The turnover between the ASEs and SEs was inconsistent with requirements and needed improvements to comply with AI-2.10. See section VI.B.3.b for details.

Recommendation

NSRS recommends that AI-2.10 be reviewed with all operations staff to emphasize the requirements and importance of shift and relief turnover.

D. Reactor Safety and Criticality Controls

1. Fuel Handling Operations

Conclusion

Fuel handling and training were being accomplished in accordance with TI-2, "SNM Control and Accountability System." Preoperational testing was being used as a training function. Plant activities in this area appeared adequate. See section VI.B.4.a for details.

2. Reactor Safety Controls

Conclusion

The area of reactor criticality control reviewed for this report, involving a modification to the reactor protection system, was adequate. See section VI.B.4.b for details.

E. Chemistry Control

Conclusion

The implementation of the chemistry control program observed during the heatup phase to 250°F was adequate. Procedures and instructions were in place and were being followed by Chemical Unit personnel. Personnel training on Surveillance Instructions was continuing. See section VI.B.5 for details.

F. Health Physics

1. Operational Quality Assurance Branch (OQAB) Activites

Conclusion

The OQAB had performed an operational readiness review of the WBN radiological protection program at the request of WBN management. That review was effective in identifying problems in the radiation protection program in the area of health physics instrumentation and equipment, health physics staffing, and administrative controls. The plant health physics staff was actively addressing the problems identified by the OQAB review team. See section VI.B.6.a for details.

2. R-84-15-WBN-05, Field Quality Engineering (FQE) Activities

Conclusion

FQE checklists for surveillance of health physics activities had not been prepared, and surveillance of health physics activities had been minimal. Appropriate corrective actions had been taken by the health physics staff in response to Deviation Reports (DRs) written by FQE. See section VI.B.6.b for details.

Recommendation

FQE surveillance checklists should be prepared and surveillance scheduled during the fuel loading and startup phases of unit 1 to assure that the radiation protection functions are being performed in compliance with established program requirements and to determine the quality of that performance.

3. R-84-15-WBN-06, Health Physics Organization

Conclusion

The plant organization does not provide the plant Health Physics Section independence from line operational pressures and organizational flexibility to deal directly with all aspects of the plant health physics program. The reporting chain of the Health Physics Section supervisor is through the Operational and Engineering superintendent to the plant manager. See section VI.B.6.c for details.

Recommendation

NSRS recommends that the plant organization be revised to establish the reporting chain of the Health Physics Section supervisor directly to the plant manager.

4. Health Physics Section Staffing

The Operation Unit of the Health Physics Section was expected to be adequately staffed with well qualified personnel by the end of November 1984 to support the startup and operation of unit 1. However, as earlier identified by OQAB, the Technical Unit was still not staffed to perform the functions planned for that unit and could not support the startup and operation of unit 1. The plant staff was taking appropriate actions to make personnel selections to fill these positions. See sections VI.B.6.c and VI.B.6.d for details.

5. R-84-15-WBN-07, Health Physics Program Administrative Controls

Conclusion

Administrative controls had been provided to control radiation protection activities addressed by section 6 of the draft WBN Technical Specifications. The additional detailed procedures required to instruct the health physics staff in implementation of the health physics program were issued or would be issued in the immediate future. The Special Work Permit/Radiation Work Permit (SWP/RWP) program had only recently been significantly revised. See section VI.B.6.e for details.

Recommendation

As the RWP system is new and is the primary administrative system for controlling personnel exposure to radioactive materials and radiation, awareness seminars for the RWP program should be provided to the plant staff prior to the startup of unit 1.

6. Health Physics Instrumentation, Equipment, and Facilities

Conclusions

The WBN portable survey instrumentation and air samplers met the requirements as specified in the FSAR and the program for control of the instrumentation was adequate. Some other required equipment and facilities had not arrived onsite. The health physics staff was aware of these inadequacies and was expediting procurement of the equipment and final construction of the facilities. The required equipment not yet received that would significantly impact the health physics program are the TLD processing equipment and the C-zone supplies. Although not planned, TLD services could be provided by the Radiological Hygiene Staff (RHS) and C-zone supplies could be borrowed from other NUC PR facilities to support startup of unit 1. See section VI.B.6.f for details.

7. R-84-15-WBN-08, Health Physics Section Personnel Stopwork Responsibility and Authority

Conclusion

The health physics section personnel do not have sufficient authority to terminate an activity involving imminent danger conditions or situations. RCI-1 indicates that termination of an activity will be accomplished through the plant manager or his designated representative. See section VI.B.6.g for details.

Recommendation

The stopwork responsibility and authority statements in RCI-1 for imminent danger conditions should be revised to specify that health physics personnel have the responsibility and authority to stop work or order an area evacuated when, in their judgment, the radiation protection conditions warrant such an action and such actions are consistent with plant safety. It should be clear that only the Plant Manager, Health Physics Section supervisor, or their designated representatives on backshifts can overrule a stopwork action initiated by health physics personnel.

8. FSAR Description of the WBN Health Physics Program

Conclusion

The WBN FSAR did not accurately depict the planned WBN health physics program. The plant health physics staff initiated actions to review the respective sections of the FSAR and submit revisions as necessary before the end of the NSRS review. The NSRS will review the respective sections

of the revised FSAR at a later date to determine if it accurately depicts the implemented WBN health physics program. See section VI.B.6.h for details.

VI. DETAILS

A. Previously Identified Open Items

1. R-84-02-WBN-01, Noncompliance With TVA Commitments and NUC PR Requirements for GET Training

TVA is committed to Regulatory Guide (RG) 1.8, "Personnel Selections and Training," and ANSI 18.1, "Selection and Training of Nuclear Plant Personnel," through the TVA Topical Report. ANSI 18.1 states that all persons regularly employed in the nuclear power plant shall be GET trained. WBN AI-10.1 exempts plant superintendents and assistant plant superintendents from all initial training and retraining on GET (except GET 2 and 3). NSRS recommended that the exemption should be removed from AI-10.1 to be in full compliance with TVA commitments and NUC PR requirements or formal exemption to the commitments and requirements should be obtained.

WBN had not revised AI-10.1 to be in full compliance with TVA commitments nor had they requested formal exemption from established requirements. The WBN staff feels that they meet the intent of ANSI-18.1 in that the plant manager, assistant plant manager, and superintendents are, by virtue of their positions, knowledgeable in the areas of concern. The WBN staff feels that whether this knowledge is obtained through formal training courses or otherwise is not relevant. While this may be true, TVA has not taken formal exception to the requirements committed to by TVA for GET and is therefore subject to violation of commitments to the NRC in the event appointed plant managers or assistants do not receive the required training. This item remains open until the exemption is removed from AI-10.1 or formal exception is taken in all applicable documents.

2. R-84-02-WBN-02, Expansion of the FQE Survey No. 3QT(a)

The NSRS found that the FQE survey was not representative of GET training status, did not survey status of retraining, and the specified timeframe was inconsistent with AI-10.1. NSRS recommended that the survey checklist be expanded to better represent the overall status of compliance with AI-10.1. WBN had expanded the FQE survey to better represent the overall status of compliance with AI-10.1. A formal response from NUC PR denied part of the finding but from further NSRS review it was determined that the recommended changes had taken place after the intital NSRS review and before the writer of the response had reviewed the area of concern. This item is closed.

3. R-84-02-WBN-03, Problems With Scheduling and Recordkeeping Associated With the Health Physics and Security Bypass Examinations (GET 2.35 and 3.15)

There were indications that all six plant sections reviewed by NSRS were delinquent for the bypass examinations for health physics and security. The root cause appeared to be scheduling and recordkeeping. NSRS recommended that sufficient bypass examinations should be scheduled and/or the methodology for updating the "Train Report" should be adjusted to give credit for GET 2.35 and 3.15 when personnel take retraining courses in lieu of the bypass examinations.

The NSRS recommendations had been implemented as GET 2.35 and 3.15 were scheduled every Thursday and Friday of each week for the timeframe of July 2-September 28, 1984. Additionally, when retraining is successfully completed, the due dates for the bypass exams for health physics and security are now automatically updated. The formal NUC PR response did not address the concern raised by NSRS. This was possibly caused by the NUC PR review being made after corrective action had occurred. However, the plant actions were adequate for both NSRS recommendations. This item is closed.

4. R-84-02-WBN-04, Enhanced Employee Awareness of TVA's Policy on Expression of Staff Views and Preferred Methodology for Reporting Nuclear Safety Concerns

Employees selected at random and interviewed by NSRS were generally unaware of the TVA policy for expression of staff views and the preferred method for reporting nuclear safety concerns as defined in TVA Code II, Expression of Staff Views. NSRS recommended that training and retraining in the form of GET should be provided to all WBN employees to enhance their awareness of TVA's policy for expression of staff views and to ensure that they are aware of the preferred method for reporting nuclear safety concerns.

The plant response indicated that no corrective action is necessary as the information is given to employees verbally in GET-2.1 (HP) and GET-4 (QA and QC) classes as part of taped script with slide show. Slides 43 and 47 of the GET-4 presentation did address reporting adverse plant conditions to employee supervisors and the direct access to NRC but contained no reference to an internal system at the plant or to the NSRS. The instructor notes for GET-2.1 discussed this issue in a like manner. However, the employee responsibilities for reporting nuclear safety concerns along with the TVA preferred reporting methodology as defined in TVA Code II were not adequately addressed in GET-2.1 and GET-4. As the reporting of concerns is covered in GET it should be covered properly. This item remains open until the policy and preferred procedures defined in TVA Code II have been

adequately addressed in GET training and the procedures defining the process at the site are adequate.

5. R-84-05-WBN-01, Definition of Responsibilities and Authorities for Administration of the STA Program

The responsibilities and authority for administration of the STA program were not defined in any formal plant document other than the MAS goals of the Engineering Section and Reactor Engineering Unit supervisors. NSRS recommended that the authority and duties for administering the STA program be clearly established in AI-2.16, "Shift Technical Advisors."

AI-2.16 had been revised to clearly establish the authority and duties for administering the STA program as recommended by NSRS. This item is closed.

6. R-84-05-WBN-02, Station STA Training

None of the STAs had completed the Results Section Training, RST-26 "Station Shift Technical Advisor Training," at the time of the original review of this area. NSRS recommended that RST-26 training be completed prior to assignment of the STAs to shift duties for the first time.

RST-26 training had not been completed, although STAs were receiving the required training at the time of this NSRS review. The STAs were scheduled to complete the training by September 1, 1984. This item remains open until the training is completed and the NSRS reviews the training records.

7. R-84-05-WBN-03, Annual STA Retraining

At the time of the first review, all STAs were reported to be up to date with annual retraining requirements. However, no formal plant training records were available in the plant files that documented the up-to-date status. NSRS recommended that the formal plant training records should be maintained current to indicate the accurate status of the STA retraining.

Formal records (TVA 1453) to indicate the status of the STA retraining had been added to the STA training records. This item is closed.

8. R-84-05-WBN-04, Certification of WBN STAs

Certification records for only 6 of the 11 qualified plant STAs were in the plant training records at the time of the original review. NSRS recommended that certification records for all qualified STAs be added to the formal plant training records.

Certification records had been placed in the training records of the 11 qualified STAs. This item is closed.

9. R-84-05-WBN-05, STA Plant Familiarization Walkthroughs

The walkthrough portion of the STA training program had been conducted by AUOs. This was determined appropriate for certain portions of the walkthrough program but not appropriate for other portions. NSRS recommended that the STA walkthrough program be upgraded to require that SROs or qualified STAs be required to conduct walkthroughs for certain portions of the STA training program.

The follow-up review of this item revealed that ENSL-R4 had been revised to upgrade the walkthrough portion of the STA program as recommended. This item is closed.

10. R-84-05-WBN-06, Divergence from the STA Program to Provide a STA Corps Independent of Commercial Operation

The WBN STA program had diverged from the original NRC intent that a corps of trained and experienced STAs be available to provide independent operational and accident assessments. The original intent was that the STA would be independent from duties associated with commercial concerns for operation of the plant. All STAs at WBN perform the STA functions as a collateral assignment while having other assignments associated with commercial operation. NSRS recommended that the STAs assigned to shift coverage should be removed from any other duties other than those associated with that function.

The plant staff disagreed with the NSRS conclusion based upon the fact that recent NRC draft proposed rulemaking would replace the STA with a position that provides engineering expertise by requiring, on each shift, a person with primary management authority for integrated facility operations and engineering assessment expertise as well as plant operation knowledge and experience. They felt that the present NRC-proposed position did not perpetuate the idea of independence from commercial concerns.

NSRS agrees with the plant staff's position as it relates to the present NRC direction. However, it is clear that the STA assignment is a collateral assignment and that there is a possibility that the STA's performance in that capacity could be affected by conflicts with his primary work supervisor because of his unavailability to perform those functions he is normally responsible for when he is not assigned to STA shiftwork. As a result of these conflicts the performance of STA duties could be adversely affected.

AI-2.16 indicates that the STA primary responsibility while on shift is the performance of the STA duties and answering to the shift engineer. Therefore, administratively the NSRS concern has been satisfied. NSRS will monitor the performance of the STA program during the startup of unit 1. This item is closed.

11. R-84-05-WBN-07, Two-Party Verification for Fuel Loading

The follow-up review of this item with the Reactor Engineering Unit (REU) revealed that TI-1, "SNM Control and Accountability," had been revised to reflect the requirements of the N-OQAM for "Separate and independent parties" for verifying fuel transfers. The new revision defined the duties and responsibilities between REU and FQE. This item is closed.

12. R-84-05-WBN-08, High Density Fuel Storage Racks (HDFSR) Attentuation Testing

No additional information had been received to evaluate the technical justification for the 15 percent sampling rate of the attentuation test as requested in the earlier report. EN DES was requested to supply this information to the Site Director, but no response had been transmitted to either him or the NSRS. This item remains open..

13. R-84-05-WBN-09, Surveillance Requirements for Changing Modes of Operation

Information obtained during the follow-up review of this item with the FQE and Operations staff on the verification of surveillance requirements for changing modes of operation satisfies the NSRS concerns. The planning and scheduling section will comply with the requirements of changing modes by delineating the required SI performances by a schedule to be supplied to the Operations staff. This item is closed.

14. R-84-05-WBN-10, Workplan Quality Assurance (QA) Requirements

This finding dealt with a discrepancy between engineering change notices (ECNs) and workplans. During the review of workplans, ECN cover sheets were observed that were marked "yes" to "QA applies." However, the workplans were marked to indicate that QA did not apply. The NSRS recommended that these differences be resolved. The WBN site response indicated that all workplans would be reviewed for this discrepancy and would be corrected beginning June 25, 1984. The response appeared adequate. The NSRS reviewer examined a limited number of workplans initiated since June 25, 1984 and did not observe any further examples of problems in this area. However, this item will remain open until additional workplans are issued and can be reviewed for compliance with the corrective action.

15. R-84-05-WBN-11, Workplan Functional Tests

Section 5.2.1c.3g of AI-8.5 cited details of functional tests that the cognizant engineer should include, as applicable, in the instruction portion of the workplan. During a random review of workplans, it was observed that workplans

requiring functional tests did not appear to have sufficient details as required by the procedure for testing. The WBN response indicated that no corrective action was required. A review of approximately ten more workplans did not reveal any recurrences of this problem. This item will remain open pending a thorough review of workplans to ensure detailed instructions or references to approved instructions for functional tests are written in the workplan.

16. R-84-05-WBN-12, Supplemental Information Added to Workplans

This finding dealt with the concern that supplemental information had been added to workplans. There was no identification of the person who added the information nor was it dated to indicate when the information had been recorded. Since these additions to workplans were not dated, it could not be determined if the comments were added during the initial review cycle or later. The site's response to review all workplans to ensure that additions were identifiable and dated appeared adequate. Review of a small number of more recent workplans indicated that supplemental information was being initialed and dated by the responsible engineer. However, this item will remain open to allow a thorough review of workplans to ensure continued compliance.

17. R-84-05-WBN-13, Plant Modifications Made by Use of a Maintenance Request (MR)

This concern dealt with the site possibly doing modification work on an MR. Review of the information in the site's response indicated that information was acceptable and accurate.

MR 224689 had been issued to install a temporary alteration (TACF 1-84-11-271). This action was in compliance with AI-2.15, "Temporary Alterations." The temporary condition was then to be made permanent by the use of an ECN. No further examples of possible plant modifications using an MR were discovered. This item is closed.

18. R-84-05-WBN-14, Inspector Certification Records

This finding dealt with the fact that inspector certification records were not kept at the site. The document used to provide inspector certification was a monthly printout received from Power Operations Training Center (POTC). Problems existed with the printout. SQN had previously been cited by OQA with a deviation for not possessing a current list of certified inspection personnel. The problem also appeared to exist at WBN. The site responded to indicate an interactive computer system would be obtained which should improve the certification documentation process. This response appears adequate. This item will remain open until implementation of the corrective action can be reviewed.

19. R-84-05-WBN-15, Material Inspection

AI-8.5 stated that "the originator of the workplan shall ensure that the design, construction, installation, inspection, and testing of modifications meet quality assurance standards at least equal to those of the original CONST installation requirements." One requirement cited from the OEDC Quality Assurance Manual for ASME Section III Nuclear Power Plant Components (NCM) was that "all items shall be identified during manufacture and/or installation to facilitate control and maintenance of records." In CONST identification of items is accomplished by quality control (QC) inspectors' routine and required inspections of all items during fabrication and installation. At WBN, NUC PR allowed the user of the materials to verify correct identity before installation. The user of the material was determined to be the responsible craft. This practice appeared to violate the NCM requirement and Criterion X of 10CFR50 Appendix B. The following was the site response:

> N-OQAM, Part II, Section 5.3, Attachment 1, Paragraph I.H, allows a cognizant individual to verify material in lieu of a holdpoint; therefore, QC holdpoints have not been established for Section III installations. FQE had established an activity survey checklist in March 1984 which physically verifies the installation of material. This is performed on QA Levels I and II material which includes ASME Section III materials. The first performance of this survey (WB-AS-84-83) was March 21, 1984, prior to the NSRS review. Subsequent surveys will physically verify installation of materials, including Section III material, by revising the checklist to specifically reference ASME Section III material.

The following paragraphs detail the NSRS position that the response is inadequate.

(a) N-OQAM, Part II, Section 5.3, Attachment 1, paragraph I.H does allow a cognizant individual to verify material. However, paragraph 3.2 of this same procedure states, "A QC inspection program based on inspection by peers or cognizant engineers shall not be acceptable." These two statements are conflicting. However, the difference between a cognizant individual and cognizant engineer is not clear. It appears to NSRS that the requirement stated by paragraph 3.2 is the proper method to be utilized for a QC inspection program.

(b) From an interview with the FQE supervisor, it appeared that the survey, WB-AS-84-83, was not performed on a scheduled interval, but only a random basis. Even

having FQE do a scheduled survey of material traceability would not satisfy the NCM requirement that all items shall be identified during installation. Also review of the completed survey indicated that material issue only was observed and page 5, item IV, of the survey documents that FQE did not physically verify installation of materials.

The site response is unacceptable since it does not appear to implement the minimum requirements outlined in report R-84-05-WBN. This item will remain open.

20. R-84-05-WBN-16, Records

Workplan activity may be performed by CONST or NUC PR. If the activity is accomplished by CONST, then all the inspection documents are stored in the CONST records vault. Review of CONST inspection records indicated that documents may possibly not be readily identifiable and retrievable. The response submitted by NUC PR assigned the task of reviewing workplan records to the As-Constructed Drawing Task Force. The task force will evaluate the identification and retrievability of CONST workplan records and make recommendations as appropriate. Also, OQA is working with WBN in the preparation of a retrieval instruction. The implementation of that procedure will be reviewed during the next review. This item will remain open until NSRS determines the implementation of the procedure and adequacy and implementation of recommendations made by the task force.

21. R-84-05-WBN-17, Two-Year Review Cycle for Procedures and Instructions

The NSRS recommended that the plant level document for controlling the review of procedures and instructions, AI-3.1, "Plant Instructions - Control and Use," be put into compliance with the upper tier controlling documents. NUC PR responded that they disagreed with this item. They also stated that the requirement was being discussed with Quality Assurance and that the discussion could be resolved after the reorganization is complete.

The NSRS still believes this is a valid concern. AI-3.1 is not in agreement with NRC Regulatory Guide 1.33, "Quality Assurance Program Requirements," ANSI N18.7-1976/ANS3.2, "Administrative Control and Quality Assurance for the Operational Phase of Nuclear Power Plants," nor N-OQAM, Part II, Section 1.1, "Document Control." AI-3.1 allows a successfully documented procedural performance to substitute for the required two-year review and this is in direct contradiction to all upper tier documents. This item will remain open until AI-3.1 has been revised to comply with the respective requirements of R.G. 1.33, ANSI-N18.7-1976/ ANS-3.2, and the N-OQAM and until a two-year review requirement independent of successfully documented procedure performances has been implemented.

22. R-84-05-WBN-18, Field Quality Engineering (FQE) Review of Procedures and Instructions

The NSRS recommended that in the future, FQE procedures and instructions that implement quality assurance requirements and that are written by FQE should have the documented review performed by someone other than the original author. NUC PR stated in their response that the OQAM (Part III, Section 1.1, April 11, 1984) does not require an independent review for OQAM, DPM and ID-QAP implementation and that the independent review referred to in paragraph 4.4.3.1-b of the OQAM is the PORC review.

NUC PR is correct in its response that what is required is a review and concurrence by FQE to assure that plant instructions correctly implement the division quality assurance program. However, that is not the issue. The NSRS does not believe that a review and concurrence of a procedure by the person who wrote it initially and subsequently revised it is appropriate. It violates the basic concept of quality control, that is, verification of an activity by a person other than the one who performed it.

The NSRS position is that in the future, FQE procedures and instructions should have the documented review performed by someone other than the author. This item is closed.

23. R-84-05-WBN-19, Operator Response to Critical Alarms Before Licensing

The NSRS recommended that Operations personnel should be made more aware of the potential problems associated with ignoring alarms initiated during construction and testing phase of plant life. The incident which brought up this item was a water level alarm in the spent fuel pit to which Operations did not respond until the covers were removed from the pit for a surveillance instruction to be performed on a radiation monitor. NUC PR replied that a letter had been sent to all Operations personnel emphasizing the point that certain alarms must be responded to even before fuel loading. Based on this letter, this item is closed.

24. R-84-05-WBN-20, Interface Study Report

The NSRS recommended that the report be updated or a new study conducted, that the preoperational test director and engineer be trained in the interface program, that the interface coordinator be more active in the interface program, and that the interface log be reviewed against the preoperational tests.

The NUC PR response stated that "the 1980 Unit Interface Study was performed to be a study and was not intended to be the controlling document for interface." It went on to

describe all the controlling documents. These controlling documents were also described in the NSRS report. The response then described the periodic training and the test that test engineers must pass. This had also been described in NSRS Report No. R-84-02-WBN and had been noted by the NSRS as a commendable response to NRC findings.

The NSRS made the recommendation because of the problem that it had identified in reviewing the interface program. The official response did not address several of the recommendations that had in fact been followed by the interface coordinator. He had become more active in his role, the log had been compared with the test procedures, and interface points had been installed in several preoperational test procedures by the use of change sheets. The written response stated that:

> The periodic reviews of the interface points by the interface coordinator show that the interface points are correctly established at this time.

In fact, the NSRS found this to be the case on its follow-up review but not so during the initial review. This item is closed based upon the site activities, not upon the formal reply.

25. R-84-05-WBN-21, Interface Hold Orders

The NSRS recommended that test procedures should be reviewed for instances where hold orders should be applied to control interface points. During the review the NSRS had noted that the Interface Study Report had listed valves to be closed for interface points. These valves had been closed in the test procedure but were not shown as interface points.

NUC PR responded that: "For all interface points that had been established at the time of the NSRS audit, hold orders or TACFs had been installed in accordance with AI-1.6." This statement was true but it did not address the NSRS recommendation. The NSRS report stated that valves were closed which should have had interface controls on them but they had not been properly identified in the test procedure and controlled as interface points.

When the NSRS reviewed this area again, it was determined that change sheets had been written for preoperational test procedures to establish these already closed valves as interface points by using the interface hold order as the control mechanism.

The NSRS felt that the written response did not address the issue raised but that activity at the plant was adequate. This item is closed.

26. R-84-05-WBN-22, Marked-up Drawings for Interface Points

During the R-84-05-WBN review the NSRS attempted to verify that marked-up drawings for interface control points were given to the shift engineer as required by AI-6.1. The NSRS reviewer looked through the TACF and Hold Order (HO) Log Book in the SE's office on April 5, 1984, and found only one drawing. On a second trip to the SE's office on April 6 the SE was asked to find the drawings. He said that the one drawing was the only drawing available. On a third trip to the SE's office, also on April 6, the SE performed a thorough search of the office and could not locate any other drawings that had been supplied by preoperational test engineers to show interface points. The NSRS recommended that marked-up drawings for each set of interface points be submitted to the SE.

NUC PR responded that: "Apparently, the shift engineer only showed the NSRS inspector one print on which an interface point had just been established." Also, the response stated that the book that holds these prints had been labeled more clearly and a review had been made of drawings to ensure that all interface points were marked.

During the NSRS follow-up, two shift engineers were asked for the interface TACFs and HOs and both of them knew without being asked that a set of drawings went with them and where these drawings were located. The book with these drawings was distinctively labeled and was on the top slot in a drawing rack next to the SE desk. Three minor deficiencies were noted in the drawings and reported to the interface coordinator for correction. This item is closed.

27. R-84-05-WBN-23, Interface Points in Unit 2 Reactor Protection Cabinets

The NSRS recommended that the Solid-State Protection System (SSPS) output cabinets for unit 2 be transferred to NUC PR. This was recommended in the Interface Study Report because wire lifts and jumpers had been installed in the output cabinets of this system. NUC PR responded that these cabinets had been previously transferred as a direct result of the interface study. During the NSRS follow-up, it was determined that the unit 2 SSPS cabinets had not been transferred to NUC PR but that some of the internal wiring had been. The reason for transferring the cabinets was to allow them to be controlled by NUC PR. During this latter review, the SSPS cabinets for unit 2 were transferred to NUC PR. This item is closed.

28. R-84-05-WBN-24, Interface Review After Unit 1 Fuel Loading

Since there would be two years between fuel loading for unit 1 and unit 2, the NSRS recommended that periodic physi-

cal reviews of interface control points be made during this two-year period. At the time of the NSRS review upper plant management was in agreement with NSRS on this item even though there was no regulatory requirement for periodic reviews of interfaces. The NSRS stated in the details of the report that administrative controls for installing and controlling interface points seemed adequate if these controls were implemented as described. Also from the NSRS report:

> The interface program coordinator in the Preoperational Test Section stated that he had committed to plant management that a walk through of the physical interface control points would be conducted two weeks prior to fuel loading.

This was noted in the NSRS report and accepted as a good idea.

NUC PR responded to the recommendation that:

> An activity has been added to the project schedule for all interface points to be reverified prior to fuel loading for unit 1. This 100-percent verification, coupled with the normal controls placed on all hold orders and TACFs as shown in the plant administrative instructions, is felt to be adequate to ensure that the unit interface points have been properly established and are in place for unit 1 fuel loading.

NSRS agrees that the planned NUC PR actions are appropriate and should ensure that a proper interface is installed for fuel loading of unit 1. However, the interface will become more important to personnel and plant safety after unit 1 is operational. Unit 1 operation can adversely affect unit 2 construction and testing activities, and unit 2 activities can adversely affect unit 1 operation. The NSRS concern was with keeping the interface in place after unit 1 is operational. Due to the importance of the interface system to plant and personnel safety the NSRS continues to recommend that physical reviews of interface control points be formally scheduled and accomplished on a periodic basis (at least every six months) after unit 1 fuel loading and subsequent operations. This item remains open.

B. New Review Areas

1. Preoperational Testing

For background information, a description of the preoperational testing program and its controlling documents will be outlined.

NRC Regulatory Guide 1.68 (R.G. 1.68), "Initial Test Programs for Water-Cooled Nuclear Power Plants," Revision 7, 1978, is the controlling document for the preoperational test program.

R.G. 1.68 states:

> Preoperational testing, as used in this guide, consists of those tests conducted following completion of construction and construction-related inspections and tests, but prior to fuel loading, to demonstrate, to the extent practical, the capability of structures, systems, and components to meet performance requirements to satisfy design criteria.

Appendix A, "Initial Test Program" to R.G. 1.68 states:

> To ensure valid test results, the properational tests should not proceed until the construction of the system has been essentially completed.

ANSI N18.7-1976/ANS 3.2, "Administrative Controls and Quality Assurance for Operational Phase of Nuclear Power Plants" states:

> The preoperational testing program shall demonstrate, as nearly as can be practically simulated, the overall integrated operation of plant systems at rated conditions, including simultaneous operation of auxiliary systems.

N-OQAM, Part II, Section 4.1, paragraph 6.4 states:

> Each system or subsystem should be tentatively transferred in sufficient time to permit a period of pretest checkout before the formal test. The power plant operations section should operate the system in as many modes as possible during the pretest checkout period. Such operation shall be coordinated with the NUC PR test director. Where possible, this operation should include practice runs of the system utilizing the approved test instruction to identify weaknesses in the instruction.

Paragraph 6.5 of the same document states:

> The NUC PR test director, with the advice of the CONST test representative, shall recommend conduct of the test when he is assured that the installation status of the system is adequate for conduct of required testing activities.

Area Plan 1104.01, "Test Staff Program Manual - Preoperational Test Program," and AI-6.5, "Procedure for Initial Operation, Testing, and Transfer of Equipment and Auxiliaries" are implementing procedures and are generally in agreement with higher tier documents.

AI-6.5, section 3.10, defines hot functional testing as follows:

> For purposes of this instruction, hot functional testing is defined as beginning when the CONST Project Manager and the NUC PR Plant Manager authorize, by signature, the conduct of the preoperational test involving the initial reactor coolant system heatup to operating temperature.

In the hot functional test the primary system is brought up to operating temperature using heat from the operation of the reactor coolant pumps and pressurizer heaters but not from nuclear reaction.

In August 1983 the WBN hot functional tests (HFT) were completed. Because of deficiencies encountered during the testing it was decided that a second hot functional test, to be called the mini-hot functional test (MHFT), should be performed. The MHFT was begun in August 1984. The NSRS reviewed the MHFT and observed all plant sections as they operated within the context of simulated plant operation.

At the time of the first HFT it was known that several systems were incomplete but it was thought that these items could be tested during initial startup, which is a common practice. These systems include the Steam Generator Blowdown System, the Auxiliary Feedwater System, and some incore thermocouples among others.

For the mini-hot functional test, the NSRS observed portions of the following preoperational tests being performed:

a. W-1.1, <u>Heatup for Hot Functional Test</u>

   This test forms the framework for conduct of several other preoperational tests as well as being a test in itself. It is the controlling document for bringing the plant from ambient conditions up to no load operating temperature and pressure (557°F and 2235 psi respectively). The test had been performed in its entirety for the first HFT. For the MHFT a lengthy change sheet was written to incorporate only sections of the test that had to be repeated. This change sheet was used for test conduct.

   The NSRS noted no problems in the conduct of W-1.1. Everything was handled as required by controlling

documents. The test procedure, the test log, change sheets and test exceptions and deficiencies were reviewed and found satisfactory.

b. W-1.2, Hot Functional Testing

Hot functional testing was a continuation of TVA-1.1, "Heatup for Hot Functional Testing." The same engineers were conducting W-1.2 as were conducting W-1.1 and their performance continued to be acceptable.

c. W-1.7, RCS Thermal Expansion and TVA-23B, Thermal Expansion of Piping System (Feedwater Piping)

These preoperational (preop) tests were observed by NSRS at the 150°F plateau. The tests appeared to be performed in accordance with the test instructions. In addition to preoperational test engineers, the test director was assisted by an Engineering Design (EN DES) representative onsite while the preoperational tests were being conducted. It appeared to NSRS that the presence of an onsite EN DES representative enhanced the performance of the tests. Steamfitter craftsmen were assigned to collect data readings. The document used by the steamfitters to record data identified: (1) the temperature at which the readings were taken, (2) the support checked, (3) movement readings, and (4) time data recorded and data recorder. With the exception of one steamfitter, the craftsmen assigned to this task were cognizant of their duties. After a discussion among the craftsmen during lunch of the first day of testing concerning the method used to take the measurements, the test director was asked to explain the method. It was then determined that the one craftsman had misread all the data points taken by him up to that time. Before this person was allowed to continue collecting data, he was reinstructed by the test director on how to properly take movement readings. After reinstruction, the craftsman repeated all the measurements that had been taken prior to that time.

During review of the test instructions, the results of the thermal expansion test performed as a part of the previous hot functional test were reviewed. Review of the results by NSRS revealed a minor item of concern. Deficiencies from the previous thermal expansion test had been properly documented and submitted to EN DES for resolution. EN DES response indicated that some hangers would be modified. However, the reply memorandum did not identify the engineering change notice (ECN) that would control the modifications. In this instance the EN DES person who handled the deficiencies was the onsite representative during the second thermal

expansion test and was able to communicate this information to the test director. It appeared to NSRS that this needed information should have been included in the EN DES reply memorandum instead of relying on verbal means as a proper method of communicating information. The EN DES representative was apprised of this condition from conversation between the NSRS reviewer and the test director; however, no proposed corrective action was decided upon.

d. TVA-1, Shield Building Inleakage Tests, Emergency Gas Treatment System Functional Tests

The portion of this test dealing with shield building inleakage was observed. Administrative controls for the test were being implemented properly, and the engineers conducting the test appeared competent. This test had been conducted earlier in the year and after much effort to seal leaks, an acceptable rate of inleakage was achieved. Prior to the actual conduct of this test during this review, several days were spent again attempting to seal leaks before an acceptable inleakage rate could be achieved. The NSRS reviewer watched while several leaks were sealed. These leaks were either caused by deterioration of materials, accidental damage, or willful damage. The test engineers stated that they believed several leaks around piping boots were obviously damage-induced but how the damage occurred could not be determined. The NSRS reviewer agreed with the engineers since there were clean breaks and cuts. While monitoring this test performance, the general condition of equipment inside the protected area was observed. Several problems were noted:

(1) There was a pigtail with broken flexible conduit on annulus vacuum fan 1A.

(2) The boots around the containment penetrations for main steam and feedwater had leaks, some of which appeared to be caused by people climbing and one which the preoperational test engineer said appeared to be a cut by a sharp object.

(3) In the north steam valve room, the conduit to a valve motor was broken. The valve number was not determined.

(4) An instrument sensing line for a flow transmitter associated with annulus vacuum fans was badly bent.

These items were noted in a short time of observation and could mostly be attributed to personnel working in

the area to complete construction or to perform maintenance. NUC PR realized this problem existed and was implementing a program to control the number of workers in the protected area.

e. TVA-22, Auxiliary Feedwater System

Portions of this test were observed by the NSRS while the reactor coolant system was at 557°F. The test director appeared competent, the procedure was adequate, and all administrative controls were being implemented. FQE personnel were monitoring this test and appeared thorough in their work. The NSRS did note that deficiency number (DN) 195 was written against the test during the activities being monitored. Most of the deficiencies were equipment and system failures. Also, there were 86 change sheets associated with this test procedure. Many of these changes were to accommodate plant conditions that could not be predicted by the test director before the test conduct began. (A level IV violation had been written against this test by NRC during the first HFT, but the conduct of the test this time did not appear to violate any procedural requirements.)

f. TVA28, Sampling System

The sampling system test attempts to prove that certain important systems can have samples taken for analysis during all operational conditions. The NSRS monitored the test conduct. The test engineers appeared competent, the procedure adequate, and administrative requirements handled properly. The test itself could not be performed at the time of the observations because of leaking isolation and bypass valves for sampling. MRs were written to correct the deficiencies in the valves.

g. TVA-29, Steam Generator Blowdown System

The NSRS attempted to review activities associated with this system, but equipment problems prevented the test from being performed. This system was required for secondary side chemistry control and had been used for this during the first HFT and was being used for this purpose during the MHFT, but the system was not in a testable condition during the MHFT because instrumentation was not operating properly. The Instrument Maintenance Section calibrated and loop-checked the instrumentation and it was in proper functioning order; but it was later discovered that instrument sensing lines were incorrectly routed, slopes were incorrect, there were some wires incorrectly terminated, and air was in the lines. Since the NSRS review, a problem had developed with the system's pumps. The problem was still under investigation by NUC PR.

From the observations made by the NSRS during the MHFT it was concluded that the MHFT testing was being conducted by qualified test directors in accordance with established test instructions. However, it appeared that optimum quality and efficiency had not been achieved during testing activities as evident by the number of deficiencies, change sheets, and inoperative equipment associated with TVA-22 and -29. The conduct of TVA-22 and -29 did not appear to comply with the intent of the respective regulatory guides, ANSI standards, and the N-OQAM in that there was a marked difference between the upper tier guidance of "pretest checkouts," "practice runs . . . to identify weaknesses in the instructions" and "construction tests . . . satisfactorily completed" and the actual field testing experience of 195 deficiencies and 86 required changes to the test instruction for TVA-22 and the inoperable equipment associated with TVA-29. TVA-22 was only one example of a test with many deficiencies and change sheets.

A possible root cause that promotes the type of problems encountered with TVA-22 and -29 is a philosophy of testing as soon as possible any part of a system that can be tested even if much simulation by means of wire lifts and jumpers is required. This philosophy encourages the transfer of systems before construction is essentially complete. The potential for this problem was identified in NSRS report No. R-81-28-WBN, Mini-Management Review, conducted from November 16 through December 4, 1981, wherein it was noted:

> There is potential for problems caused by systems being transferred before completion.

And later:

> The scope of work being conducted under these circumstances opens the way for a potential loss of control of the work function especially as it involves quality-related activities. CONST has continued to transfer systems to NUC PR with hundreds of open items. The systems are transferred in this configuration to meet the present schedule. If the schedule is unrealistic, this method of meeting the schedule may increase the potential for the performance of non-quality work . . .

At that time there were 8000 items on the Outstanding Work Item List. These were on systems that had been transferred to NUC PR but the work was to be completed by CONST.

To improve the quality and efficiency of preoperational and noncritical systems (ICS) testing, NUC PR should assure that systems are essentially completed, checked out, and tested by construction prior to transfer. System operability and test construction adequacy should be verified before conducting the formal testing activities. These actions should enhance compliance with the intent of the upper tier documents governing these activities and result in a better quality testing program.

2. Maintenance Activities

During this review the control of the mechanical maintenance activities by the MR system was evaluated to determine the degree of compliance with established requirements. Additionally instrument maintenance activities were observed to evaluate performance of Surveillance Instructions, to determine the status of the preparation of required Surveillance Instructions, and to assess the qualifications of instrument maintenance personnel. The results of the NSRS activities in these areas are detailed as follows:

a. Mechanical Maintenance

AI-9.2, "Maintenance Program," was the administrative instruction that established the method and responsibility for initiating, planning, scheduling, performing, tracking, and documenting maintenance at WBN. This instruction applied to all maintenance work, including preventive maintenance.

Paragraph 5.3 of this administrative instruction gives a description for the information needed on an MR.

Approximately 90 MRs assigned to the Mechanical Maintenance Section were reviewed for compliance to procedural requirements. It appeared that MRs were being handled in accordance with stated requirements.

Paragraph 5.1 and item 14 of paragraph 5.3 of AI-9.2 stated that modifications could not be made on maintenance requests. During the NSRS examination of MRs, one maintenance request (A-400922) reviewed had work instructions that appeared to be a modification. The instructions required temporary cooling water supply and drain lines be installed on "B" auxiliary feedwater pump inboard and outboard bearing housings. The NSRS reviewer talked with the MR originator concerning this particular maintenance request. The MR originator contacted the responsible engineer and learned that TACF 1-84-125-3 had been written to control this tempo-

rary alteration (TA). A check of the SE logbook revealed that the TA was valid for this work. However, the TA number had not been recorded on the maintenance request causing continuity of information to be lacking. It appears to NSRS that when maintenance requests are used to install a temporary alteration then the TA should be recorded on the MR. This would allow cross reference between the documents.

Item 30 of paragraph 5.3 (AI-9.2) required that field quality engineering (FQE) perform a review of "entries for CSSC corrective maintenance in a timely manner to ensure the format and contents are in compliance with plant quality assurance requirements." NSRS observed that MRs that had been completed with the exception of the FQE review were being kept at the reviewer's desk for up to three days without any measures being provided to prevent possible damage to the documents or their loss. These documents are one-of-a-kind records which contain needed information. An interview with the FQE supervisor revealed that their document review responsibilities would probably increase in the future and thus the time to review them. If present conditions continued, the result would be more records being retained at the FQE unit without protection from possible damage or loss. It is the NSRS conclusion that these records should be placed in a fire-rated storage cabinet while awaiting this final review. As a minimum, this would guard against records being lost or destroyed, which would require a recreation of those records. This may be a generic problem which could apply to all QA records.

b. Instrument Maintenance

During this review an NSRS team member observed the conduct of Surveillance Instruction SI-3.1.12II, "Pressurizer Pressure Protection Set II." The SI was being conducted using a temporary change to an instruction. A problem was encountered with a transmitter and an MR was written to recalibrate the transmitter. Everything associated with the conduct of the SI appeared adequate. In an interview with management it was determined that the SIs were being performed with temporary changes or on an MR as unofficial performances to get problems corrected. The MMFT was being used as a framework for performance of the SI.

From a presentation by plant management to the NRC on August 16, 1984, it was determined that there was a total of 546 SIs for WBN. Of these, 110 were not yet written and approved by PORC, with about one-half of these being Instrument Maintenance SIs, of which all but 6 were drafted and in the review process. At the

same presentation it was stated that there would be 1271 total instructions at WBN with 126 left to run.

At that time the NSRS was concerned that there were many SIs to be performed and only two months to perform them before the scheduled October 11 fuel loading date. The fuel loading schedule slippage has reduced some of the pressure for completion of the SIs and thus the NSRS concern.

The NSRS interviewed approximately 25 personnel in the Instrument Maintenance Section. These people included instrument mechanics, senior instrument mechanic foremen, general foremen, engineers, and other management level personnel. These people all appeared competent. Several changes in management personnel in the last six months were noted by the NSRS. In reviewing the individual's experience, all management personnel met the requirements of ANSI N18.1-1971, "Selection and Training of Nuclear Power Plant Personnel," which requires a high school diploma and four years experience in the craft to be supervised.

3. Conduct of Licensed Operations

a. Configuration Control and Independent Verification by Operations Section

During the performance of the MFHT the Operations crew shift activities were observed by NSRS. The observations included the performance of System Operating Instructions (SOIs), General Operating Instructions (GOIs), and shift/relief turnover between operations staff. These plant procedures were reviewed to the Standard Practice Manual and the Administrative Instruction Manual for compliance regarding the authority and duties for performing activities affecting the safety functions of structures, systems, and components.

Three SOIs were reviewed and their implementation observed. The SOIs were SOI, 62.1, "CVCS - Charging and Letdown;" SOI 68.2, "Reactor Coolant Pumps With Appendix A;" and SOI 74.1, "Residual Heat Removal System." Also, the implementation of GOI-1, "Plant Start-up From Cold Shutdown to Hot Stand-By" was observed.

Deviations from the SOIs were necessary due to the requirements of the MHFT program. The systems were in an alignment that would not necessarily be found during normal operation. The configurations were controlled by the SOI valve checklist and the configuration control log. The position of any valve could be found on

the valve checklist or log. The log provided the control for deviating from the valve checklist for a test condition or unusual alignment. The instruction to provide guidance for maintaining system status was OSL-A2, "Maintaining Cognizance of Operational Status."

The MHFT also required deviations from the GOIs to perform tests. While the SOIs supported the GOIs, the unit assistant shift engineer (ASE) and unit operator (UO) would maintain entries in the log books to indicate the current conditions and system status that differed from the GOIs.

A licensed senior reactor operator (SRO) was assigned to the MHFT to coordinate the testing with the MHFT preoperational test director in the control room. This SRO maintained the configuration control log and the completed valve checklists which were kept in the main control room.

The NSRS team performed a survey of the valve positions on the Residual Heat Removal system (RHR) for verification against the valve checklist and the configuration control log. One valve was found out of position when the "as-found" position was compared with the valve checklist and configuration control log.

The SRO acknowledged the valve position could be improperly noted by the paperwork, but not in an improper position for the current alignment. The SRO did know the required position versus what was recorded, and the paperwork was corrected.

Subsequent to the valve position survey, a survey of independent verifications was made on the RHR, CVCS, and RCS by checking the completed paperwork. Three two-party verifications had incomplete signoffs. AI-2.19, "Independent Verification," states in section 5.8:

> Independent verification is the determination by two separate individuals that a function has been accomplished as required. It is the policy at Watts Bar that these two individuals may verify the action at the same time, that is, may travel about the plant together or at different times. It shall be stressed that when traveling together each individual must verify the action. For example, if an independent verification must be made that a manual valve is open and the valve is in remote location that requires climbing a ladder, both individuals must climb the ladder to verify the valve is open. One

person going up and calling down to the other that the valve is open is unacceptable.

A discussion of these discrepancies with the FQE supervisor revealed that an inhouse survey by FQE was in progress. The FQE survey was being performed to identify any configuration control and independent verification problems. As a result of the FQE surveys two corrective action reports (CAR) were issued. WB-CAR-84-38 addressed the failure of the Operations Section to perform independent verification per AI-2.19. WB-CAR-84-39 addressed the failure of the Operations section to maintain configuration control. The FQE surveys revealed an average of 6.4 percent errors in configuration control and independent verification entries for the systems sampled. The errors involved wrong valve positions and incomplete verifications. The SROs took immediate action to correct the discrepancies identified to them. The Operations supervisor was planning to have meetings with the staff to stress the necessity of maintaining complete configuration control and documenting independent verifications to comply with the FQE corrective action requirements.

b. Shift and Relief Turnover of Operations Section

The shift and relief turnover of the Operations staff was observed on several occasions during the MHFT. The assistant unit operator (AUO) turnover was good with the exchange of technical information and current system status being made. The oncoming shift AUO appeared to receive a total update from the face-to-face turnover from the offgoing shift AUO. The unit operator (UO) turnover was good with the review of the current status and logs of prior events. However, some of the ASE and SE turnovers were not adequate to meet the requirements of AI-2.10. Some ASEs and SEs were not present for the oncoming shift turnover, so in some cases the only turnover was in the logs.

AI-2.10, "Shift and Relief Turnover," defines the manner and minimum information required to pass between oncoming and offgoing shift personnel.

The observed inadequate shift turnovers were discussed with the Operations Section supervisor and assistant supervisor. The supervisor said that AI-2.10 requirements would be discussed with all Operation staff assigned to shift work and would be complied with prior to fuel loading.

4. Reactor Safety and Criticality Controls

a. Fuel Handling Operations

No substantial fuel handling had occurred since the NSRS phase II review. A complete fuel inventory and audit was being performed during the last review by the NSRS (phase III review). All activities observed were conducted according to Technical Instruction TI-2, "SNM Control and Accountability System," with no observed discrepancies.

Preoperational tests were conducted on the fuel handling tools and fixtures necessary for core loading operations during the current NSRS review. The preoperational test W6.1, "Fuel Handling Tools and Fixtures" was reviewed and found thorough, detailed, and complete as a preoperational test. The test actually utilized new fuel to verify operability of all tools and fixtures. Several Operations personnel were involved in this test for familiarization with the equipment.

Selection and training of fuel handling operation crews was to have begun shortly after the NSRS review was completed.

b. Reactor Safety Controls

The Phase II review identified NRC Information Notice 83-18, "Failures of the Undervoltage Reactor Trip System Breakers," which required a modification to the reactor protection system (RPS). The required modification had been made per Work Plan 4336.

Electrical Maintenance Instructions, Surveillance Instructions, and Operating Instructions were reviewed to verify the incorporation of the modification into procedures necessary for fuel loading. The modification met the requirements of Information Notice 83-18 and should satisfy the NRC's concerns.

5. Chemistry Control

Prior to and during the heatup phase to 250°F of the hot functional test, NSRS observed the WBN chemical unit activities while analyzing and adjusting the primary and secondary chemistry parameters to within specifications listed in preoperational test procedure W1.1 and TI-16, "Plant System's Sampling and Chemical Criteria." The analyses were conducted in accordance with established technical instructions and results recorded on official log sheets for each system. Parameters such as dissolved oxygen in the primary system and Ph, copper, and dissolved oxygen in the secondary system were initially out of specifications, which is not

uncommon during system heatup from shutdown conditions. The heatup was restrained until various parameters were adjusted and the plant chemical unit took appropriate corrective actions to adjust the specified chemical concentrations to within specifications.

During the performance of preoperational test W1.1 to the 250°F plateau, NSRS observed that there was an apparent breakdown in the communications between the test director and the chemical laboratory personnel which caused some delays in the heatup process. It appeared that the shift chemical laboratory personnel were not being informed of the progress of the test and were thus not prepared for the addition of chemicals and the preop test required analyses when various plateaus were reached. This observation was discussed with the Chemical Unit and Preoperational Test Unit supervisors. Those supervisors indicated that the information interface between the two units would be improved.

It was noted during the review that the Chemical Unit supervisor had initiated a formal program to ensure that all of the radiochemical laboratory analysts were trained on all Surveillance Instructions that they would be required to perform. The status of this training was being tracked by the supervisor via a matrix which clearly illustrated the training progress of each analyst. This practice should enhance the quality of the Chemical Unit surveillance program.

6. Health Physics

The WBN health physics program was assessed by NSRS to determine its readiness for fuel loading, initial criticality, operation, and an unplanned outage. The assessment consisted of discussions with site, plant, NUC PR Central Office (NCO), and Operational Quality Assurance Branch (OQAB) personnel along with review of regulatory, TVA corporate, NUC PR, and WBN documents. The following areas relating to the WBN health physics program were assessed:

- OQAB Activities
- WBN FQE Activities
- WBN Health Physics Organization
- WBN Health Physics Qualifications and Staffing
- Health Physics Program Administrative Controls
- Health Physics Instrumentation, Equipment, and Facilities
- Health Physics Section Personnel Stopwork Responsibility and Authority
- FSAR Description of the WBN Health Physics Program

The results of the assessment are detailed as follows:

a. OQAB Activities

The WBN plant management had requested the OQAB to perform an operational readiness review of the plant's radiological protection, radwaste control, and radiological emergency planning programs. The review was performed the week of June 18, 1984, by a three-member team consisting of personnel with professional health physics experience from OQAB, NUC PR, and the Radiological Hygiene Staff (RHS). The findings and recommendations from that review were reported to WBN on July 19, 1984 (see reference VII.DD). A follow-up review by OQAB was not scheduled.

Utilizing existing offsite TVA resources to determine the operational readiness of the WBN radiological protection, radwaste control, and radiological emergency planning programs represents a progressive management attitude and the respective WBN management should be commended for their initiative. Additionally it should be noted that OQAB was responsive to the request.

The review performed by OQAB indicated that some problems existed in the areas of health physics instrumentation and equipment, health physics staffing, and the status of related radiological protection procedure preparation. As a follow-up OQAB review was not scheduled, NSRS evaluated the status of actions taken concerning selected findings and recommendations from that review. The status of those actions will be discussed in respective sections of this report.

b. WBN FQE Activities

NSRS interviewed FQE management personnel to determine the extent of that plant section's surveillance activities in the program area of health physics. In addition, corrective action report status logs for 1983 and 1984 were reviewed to determine if any problems had been identified in the area of health physics via the Corrective Action Report (CAR) and Deficiency Report (DR) systems. The results of the interviews with FQE management personnel and the review of the CAR and DR status logs are detailed below:

(1) FQE Surveillance of WBN Health Physics Program Activities

Management personnel in FQE reported that checklists for surveillance of health physics activities had not been prepared as the significant implementation of the health physics program begins at fuel loading and startup. The FQE

surveillance of health physics activities had therefore been minimal.

FQE surveillance checklists should be promptly prepared and surveillance scheduled during the fuel loading and startup phases of unit 1 to assure that the radiation protection functions are being performed in compliance with established program requirements and to determine the quality of that performance.

(2) Problems Identified In the Area of Health Physics Via the Corrective Action Reporting System (CARs and DRs)

No CARs had been issued for corrective action assigned to the WBN Health Physics Section during the timeframe of 1983-June 1984. Two DRs had been issued requiring action in the areas of housekeeping and QA records. Acceptable corrective actions had been taken and those DRs were closed. Several (13) DRs had been issued in April 1984 identifying Radiation Protection Area Plan procedures that had not been implemented in plant instructions. Health Physics Section management personnel reported that the respective plant instructions had been prepared and were issued or were in the review and approval cycle at the time of the NSRS review, and the DRs would be closed in the near future.

c. WBN Health Physics Organization

NSRS discussed the planned health physics organization and staffing with the Site Services Manager and the Plant Manager's staff. The results of those discussions are detailed below:

(1) Facility Organization

Figure 1 of this report depicts the planned site and plant organizations as specified in Figure 6.2-2 of the August 7, 1984 draft WBN Technical Specifications.

(a) Site Director's Staff

It was planned to add a staff health physicist answering through the Site Services Manager to the Site Director. This position had not been filled at the time of the review nor had the range of activities to be performed and the methodology of interface with the plant and offsite organizations been

defined. Site management indicated that the staff health physicist position would be filled and the scope of activities along with the methodology of interface would be defined after a decision had been made concerning which health physics functions would remain with the NCO and which functions would be transferred to the Site Director's staff. That determination was underway and was expected to be completed by October 1, 1984.

The addition of a health physicist to the Site Director's staff should enhance the WBN health physics program. This position should be filled and the scope of activities along with the methodology of interface with the plant and offsite organizations defined before startup of unit 1.

(b) Plant Health Physics Staff

The current reporting chain of the Health Physics Supervisor is depicted by Figure 1 of this report. The Health Physics Supervisor reports through the Operations and Engineering Superintendent to the Plant Manager.

Reg. Guide 8.8 and NUREG-0731 state respectively:

> The Radiation Protection Manager (RPM) onsite has a safety function and responsibility to both employees and management that can be best filled if the individual is independent of station operations, maintenance, or technical support, whose prime responsibility is continuity or improvement of station operability.

and

> The reporting of the functional areas of radiation protection, quality assurance, and training should assure independence from operating pressures.

After the TMI accident in 1979 the NRC conducted a health physics appraisal program to evaluate the adequacy and effectiveness of radiation protection programs at the nuclear power plants in operation at that time. The

results of that appraisal were reported in NUREG-0855 issued in March 1982. In that NUREG the NRC reported that significant weaknesses in the area of radiation protection organization and management were identified at approximately a third of the facilities inspected. One of the significant weaknesses involved "lack of management support." The NRC stated:

> The lack of management support of radiation protection programs was reflected in several ways. At some facilities the Radiation Protection Manager's (RPM) reporting chain was such that the RPM must compete with others within the same group to bring radiological problems and concerns before the station manager.

Additionally, the NRC stated:

> At some facilities, the quality of radiation protection was found to be significantly less where the RPM was not reporting directly to the station manager. It was noted in these organizations that health physics was more of a routine service organization than a radiation protection support function, integrated into the fabric of all plant operations. It was noted that personnel within these organizations generally lacked incentive and a depth of technical knowledge.

The plant organization does not provide the plant Health Physics Section independence from line operational pressures. On the one hand the Operations and Engineering Superintendent is responsible for operations and engineering (technical support) activities which affect generation availability. On the other hand, he is responsible for health physics activities which by necessity may delay the operation and engineering process and can result in decreased generation availability. The Health Physics Section Supervisor may have to compete with the Operations and Engineering Group Supervisors, both of whom are higher grade levels. In the absence of the Operations and Engineering Superinten-

dent the Health Physics Section Supervisor may be required to report to either the Operations or Engineering Group Supervisors if one of those supervisors temporarily assumes the Superintendent's responsibilities.

A significant amount of the Health Physics Section's functions will be associated with maintenance and modification activities. The present organization does not promote a radiation protection support function integrated into the fabric of all plant operations which includes maintenance and modification activities as well as engineering and operations activities. The Health Physics Section should have the same relationship with maintenance and modification personnel that it has with operations and engineering personnel. At the time of the NSRS review there was no indication of conflicts or problems. It is recognized that the present organization could actually enhance the health physics program by providing increased upper plant management availability to health physics and increased interface with the Operations and Engineering personnel to work out problems encountered during plant operation and routine testing activities. However, increased interface with operations and engineering personnel may be at the expense of proper interface with maintenance and modifications personnel.

To minimize the potential for conflicts and program degradation and to organizationally provide the health physics supervisor the flexibility to deal effectively and directly with all aspects of the health physics program the NSRS recommends that the current plant organization be revised to establish the reporting of the Health Physics Section supervisor directly to the plant manager. This aspect of the organization is considered consistent with current regulatory policy.

d. Health Physics Qualification and Staffing

The WBN health physics staffing status at the time of the NSRS review is depicted in figure 2. The OQAB review team had evaluated the qualifications and adequacy of the health physics staff to meet the minimum staffing requirements and found that the Health Physics Section personnel met the qualification requirements of

ANSI N18.1-1971 and was adequately staffed with the following exceptions:

- There was an insufficient number of HP technicians onsite to adequately respond to an ALERT.

- The Health Physics Technical Unit was inadequately staffed to effectively implement their planned activities during unit operations. These activities include:

  - Operation of the respirator fitting test equipment.

  - ALARA and health physics dose tracking.

  - Operation of the body counting systems.

  - Dosimetry issuance and Thermo Luminescent Dosimeter (TLD) processing.

The OQAB review team recommended that the plant staff fill the dosimetry technician and data entry operator positions with permanent or temporary personnel prior to startup or the establishment of large radiological controlled regulated areas. They recommended that if the estimated reporting dates for individuals filling these positions was within two months of startup, the plant staff should obtain temporary personnel to allow for adequate training.

The NSRS evaluated the current adequacy of the plant health physics staff to support the startup of unit 1. The results of the NSRS evaluation are detailed below:

- The health physics staff had 17 SE-5 level HP technicians onsite and job offers had been made to an additional 8 candidates for that position.

- There were 8 SE-4 level HP technician trainees onsite with an additional 17 technician trainees due onsite November 12, 1984. The majority of the SE-4 level technician trainees had participated or are participating in on-the-job training at SQN (some for up to one year).

- The Technical Unit staffing had not changed significantly since the OQAB review and that unit was still not adequately staffed to support the startup, testing, and off-normal events. For the primary inadequacies, vacant position announcements had been issued, some had closed, and selections had been made. Job offers for the dosimetry technicians were scheduled to be made by August 14,

1984. A NUC PR training class for dosimetry technicians was scheduled to start on September 10, 1984.

- The Outage Support Unit had not been staffed. The staffing status of this unit should not adversely affect the startup of unit 1.

By the end of November 1984 the number and experience level of the WBN HP technicians and trainees in the Operational Unit should provide adequate staff to handle that unit's normal and expected off-normal health physics support for fuel loading, initial startup testing, and minor forced outages during the startup process of unit 1. It is probable that WBN will have the largest number of well qualified technicians of any TVA nuclear facility during initial startup and this should enhance the facility health physics program.

The staffing of the Technical Unit was still inadequate to support the startup and operation of unit 1. The plant staff was taking appropriate actions to fill the vacancies in that unit.

e. Health Physics Program Administrative Controls

The OQAB review team reviewed the radiation protection procedures for general content to determine their readiness for plant startup. Their review included those minimum procedures required by the draft WBN Technical Specifications and the additional detailed procedures required to instruct the health physics staff in the implementation of the health physics program. The OQAB found that neither the minimum required or additional detailed procedures to instruct the health physics staff in the implementation of the health physics program were adequate for startup.

The OQAB review team recommended that the required procedures be revised and/or issued by July 15, 1984 or at least two months before fuel loading to give the plant staff ample time to learn the procedures before startup.

The NSRS discussed the status of each procedure addressed in the OQAB review report with the Health Physics Section Supervisor. From these discussions the NSRS determined the following:

- With only a few exceptions the existing procedures had been revised and new procedures written as recommended by OQAB. Even though some of the procedures had been issued others were still in

the review and approval cycle or in reproduction for issue. Health physics management expected that those procedures in the review and approval cycle would be approved and issued in the immediate future.

Through discussions with the plant health physics management and observation of existing procedures NSRS concluded that administrative controls had been provided to control those activities relating to the radiation protection program addressed in section 6 of the draft WBN Technical Specifications. These include the following:

- Control of the Health Physics Section overtime.
- Surveillance of radioactive sources.
- Health physics technician training, retraining, and replacement training.
- Inplant radiation monitoring for airborne iodine concentrations in vital areas under accident conditions.
- Access control of high radiation areas.
- Reg. Guide 1.33 required procedures.

The additional detailed procedures required to instruct the health physics staff in the implementation of the health physics program were in place or were in the review and approval cycle and were expected to be in place in the near future. It was noted that the primary administrative system for controlling personnel exposure to radioactive materials and radiation (Radiation Work Permit) had recently been revised at WBN. The significant revision places more responsibility for radiological safety on the job foreman and workers. Due to the importance of this system of controls and the significance of the revision, NSRS recommended that awareness seminars for the new RWP program be provided to the plant staff prior to the startup of unit 1.

f. Health Physics Instrumentation, Equipment, and Facilities

(1) OQAB Review Team Findings and Recommendations

The OQAB had evaluated the adequacy of the Health Physics Section's instrumentation and equipment for fuel loading. The OQAB found that an adequate supply of portable survey instruments, laboratory equipment, and respiratory protection equipment

was available for use. However, they also found that some necessary equipment and supplies (C-zone clothing, TLD processing equipment, and portable monitors) were not onsite. The following is a summary of their findings and recommendations:

The OQAB recommended that emphasis should be placed on expediting the procurement of those necessary items that were not yet onsite. The NSRS determined the status of those items and concluded the following:

- TLD processing equipment had not yet arrived from the vendor.
- Portal monitors had not arrived from the vendor. One monitor had been shipped by the vendor the week of the NSRS review and the other monitor was being packaged for shipment in the immediate future.
- C-zone supplies (including C-zone clothing) had been ordered but had not been received.
- The TLD issue area was being constructed and should be completed by fuel loading of Unit 1.

Procurement and completion of necessary equipment and facilities were being expedited by the plant staff.

(2) NSRS Inspection of Health Physics Instrumentation, Equipment, and Facilities

NSRS inspected the portable instrumentation inventory and other health physics equipment and facilities and reviewed respective program controls. The results of the inspection and review are as follows:

(a) Portable Health Physics Survey Instrumentation and Air Sampler Inventory and Control

Section 12.5.2 of the WBN FSAR states, "The portable health physics survey instrumentation will be equivalent to the instrumentation described in Regulatory Guide 8.8.C.4." Section C.4.b of Regulatory Guide 8.8 states that, "Portable instruments needed for measuring dose rates and radiation characteristics will include:, (1) Low-range (nominally 0 to 5 R per hour) ion chambers or G-M rate meters; (2) High range (0.1 to at least

500 R per hour) ion chambers; (3) Alpha scintillation or proportional count rate meters; (4) Neutron dose equivalent rate meters; (5) Air samplers for short-term use with particulate filters and iodine collection devices (such as activated charcoal cartridges); and (6) Air monitors with continuous readout features."

The inventory and characteristics of the WBN instrumentation and portable air samplers are tabulated in tables 2 and 3 of this report.

NSRS determined that the inventory and characteristics of the portable health physics survey instruments and air samplers met the requirements of section C.4.b of Reg. Guide 8.8 and section 12.5.2 of the FSAR. The normal inventory was adequate to perform radiation surveys to support fuel loading, startup, operation, and off-normal occurrences.

Controls had been established in HPSILs for periodic calibration, functional checks, use, storage, and segregation of defective or out-of-calibration instruments.

Portable instruments for emergencies were stored in the backup health physics laboratory and in the health physics monitoring van. Implementing procedures for the Radiological Emergency Plan required that in the event the health physics laboratory has to be evacuated, the technicians will remove portable survey instruments, air samplers, and supplies as they leave the laboratory and transport this equipment to a designated area. NSRS interviewed a health physics shift supervisor and two technicians to determine if they were aware of the requirement. Those interviewed were well aware of the requirement.

Air flow rate measuring devices for air sampling were integral components of air sampling equipment. The WBN health physics staff planned to calibrate the air flow rate measuring devices at WBN using established procedures (HP TSIL-25) and calibration equipment certified to the National Bureau of Standards. However, certification documents for the calibration equipment were not available at the plant site. This certification should be acquired and maintained by the plant staff.

(b) Other Health Physics Facilities, Equipment, and Controls

The NSRS inspected and discussed other health physics facilities and equipment. The facilities and equipment appeared to be adequate with the following exceptions:

- Health Physics Laboratory Counters

  The health physics laboratory was equipped with four counters to process smears and air samples. At the time of the NSRS review three out of the four counters were out of service because of breakdowns. One of the out-of-service counters was still in warranty and was being repaired by the vendor while two of the out-of-service counters were being repaired by the plant Instrument Maintenance Section. As these counters are essential for supporting normal and off-normal plant operation, service contracts and/or training should be provided to maintenance personnel to provide for preventative maintenance and prompt and effective repair of inoperative equipment.

- Health Physics Laboratory Fume Hood

  The fume hood in the health physics laboratory was not operational and had not been checked for proper air flow velocities and patterns. The fume hood is located in the immediate vicinity of the laboratory counters and has no instrumentation or indicator to alert personnel as to its operational status. Fume hoods are provided to facilitate processing samples that are potentially highly contaminated. The location of the fume hood (adjacent to the laboratory counters) and the lack of indication of its operational status make use of this hood for processing highly contaminated samples questionable. If the plant staff elects to use this fume hood for processing radioactive or contaminated samples, the laboratory counters should be relocated (for background and contamination considerations) and the fume hood provided with some sort of device that would alert the technicians to the operating status prior to use.

- Laundry Monitors

  The laundry monitors were onsite but had not been installed and calibrated. Additionally, the laundry workers had not been trained on use of the monitors. Installation, calibration, and necessary training should be accomplished before the startup of unit 1.

- Respirator Storage, Issue, and Repair Facility

  This facility located adjacent to the health physics laboratory in the service building was not fully constructed and had not been turned over to the health physics staff. This facility should be completed and equipped prior to startup of unit 1.

- High Radiation Area Lock Tumblers

  Section 6.12.2 of the draft Technical Specifications require that radiation levels greater than 1000 mR/hour at 45 Cm from the radiation source or from any surface which the radiation penetrates shall be provided with locked doors to prevent unauthorized entry and the keys shall be maintained under the administrative control of the shift foreman on duty and/or the Health Physics Supervisor. Special tumblers for the locks to be used for controlling access to high radiation areas had been ordered but had not yet arrived on site.

- Gamma Ray Spectrometers for Analyzing Particulate, Iodine, and Noble Gas Samples

  The plant health physics staff was not provided with gamma ray detectors for the purposes of qualitatively and quantitatively analyzing air samples for radioactive particulate, iodine, and noble gas concentrations. The health physics staff must rely on the plant chemical unit to provide these services. Discussions with chemical unit personnel indicated that the chemical unit spectrometers had been calibrated for the health physics sample geometries and

calculator programs had been developed to process data from the analyses. A methodology for establishing the analysis priority for the health physics samples had been established in the Radiological Emergency Plan Implementing Procedures (REP IP). However, the chemical unit was not aware that they would be required to analyze several samples (projected to be 20-40) on a daily basis. Historically at BFN and SQN there have been problems with priority setting between health physics and chemical unit samples. Any confusion concerning priority setting for both normal and off-normal samples should be resolved prior to the startup of unit 1.

In general the instrumentation, equipment, and facilities were still not adequate to support startup of unit 1 primarily in the area of dosimetry processing equipment and contamination zone supplies. However, the dosimetry services could be provided by the RHS in Muscle Shoals and contamination zone supplies could be borrowed from other NUC PR facilities. The plant staff is taking actions to assure that the necessary equipment or services and supplies will be provided in sufficient time to allow for implementation of the planned programs and to allow for refinement of those programs prior to the startup of unit 1.

g. Health Physics Section Personnel Stopwork Responsibility and Authority

Section V.B of RCI-1, "Radiological Hygiene Program" states that: "When imminent danger or major violations of the Radiological Control Instructions are encountered, the Health Physics Supervisor (or his designated representative, either the Shift Supervisor or the Assistant Health Physics Supervisor) has the responsibility and authority to take the necessary corrective action including termination of an activity through the plant manager or his designated representative.

Imminent danger is defined as a condition or situation where there is a reasonable certainty that immediately, or within a short period of time, the condition or work operation will cause death or serious physical harm to any employee or person exposed to the particular hazard."

These statements indicate that health physics personnel must obtain the approval of the Plant Manager or his designated representative before terminating an activi-

ty when imminent danger or major violations of RCIs are encountered. This would be inconsistent with corrective actions necessary to mitigate an imminent danger condition or situation as it could take some time to make the necessary contacts with the Plant Manager or his designated representative.

The stopwork responsibility and authority statements in RCI-1 for imminent danger conditions should be clarified to specify that health physics personnel have the responsibility and authority to stop work or order an area evacuated when in their judgement the radiation protection conditions warrant such an action and such actions are consistent with plant safety. It should be clear that only the Plant Manager, Health Physics Section Supervisor, or their designated representatives (Shift engineer or Health Physics Shift Supervisor) on backshifts can overrule a stopwork action initiated by health physics personnel.

Plant management indicated that they would evaluate the NSRS concern in this area.

h. FSAR Description of the WBN Health Physics Program

Some sections of the FSAR did not accurately depict the planned WBN health physics program. Examples of the inaccuracies are as follows:

- Section 13.3.4.4.1 of the FSAR states that portal monitors will be located in the gatehouse. It was planned to locate high sensitivity portal monitors at the exits of the "power block." It was not planned to install portal monitors in the gatehouse even though those have been procured and were onsite.

- Section 12.5.1, "Organization," makes reference to the Radiological Hygiene Branch (RHB) and its responsibilities and activities. The RHB no longer exists and its responsibilities and activities have been divided between the new RHS, NUC PR NCO, and the WBN plant staff.

- Section 12.5.2, "Equipment, Instrumentation, and Facilities," contains inaccuracies as follows:

  - The health physics technician base of operations and communications is described as the laboratory located at the boundry between the office and service buildings when in reality it is in the new laboratory in the service building.

- The WBN plans and program for processing TLDs are not addressed.

- Section 12.5.3, Procedures," references the "SWP" system which has been discontinued and replaced by the "RWP" system which is significantly different.

NSRS recommended to plant health physics management that respective sections of the FSAR should be reviewed to determine inaccuracies and updated to accurately reflect the planned WBN health physics program and activities prior to unit 1 startup. The plant health physics staff initiated an effort to accomplish this recommendation prior to completion of the NSRS review.

In summary the administrative controls for health physics activities were in place or would be in place in the immediate future. The personnel complement (by November) and experience level of the Operation Unit should enhance the health physics program. The personnel complement of the Technical Unit was still inadequate to provide those services planned for that unit. However, unplanned support could be obtained from the RHS for TLD dosimeter processing and equipment such as C-zone supplies could be acquired from other NUC PR facilities. The WBN health physics management was aware of these conditions before the NSRS review and was making progress toward obtaining the required personnel, equipment, and facilities. The progress (particularly personnel staffing) has been slowed somewhat by the recent TVA reorganization.

VII. LIST OF DOCUMENTS REVIEWED

A. SOI-74.1, "Residual Heat Removal System Unit 1 or 2," R7

B. SOI-68.2, "Reactor Coolant Pumps Unit 1 or 2," R4
App. A, "RCP Local Inspection Checklist," August 2, 1984

C. SOI-62.1, "CVCS - Charging and Letdown Unit 1 or 2," R4
Valve Checklist, July 11, 1984

D. AI-2.10, "Shift and Relief Turnover," R7

E. AI-2.19, "Independent Verification," R1

F. OSL-A2, "Maintaining Cognizance of Operational Status"

G. GOI-1, "Plant Startup from Cold Shutdown to Hot Standby," R5

H. SI-3.1.12 II, "Pressurizer Pressure Protection Set II," R2

I. NRC Regulatory Guide 1.68, "Initial Test Program for Water-Cooled Nuclear Power Plants," R7

J. Preoperational Test Section Instruction Letters

K. Instrument Maintenance Section Instruction Letters

L. ANSI N18.7-1976/ANS-3.2, "Administrative Controls and Qualtiy Assurance for Operational Phase Nuclear Power Plants"

M. N-OQAM, Part II, Section 4.1, "Preoperational Test Program," April 11, 1983

N. Preoperational Test Instructions

a.	W-1.1	Heatup for Hot Functional Test, R0
b.	W-1.2	Hot Functional Testing, R0
c.	W-1.7	RCS Thermal Expansion, R0
d.	W-6.1	Fuel Handling Tools and Fixtures
e.	TVA-1	Shield Building Inleakage Tests, Emergency Gas Treatment System Functional Tests, R0
f.	TVA-22	Auxiliary Feedwater System
g.	TVA-23B	Thermal Expansion of Piping System (Feedwater Piping), R0
h.	TVA-28	Sampling Program, R0
i.	TVA-29	Steam Generator Blowdown System, R0

O. Area Plan 1104.01, "Test Staff Program Manual - Preoperational Test Program," June 11, 1984

P. AI-6.5, "Procedure for Initial Operation, Testing, and Transfer of Equipment and Auxiliaries," R5

Q. N-OQAM, Part II, Section 2.1, "Plant Maintenance," July 18, 1984

R. N-OQAM, Part II, Section 5.3, "Maintenance and Modification Inspection Program," July 30, 1984

S. AI-2.15, "Temporary Alteration," R6,

T. AI-4.1, "Quality Assurance Records," R7,

U. AI-9.2, "Maintenance Program," R11,

V. WBNP-QCI-1.25, "Control of As-Constructed Drawings," R7 (Addendum 1), January 25, 1984

W. Engineering Change Notices (ECNs) 4533 and 4558

X. Temporary Alteration Control Form (TACF) 1-84-11-271 and 1-84-125-3

Y. Activity Survey WBN-AS-84-83, "Issue of Material and Traceability," March 20, 1984

Z. Work Packages (WPs) 4453, 4440, 4547, 4519, 4025, 3271, 4065, 4126, 4437, 4523, 4301, 2683, 3126, 2578, 3906, 4124, and 3915

AA. Maintenance Requests - Several

BB. NRC Regulatory Guide 1.33, "Quality Assurance Program Requirements," R2

CC. ANSI N18.1-1971, "Selection and Training of Nuclear Power Plant Personnel"

DD. Memorandum from R. L. Moore to W. T. Cottle, "Watts Bar Readiness Review," July 19, 1984 (OQA 840719 703)

EE. AI-2.16, "Shift Technical Advisors," R4

FF. TVA Topical Report, TVA TR75-1A, R7

VIII. PERSONNEL CONTACTED

J. R. Anderson	Health Physics Shift Supervisor
R. A. Beck **	Health Physics Supervisor, WBNP
H. B. Bounds **	Plant Superintendent (Maintenance), WBNP
S. B. Billings	Radiochemical Laboratory Analyst, WBNP
S. R. Bradley	Health Physics Shift Supervisor, WBNP
J. L. Brown	Radiochemical Laboratory Analyst, WBNP
J. K. Bryant	Preoperational Test Engineer, WBNP
D. R. Bucci	Nuclear Engineer, BFNP
W. L. Byrd *	Test Section Supervisor
C. R. Cook	Senior Reactor Operator
W. T. Cottle	Site Director, WBNP
W. S. Delk *	Acting Engineering Section Supervisor, WBNP
J. E. Engelhardt **	Compliance, WBNP
E. R. Ennis **	Plant Manager, WBNP
T. O. Frizzell	OQAB
E. O. Gambill	Senior Reactor Operator
J. E. Gibbs	Site Services Manager
R. R. Gibbs	Acting Reactor Engineering Unit Supervisor, WBNP
F. K. Hecker	Chemistry Unit Supervisor, WBNP
G. R. Hendricks	Reactor Engineer
B. J. Hensley	Preoperational Test Engineer
T. F. Huth	Reactor Engineer
T. E. Kendrick	Safety Aide
M. E. King	Chemical Engineer, WBNP
R. J. Kitts	Health Physicist, NCO
H. F. Koehler	Preoperational Test Engineer
J. L. Lee	Instrument Engineer
D. L. Lester	Test Section Group Leader, WBNP
J. A. McLean	Health Physics Technical Unit Supervisor, WBNP
B. Z. Mears	Preoperational Test Engineer
E. S. Murphy	Mechanical Maintenance Engineer
M. E. Murray	Chemical Engineer, WBNP
R. B. Neal	Power Stores
T. L. Newman	OPS Refuel Floor Supervisor
R. Norman **	Operations Supervisor, WBNP
J. W. Olson	Mechanical Maintenance Engineer
D. Ormsby *	Licensing

L. E. Ottinger **	Instrument Maintenance Engineering Supervisor, WBNP
C. C. Parker	Preoperational Test Engineer
H. L. Pope	FQE Supervisor
W. V. Rusbridge	Senior Reactor Operator
D. G. Sanders	Mechanical Engineer
R. C. Sauer **	Compliance, WBNP
M. E. Selewski	Preoperational Test Engineer
D. P. Shaffer	EN DES Preoperational Test
R. H. Smith	Assistant Test Section Supervisor
F. J. Spivey, Jr. **	Acting Health Physics Operational Unit Supervisor, WBNP
W. D. Stevens	Senior Reactor Operator
W. M. Stone	Preoperational Test Engineer
R. E. Swatzell	Chemical Engineer, WBNP
A. S. Thomas	Instrument Shop General Foreman
G. V. Tippens	Quality Assurance
E. B. Turnbill	Sheetmetal Foreman
D. W. Wilson	Design Services Manager
J. S. Woods	Instrument Maintenance Section Supervisor
R. E. Yarborough, Jr. *	Operations Section Assistant Supervisor

* Attended Entrance Meeting
** Attended Exit Meeting

TABLE I

WATTS BAR
OPERATIONAL READINESS REVIEW

Phase	Review Area
I 2/13/84 - 2/17/84 (Completed - Report R-84-02-WBN Issued)	1. General Employee Training 2. Employee Awareness of Regulatory and TVA Requirements and Policies Relating to Nuclear Safety Issues and Expression of Staff Views 3. Preoperational Testing (Partial)
II 3/26/84 - 4/6/84 (Completed - Report R-84-05-WBN Issued)	1. Organization 2. Qualifications of Personnel in Key Management Positions 3. Shift Technical Advisors (STA) Program 4. Control of Licensed Activities 5. Plant Procedures (Partial) 6. Unit Interface Control 7. Reactor Safety and Criticality Control (Partial) 8. Modifications and Outage Control
III 8/6/84 - 8/24/84 9/4/84 - 9/7/84 9/24/84 - 9/26/84 (Completed - Report R-84-15-WBN)	1. Mini-Hot Functional Test - Operations Section, Preoperational Test Section, and Chemical Unit personnel activities were reviewed during this time. Adequacy of and adherence to instructions and procedures were stressed. 2. Maintenance Activities 3. Conduct of Licensed Activities 4. Reactor Safety and Criticality Control 5. Health Physics
IV At Scheduled Fuel Load	Initial Fuel Load

Note 1. Plant staffing and organization will be further evaluated during subsequent reviews due to changes caused by the reorganization.

Note 2. Regulatory compliance is a part of all reviews.

TABLE 2

WBN PORTABLE HEALTH PHYSICS SURVEY
INSTRUMENT INVENTORY

Instrument ID	Detector Type	Type Radiation Monitored	Range	Inventory
1. Ludlum Model 3	G-M	beta, gamma	0.1-200 mR/hr	6
2. Ludlum Model 5-5	G-M	gamma	0.1-2000 mR/hr	17
3. Ludlum Model 300-10	G-M	gamma	1-10,000 mR/hr	15
4. Eberline Model E530N	G-M	gamma	0-20 R/hr	20
5. Eberline Teletector Model 6112	G-M	beta, gamma	0-1000 R/hr	25
6. Eberline Model RO-2A	Ion Chamber	beta, gamma x-ray	0-50 R/hr	45
7. Eberline Model RO-7	Ion Chamber	gamma	1 mR/hr-20,000 R/hr	2
8. Eberline Model PAC-4S	Scintillation	alpha	0 - 2×10^6 Counts per min.	5
9. Eberline Model PNR-4	BF_3 proportional	neutron	0 - 5000 mRem/hr	6

TABLE 3

WBN PORTABLE HEALTH PHYSICS AIR SAMPLERS

Sampler ID	Type Samples Obtained	Inventory
1. Radeco Model H-809V, H-809V-II	Gases, particulate, radio-iodine	8
2. Hi-Q Model CF900V	Particulate, radioiodine	35
3. Eberline Model RAS-1	Particulate, radioiodine	17

FIGURE 1

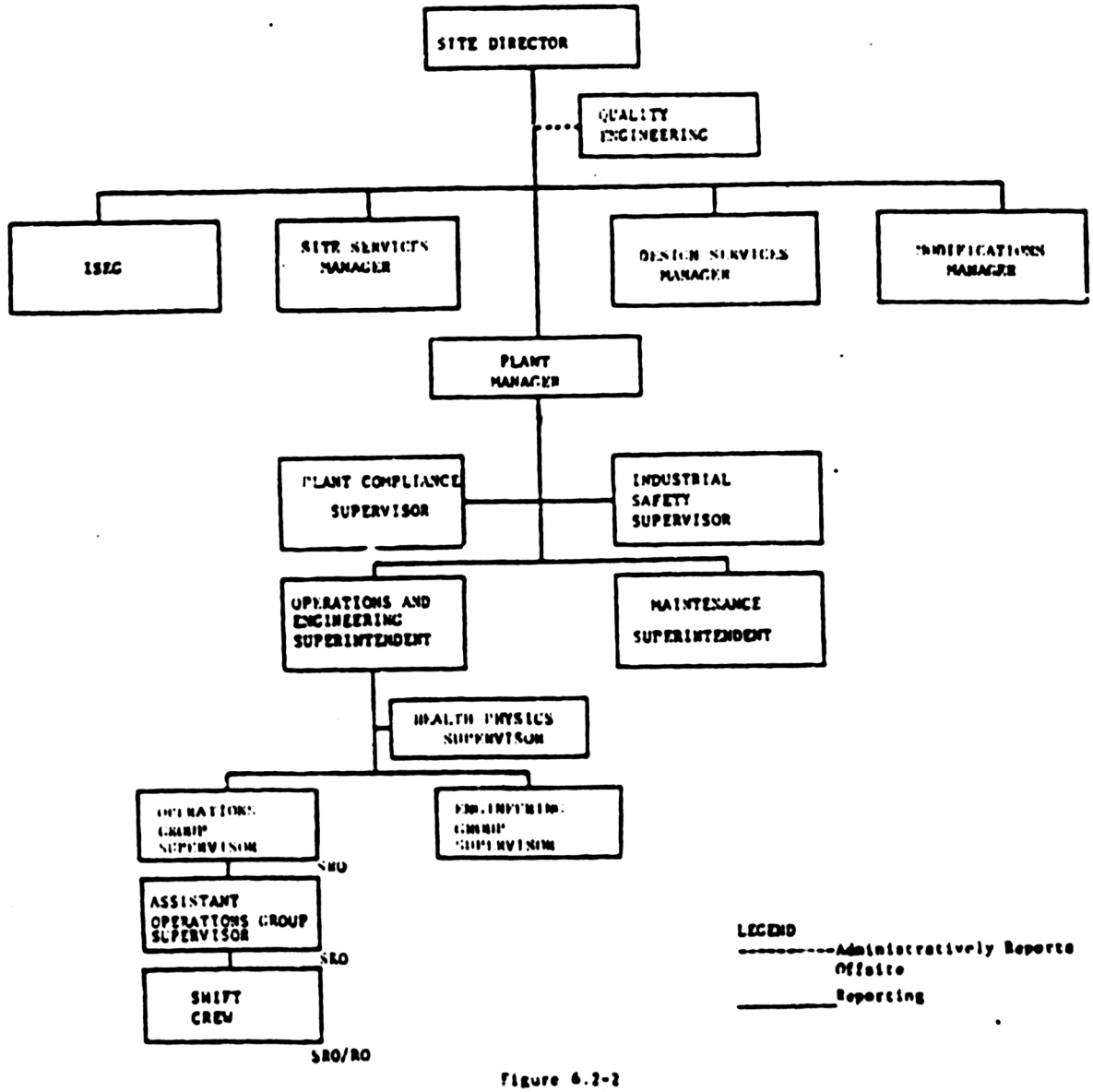
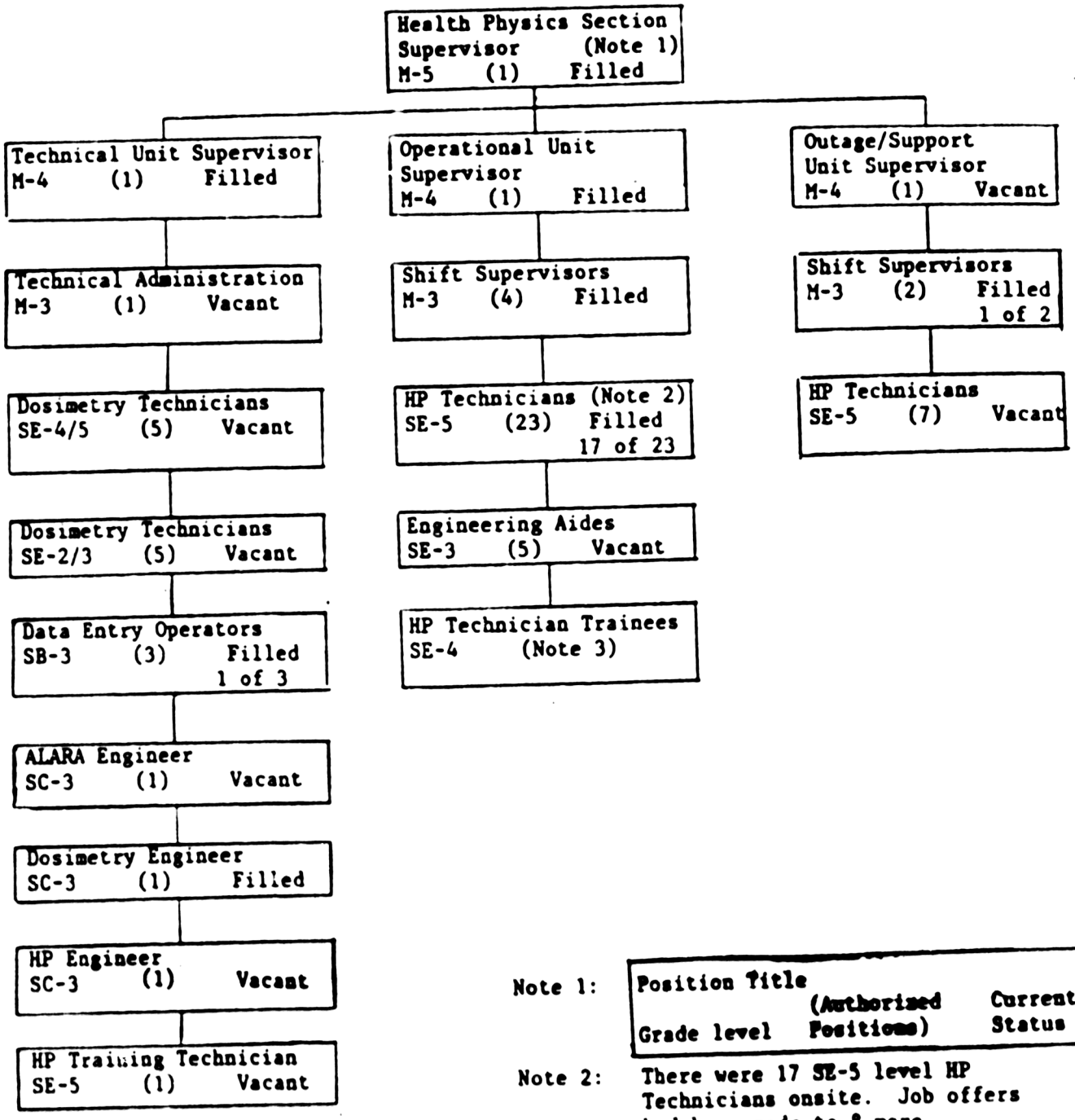


Figure 6.2-2
FACILITY ORGANIZATION

FIGURE 2

WBN HEALTH PHYSICS SECTION ORGANIZATION AND STAFFING LEVELS



Note 1:

Position Title Grade level	(Authorized Positions)	Current Status

Note 2: There were 17 SE-5 level HP Technicians onsite. Job offers had been made to 8 more.

Note 3: There were 8 HP Technician Trainees (SE-4) onsite. Due on site 11/12/84 are an additional 17 (these trainees were at SQN for on-the-job training).

TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

INVESTIGATION

NSRS REPORT NO. I-84-16-BFN

SUBJECT: NSRS INVESTIGATION OF CONCERNS RELATED TO FAILURES OF THE HIGH PRESSURE COOLANT INJECTION (HPCI) SYSTEM AT BROWNS FERRY NUCLEAR PLANT

DATES OF INVESTIGATION: MARCH 29, 1984 - MAY 10, 1984

INVESTIGATOR: P R Washer — P. R. WASHER — 6-15-84 DATE

APPROVED BY: James F. Murdock — J. F. MURDOCK — 6/15/84 DATE

MEDS, W5B63 C-K

TABLE OF CONTENTS

I. SUMMARY

The Nuclear Safety Review Staff (NSRS) was made aware of concerns, with numerous High Pressure Coolant Injection (HPCI) system failures and whether the system could meet its required safety function, by Stephan Mindel of the Office of Quality Assurance (OQA). With the many failures that have occurred, the concern is not only with reliability but also with degradation of the piping and supports to the extent that they may not perform in a safe manner if and when they are needed. The investigation was conducted between March 29, 1984 and May 10, 1984. The NSRS team concluded that the employee concern was valid and plant safety, in the event of a LOCA at Browns Ferry (BFN), was in jeopardy. NSRS recommendations to correct this condition are contained in the report.

II. SCOPE

This investigation was performed to address concerns regarding numerous failures of the HPCI system at BFN; possible damage to the piping, which would require NDE work for assessment; and the delays in correcting deficiencies so that the system can meet its required safety function. The concern centered on the fact that this is a safety system necessary for high pressure core cooling in case of a LOCA. The investigation was conducted by interviewing personnel, reviewing documentation, and by personal observation of the system itself.

III. FACTS

A. Background

On March 26, 1984 NSRS was made aware of an employee concern related to the HPCI system at BFN. The concern was brought to NSRS by Stephan Mindel of OQA and Dan Fisher of EN DES. The concern related to numerous failures of the system and whether or not it was still in a condition to perform its safety function. Both felt that some NDE work should be done on the piping in the vicinity of where restraints R-23 and R-24 had failed on unit 2. Their principal concern was that this is an important safety system and the pace of fixing the system has been very slow. The purpose of the employee concern was to elevate this problem to a high priority status.

B. Information Obtained from Interviews

On March 29, 1984 Stephan Mindel, Leonard Blankner, and Lillard Blevins of OQA were contacted by NSRS concerning this subject. Mr. Mindel felt there was a potential for damage of the piping at the lugs where the broken supports were attached. He also thought that someone should determine what motions the pipe had been through and the resulting effects. He stated that the system has had a history of broken parts during testing and use. Mr. Mindel felt that a review should be made of the overall maintenance history of the system including the break of the HPCI

turbine pedestal in 1980. Mr. Blankner stated that during his working time at BFN in the 70's there were problems with the FCW 73-45 valve allowing back leakage of feedwater at approximately 370° F, which causes steam in the line. When the HPCI system was initiated, this caused a water hammer in the pipe. He felt this could be a major part of the cause of breaking the pipe restraints. Mr. Mindel stated that review of the history of maintenance on the pipe supports would show that they had been bent before. He felt the struts were seeing a periodic overload condition which could create a fatigue failure in the piping. He also felt very strongly that some NDE work should be done on the pipe in the area of the lugs in order to qualify it for future use.

On April 6, 1984, Dan Fisher of the EN DES Boiling Water Reactor Project was contacted by NSRS concerning this subject. Mr. Fisher got involved in this problem in January 1984. Since that time there have been two support failures on this system. The first one occurred in January 1984 and the second one in March 1984. Mr. Fisher has reviewed in depth the failure that occurred in March 1984 to support R-23 in unit 2. This failure resulted in the base plate being pulled out of the wall. Upon review of the support, it was obvious that the support had been altered or repaired at a previous time. Mr. Fisher stated that the R-23 and R-24 supports were the only rigid supports in the system. The rest of the supports are dead weight hangers. Both of these supports have been repaired as damaged in the past. Mr. Fisher stated that the configuration of the lugs is such that high stress is transferred into the pipe welds and the pipe itself. He strongly feels that NDE work should be done in this area of the welds. From discussion with the support manufacturer, Bergen-Patterson, they have determined that the critical buckling load for the support is approximately equal to 33.5 kips. Since the support broke, the load had to be much higher than 33.5 kips and the load was transferred into the weld and the pipe. Mr. Fisher has copies of numerous maintenance requests or work orders to do repairs on these supports in the past. He feels this is a recurrent problem that has done some damage to the HPCI piping by now. He does not know whether a walkdown has been done on units 1 and 3 to evaluate them. However, he feels the same conditions exist for units 1 and 3 as do for unit 2.

On April 10, 1984 Ray Cole of the OQA Operations group was contacted by telephone at Bellefonte Nuclear Plant. He had been the OQA representative at BFN following the HPCI system until approximately one month before. Mr. Cole indicated that the HPCI system had given problems since initial startup of unit 1 in 1973. He issued numerous OQA documented complaints about the system and a HPCI committee was established in 1980 to review the problems. Mr. Cole said there were problems related to an electronic versus mechanical governor package along with an inherent design problem in gland-seal condenser and a problem with ruptured exhaust diaphragm. The big concern has been with needing this safety system and it tripping out and not being

available. Mr. Cole stated that there had been a problem with corrosion in the EGM system since moisture got into the box. A study on humidity in the area was started in February 1984, which showed there were humidity excursions in the area and the reason had not been determined. Mr. Cole also stated that recent tests at Vermont Yankee, Special Test 82-11, demonstrated a control modification on the HPCI turbine which improved the HPCI system quick start transient. This should reduce the transient loads on the piping system. He stated that this same test was recently conducted on unit 2 at BFN.

In discussions with Mr. Cole at BFN on April 17, he stated that history records are not very good prior to 1979. He also said the old system of Trouble Reports (TRs) was not effective since they were filed by TR number and not by system. As a result, it would be very difficult to find all TRs on the HPCI system. Since February 1983 the Maintenance Requests (MR) system has been in effect, which provides a report on a system-by-system basis. As an example of the ineffectiveness of the TR system, he said the TRs showed a changeout of a part on a turbine was made three times, while Power Stores showed ten parts were sold out.

Mr. Cole also stated that part of the problem is with attitude. The HPCI system must be recognized as a safety system that is maintained in a standby condition. Operations people must be convinced to follow procedures even though they may be skeptical of the chances of success. By following procedures in a step-by-step manner, failures can be analyzed if they occur.

On April 17, 1984, the NSRS investigator arrived at BFN for interview of onsite people regarding the HPCI concern. The first person interviewed was Randy Widick, the Mechanical Systems Engineer for the HPCI system. The discussion with him included the Special Test 82-11 results along with interviews of individuals from the operations group, valve test group, and the hanger group. The final part of this trip included a personal review of the piping system and restraints, which included photographs of the piping, hangers, and the two repaired restraints, R-23 and R-24. Mr. Widick said the 82-11 test had apparently taken out the early spike in discharge pressure. Copies of curves were provided which showed a reduction in the discharge pressure after the modification. Mr. Widick stated that in this procedure the governor is closed down so that RPMs pick up gradually and eliminate the pressure spike. He stated that this spike in discharge pressure may have caused the high forces in the piping and the restraints. This could also have caused the problem with rupturing of the gland seal condenser head gasket. Mr. Widick stated that the test on unit 2 was not done with all system and restraints repaired, since there had not been a complete walkdown of the piping system prior to the test. He recommended that this walkdown, along with any repairs needed, be completed prior to the next test.

Mr. Widick stated that they have not had the know-how to handle the complicated control problems. Part of this has been a result

of rapid turnover of electrical and mechanical people, eliminating the advantage of experience. He also stated that this Terry turbine system being used infrequently in conjunction with the complicated controls makes it very unreliable. He also stated that the operators are afraid of this system and very cautious about testing it. He has noticed marked difference in performance with different shifts. The operators are afraid to bring the turbine up to high RPMs fast. This probably complicates the problem since it is not designed to operate below 2000 RPMs. Both GE and Terry turbine personnel have stated that it should be brought above 2000 RPMs and kept there.

Mr. Widick thinks the operational method using Special Test 82-11 should be tried on all three units with close checks of system and restraints before and after the test. This would show whether the reduced pressure spikes would solve the problem of broken restraints.

On April 18, 1984, Jim Traglia of the Onsite Hanger Group was interviewed regarding the 79-14 inspection program along with his observations concerning the R-23 and R-24 restraint failures. Mr. Traglia stated that the first 79-14 inspection was done in 1980. They only made notes on missing welds, missing nuts, bent parts, etc. They did not establish a failure history. The problems that were found were put into three categories by EN DES. The three categories were: (1) repair in 30 days, (2) repair at next outage, and (3) repair when stress analysis is complete. There is no requirement for a follow-up inspection under the 79-14 program.

Mr. Traglia gave the following information concerning restraint R-23. In 1980 inspection, notes were made of members being turned in the wrong direction. From then to March 1984, when the embedded plate was pulled out of the wall, the W members and angles had been bent by injections. These bent members were removed and new members installed after the anchorage pullout in March 1984. He gave the following information concerning R-24. In 1979 the strut and welds were repaired. In 1981 a 10° bend in the strut was noted. In January 1984 the strut was broken. The support had obviously been receiving periodic high loads.

Mr. Traglia stated that he did not believe there were enough supports on the pipe. In some areas the length of unsupported pipes goes up to 40 feet. He thinks there should be more deadweight supports and restraints on the pipe. This would apply to all three units since the same type failures have been observed on units 1 and 3 also.

During the personal inspection of the HPCI piping, the observation was made that there are only two restraint-type supports on the pipe. These are the two that have failed. All the other supports are deadweight hangers. The measured distance from R-24 to a deadweight hanger was 20 feet in either direction.

Mr. Traglia stated that there is no way of knowing whether the supports are like they were when inspected, due to the massive modifications to other systems in the area. As a result, we cannot do an evaluation of the cause of the support failures. If we could inspect before and after injections, then we could do an analysis of the cause of the problems.

The next discussion on April 18 was with Ron Shadrick of the Field Services Valve Group. He gave information concerning the testing of the FCV 73-45 valve, the one that earlier was believed to have been leaking steam into the line. Mr. Shadrick stated that they have not had any problems with leakage of the valves since they were rebuilt about three years ago. That was the first time they had been rebuilt since the plant was constructed. The three units will have all FCV 73-45 valves changed out due to a different reason. The disc has been sticking in the closed position. The new valves will have a softer seat. His concluding statement was that there is no leakage problem with the FCV 73-45 valves.

The final interview at the BFN site on April 18 was with Tommy Jordan, Supervisor of Operations. Mr. Jordan stated that while opening the tell-tale drain valve, 73-551, to determine whether FCV-73-45 is leaking, that they had not observed a problem with units 1 and 2. At one time they did have a problem with unit 3, but that has been fixed. He does not believe steam leakage back through FCV-73-45 is the reason for hammer on the discharge line and breakage of supports. He agrees with Mr. Widwick that low RPM speeds on the turbine, before the 8211 change, was causing the problem.

A subsequent discussion was held with Dan Fisher of EN DES on May 10, 1984 regarding stress analysis of the HPCI piping. Mr. Fisher said there has been no stress analysis done on unit 2 HPCI piping. There has been a 79-14 type analysis for seismic events on unit 3. A similar type analysis will be done on unit 2. As far as he knows, Mr. Fisher stated there has been no transient analysis done on the system by either GE or TVA. He confirmed that R-23 and R-24 were the only restraints on the pipe. He said any discussions about adding additional restraints should be with Ron Cook in CEB, who is in charge of the analysis.

Ron Cook of EN DES was contacted on May 10 concerning the restraints and analysis. Mr. Cook said that no documented 79-14 type analysis had been done for any of the three units. He said the only analysis that had been done was the original design basis and he did not think any transient loads from dynamic fluid effects were included. He referred me to Jim Kincaid of EN DES to get background information on dynamic analysis.

On May 10, 1984, Mr. Kincaid stated that the HPCI piping has not been analyzed for transients and the seismic analysis may not be adequate at this time. He also said that the 79-14 analysis has not been documented for the three units. Mr. Kincaid believes we

could not design supports to hold the surge load if we had to analyze for transients using the old startup procedure. He agrees that we probably need to include the operational changes, tested by the 82-11 test, to prevent pressure spikes and then analyze for realistic loads and determine support requirements on that basis. He stated that we do not know the condition of R-23 before the last 82-11 test was run. He also stated that he agrees we should proceed with the FCR BF-DCR No. P-2040 to move the EGM controls.

IV. CONCLUSIONS AND RECOMMENDATIONS

From interviews of people from the various TVA organizations, it is obvious that the HPCI system has incurred many failures and has been very unreliable from startup of unit 1 in 1973. The failures have not been limited to one specific area. The failures have occurred in the components, the control mechanisms, and in structural supports. For a system that is essential for high-pressure cooling of the core in the event of a LOCA, 11 years is too long to repair-as-broken instead of providing a permanent fix. This system must be raised on the priority list and be recognized for its importance to public safety.

The system has been operated in such a manner as to cause fear of testing by the operations group, since they know something will break when testing. The control system in the EGM boxes has malfunctioned continuously due to poor environment. The hanger group along with EN DES personnel agree the piping is inadequately supported to take the loads induced by the fluid flow. Of all the people interviewed, no one stated that the system as-designed and as-built is adequate to meet its safety function.

Due to the importance to safety of this system, a complete fix to the system so that it will perform its required safety function must be pursued immediately. Eleven years is too long to rely on not needing a system rather than having it ready if and when it is needed. From the interviews and information gathered, the following recommendations are to be implemented to make this an operable system:

I-84-16-BFN-01 - The HPCI system should be recognized by all as a system that is necessary to maintain the plant in a safe condition. It should be viewed with the same importance as any system necessary to keep the plant operating.

I-84-16-BFN-02 - NDE examination of the welds and HPCI piping in the vicinity of the lugs for the R-23 and R-24 restraints should be conducted to insure that the piping is still qualified to meet its safety function. Further NDE examination of the restraints themselves is needed.

I-84-16-BFN-03 - The Special Test 82-11 should be implemented for units 1, 2, and 3. In conjunction with this operational change, the piping and supports should be inspected before and after each injection. This would allow evaluation of the cause of problems if any subsequent failures should occur.

I-84-16-BFN-04 - Design Change Request BF-DCR No. P-2040, to relocate the EGM governor control box to one of the walls in the HPCI room, should be implemented immediately. This should eliminate many of the control problems by locating the controls in a better environment.

I-84-16-BFN-05 - After implementaiton of Special Test 82-11, a transient analysis should be conducted on the HPCI system piping. From the transient analysis, the maximum loads from the fluid flow should be determined. In conjunction with this, pipe supports should be designed to restrain the system. If the analysis and design show that additional restraints and/or dead load supports are required, then these new supports should be installed. .

ATTACHMENTS

1. Mechanical Maintenance Instruction 99 for HPCI Pipe Support No. 24 on Browns Ferry Unit 2

2. Mechanical Maintenance Instruction 99 for HDCI Pipe Support No. 23 on Browns Ferry Unit 2

3. Metallurgical Report on Browns Ferry Nuclear Plant Unit 2, Failure Evaluation of HPCI Restraint R-24

4. Design Change Request, BF-DCR No. P-2040

5. Curves showing operating conditions before and after implementation of Special Test 82-11 on Browns Ferry Unit 2

TVA 64 (08-8-83)

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO : J. P. Darling, Manager of Nuclear Power, 1750 CST2-C

FROM : K. W. Whitt, Director of Nuclear Safety Review Staff, 249A HBB-K

DATE : MAR 12 1985

(1)

SUBJECT: NUCLEAR SAFETY REVIEW STAFF (NSRS) REPORT R-84-17-NPS - REVIEW OF PROCUREMENT PRACTICES AND PROCEDURES FOR OPERATING NUCLEAR POWER PLANTS

Attached for your use is a copy of the subject report. The NUC PR procedures for procurement were judged to be cumbersome, and the problems experienced by NUC PR in procuring materials in a timely manner were for the most part problems created by NUC PR and not outside support organizations.

It is important to understand that this review covered the procurement system in effect prior to the NUC PR transfer of NCO procurement activities to the sites. Consequently, changes to NUC PR's procurement process instituted since that time are not reflected in this report and may or may not adequately address recommendations contained in this report. In either event, your implementation plans and timeframes for completion are requested by April 26, 1985, with quarterly follow-up reports until the items are closed.

The cooperation of your staff and all other organizational groups involved in this review was appreciated. Questions regarding the content of this report should be directed to R. D. Smith at extension 4813 in Knoxville.

Original Signed By
K. W. Whitt

K. W. Whitt

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NSRS FILE

TENNESSEE VALLEY AUTHORITY

NUCLEAR SAFETY REVIEW STAFF

REPORT NO. R-84-17-NPS

SUBJECT: REVIEW OF PROCUREMENT PRACTICES AND PROCEDURES FOR OPERATING NUCLEAR POWER PLANTS

DATES OF REVIEW: JUNE 11, 1984 - DECEMBER 5, 1984

TEAM LEADER: Richard D. Smith — R. D. SMITH — DATE 3/8/85

TEAM MEMBER: Jack T. Muecke — J. T. MUECKE — DATE 3/8/85

APPROVED BY: M. S. Kidd — M. S. KIDD — DATE 3-12-85

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I. BACKGROUND

Problems associated with the timely receipts of procured materials have been the subject of the Division of Nuclear Power (NUC PR) discussions on numerous occasions, and as a result of the Regulatory Performance Improvement Program (RPIP) at Browns Ferry Nuclear Plant (BFN), NSRS support was solicited in the form of a review. The review was conducted to examine and evaluate the procurement process for nuclear plants and determine the reasons for time delays and problems.

II. SCOPE

The procurement activities associated with TVA's nuclear power program were divided into two phases, operating plants and plants under construction. This review covered only the operating plants and centered on quality level I and II items and services. Those services or items manufactured by TVA were reviewed for only BFN.

As a part of the NUC PR reorganization effort to move personnel from the Nuclear Power Central Office (NCO) and to solve procurement problems identified by a joint Division of Purchasing (PURCH), NUC PR and Power Stores task force, NCO procurement activities were transferred to the sites. Interorganizational communications and working relationships were stated to have been developed to attack problems and streamline operations. NSRS did not include the evaluation of the reorganization within this review, but did evaluate the task force findings based upon the findings of this review.

III. MANAGEMENT SUMMARY

During the past several months NSRS has been reviewing the procurement process of materials and services for TVA's operating nuclear plants. The review began on June 11, 1984, and continued until the final closeout in Chattanooga on December 5, 1984. As a part of the review, closeouts were held at the completion of the onsite review at BFN, SQN, NCO, and PURCH. Throughout this review, people within NUC PR, Power Stores, PURCH, and the Office of Engineering (OE) were very helpful, cooperative, and in many cases candid. Virtually everyone interviewed considered procurement to be a major problem, and to a large extent the problem was the "other guy." Interviews were conducted with a number of dedicated people trying hard to do their job as they saw it, but frustrated because the system, regulations, QA, etc., were perceived to be working against them. Each group within the procurement chain had real problems and had several examples they were willing to share.

The problems experienced by NUC PR in procuring materials in a timely manner were for the most part problems created by NUC PR. In broad terms, there were five categories within which identified deficiencies could be placed.

A. General Unfamiliarity With Procurement Cycle

Personnel associated with each step of the procurement cycle were aware of what they were supposed to do or what they perceived to

be their responsibility; however, they were not aware of the role, function, or problems of others within the procurement cycle. No one was found, of the more than 90 people interviewed, that knew the entire system. Unrealistic expectations were placed upon the procurement system by originators of procurements. Ordered material was requested to be onsite generally within 90 days when, based upon this review of procurements, 6 months to 1 year would be more realistic. No one knew how long it would take to purchase materials but it was generally accepted that they would not be there when needed.

That lack of knowledge of the procurement system and associated problems produced frustration along the procurement chain. At the sites the procurement cycle and regulations were viewed at all organizational levels as a burden and designed to make the procurement process more difficult. The system and regulations were viewed as roadblocks telling the sites why they could not purchase something versus how to purchase something, and were also designed to purchase something (low bid) the site did not want over what it did want. As a result, the sites were putting more effort into using the system shortcuts through the overuse of emergency purchases and field purchases rather than learning the system for normal procurements and how to work within it.

There was no procurement training identified at the sites for personnel within the procurement cycle. For the most part personnel were introduced to the rigors of procurement by being handed a copy of the site procurement procedure (e.g., SQA 45), which was over 300 pages long, and told to read it. The procurement of items appeared to be viewed by site personnel as a required undesirable job as if it were part of an initiation.

B. Excessive and/or Ineffective Review of Purchase Requests and Requisitions

Typically 17 approval signatures and initials, some by the same people required to sign both the purchase request and purchase requisition, were required for a site-originated procurement. The value added to those documents beyond what the originator, quality assurance, and authorizing official contributed was, for the most part, minimal. In a very small number of procurements that were considered more complicated, the NCO provided valuable input. Considering the timeframe to prepare, approve, and transmit a procurement requisition from the sites to vendors for bids, the sites typically took one to four days, PURCH about three days, and the NCO weeks to months. The value added by the NCO, which was primarily editorial in nature, could not support the continued time delay by the NCO in the procurement cycle; consequently, the removal of the NCO from the review cycle and transfer of the affected NCO personnel to the sites was viewed by NSRS as a positive action provided the NCO problems and delays were not transferred with them.

It appeared to NSRS that the entire procurement system, with all its reviews, was predicated upon the concept of safety in numbers, i.e., the more people involved in reviewing, the better the product. In actuality what NSRS found was procurement documents being changed for no apparent good reason other than a perceived need to demonstrate a degree of usefulness by each successive reviewer.

All procurements generated by the sites, both QA and non-QA, were reviewed by the site Field Quality Engineering Group (FQE). For the most part there was one individual performing that review at each site. Those procurements included direct charges, IQTs, field purchases, transfers, and Material Management System (MAMS) reorders. For example, at BFN during May and June 1984 there were 1051 procurement actions or about 26 procurements per day that required FQE review and approval. The effectiveness of the review on that number of procurements by one individual is questionable, and the effectiveness of the review of QA procurements could be enhanced if the review of non-QA procurements by FQE were performed only on a sampling basis.

C. Ineffective Use of Available Procurement Systems

IQT contracts are supposed to be time savers in that once the IQT has been reviewed and approved, Requests for Delivery (RDs) against the IQT can be issued directly to the vendor without the review and approval process required for new procurements. NUC PR's procurement procedures negated any time savings afforded by an IQT because they required the review and approval of each RD as if it were a new procurement. There was no mechanism to identify large use items such as steel, as potential candidates for IQT contracts.

MAMS is a computerized system to maintain an established supply of inventoried stock items throughout Power, and has the potential of being a very powerful tool. The maximum inventory level and minimum reorder point for some materials were inadequate, and the sites established the practice of hoarding items such as mops and plastic bottles to compensate. The sites viewed the established maximum/minimum levels as arbitrary and an effort to reduce stock inventories. In actuality the established maximum/minimum levels were neither, and the site problems can be attributed to poor communication between the site and the Materials Management Services Staff (MMSS), who administered MAMS.

Although MAMS had the capability of reordering QA items automatically, when initiated by Power Stores, this capability could not be utilized due to the reorder program not being approved as a QA system. As such, unauthorized changes to MAMS information on specifications, etc., could occur. Therefore, efforts were underway to write a QA program for MAMS. In addition, MAMS had the capability of combining like orders from different sites for non-QA material, but according to MMSS personnel was constrained by Office of the General Counsel (OGC) requirements such that it

could not be used. MAMS was also disadvantaged by not having a complete usage history of inventory items. Inventory items could be supplemented by field purchases and direct charge purchases which never became a part of a usage history.

D. Apparent Lack of Planning

NSRS did not specifically look at work planning and its associated impact upon the procurement process during the review. It was covered in an NSRS review of outage controls (see NSRS Report R-84-27-SQN/BFN). It was evident, however, from the conspicuous absence of the discussion of a planning or scheduling phase during interviews that whatever work planning was occurring, it had little positive effect upon procurement. That observation was supported by the identified fact that engineers at the plants were scheduling modifications without having the needed material onsite, with unrealistic expectations on delivery dates, and were using a large number of emergency purchases. Engineers were relying upon their ability to find the needed material somewhere within the TVA system when ordered material had not arrived onsite. The review did not attempt to determine how many jobs required cancellation or rescheduling due to material shortages. Contributing to the problem of planning work was the fact that no one interviewed really knew how long it took to procure an item. It is understood by NSRS that there is no one timeframe applicable to all items procured. Examples were found by and identified to NSRS of procurements that ranged from a few days to over three years and still waiting. A reasonable estimate should be established for routine procurements based upon past procurements, be it six months or one year, for use in planning and scheduling.

E. Quality Assurance

The quality requirements for items procured was a portion of this review. The Operational Quality Assurance Manual (OQAM) was reviewed with regard to procurement and found to be rather cumbersome and conflicting in some cases. The main problems identified were the intermingling of 10CFR Part 21 requirements with quality assurance requirements and the use of commercial grade items as basic components.

The quality level I and II designation is used for basic components and 10CFR21 applicability was determined for all procurements with those QA level designations. In the determination of Part 21 applicability, Part 21 could be determined not applicable because the item being procured was a commercial grade item. If it were a commercial grade item then the quality requirements could be significantly reduced to allow the procurement from an unapproved vendor and receipt inspection by an inspector not qualified to ANSI N45.2.6. The OQAM, Part III, Section 2.1, Appendix F, form for determining Part 21 applicability was deficient and was being misused in that if an item was identified as commercial grade no determination was required of its effect upon

the safety function of a CSSC component or system. Many QA level I and II, Part 21 N/A, procurements of commercial grade items were seen. All procurements, however, in the QA level I category required TVA-approved vendors and quality documentation. For those with a QA level II designation, which is almost equally important from a safety standpoint as a QA level I item, most required no QA documentation. Procurement with a QA level designation and no QA documentation or manufacturing requirements results in an implied level of quality that just may not be there; also, it results in purchased equipment whose quality characteristics are not known.

The use of commercial grade items as basic components is allowed by the NRC. In using such an item as a basic component TVA assumes the sole responsibility of assuring that that item will perform as required when required, including an accident situation. Currently TVA has no receipt inspection program for commercial grade items that includes testing or some other mechanism, such as vendor audit, that can make that assurance.

Considering the five basic categories of problems enumerated above and other findings identified elsewhere within this report, a comparison was made with the findings of the NUC PR Procurement Problems Task Force Report. With regard to the work of the task force and their findings, NSRS believes it represents a good work effort. Based upon the findings of this review, NSRS can support many of their recommendations that are directed toward changing the system, such as:

- Establish a planning group
- Improve PURCH/site communications
- Eliminate unnecessary procurement cycle steps
- Better utilize automated systems

NSRS understood that many of these recommendations were being implemented, but did not review the extent of the implementation. Other task force recommendations, however, appeared to be directed toward correcting the system as is or developing the ability to place blame within the present system with which NSRS does not agree.

In the details of this report additional problems are identified in the areas of approving vendor services, documentation inadequacies with internal TVA transfers, TVA-fabricated equipment, receipt inspection program, and materials with a limited shelf life. As negative as the findings may be, NSRS wants to emphasize that the findings are not for the most part people problems but are system problems. People did not have the procedures or training to perform the task more efficiently.

An NSRS suggested solution to the problems found during this review is contained in Attachment 1.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. R-84-17-NPS-01, The Procurement System is Too Cumbersome and Not Well Known by the Users

Conclusion

The biggest problem found with the procurement system used by NUC PR was its wasteful and cumbersome nature. Procurements were overloaded with redundant reviews producing little value added in most cases and causing unnecessary time delays up to months. Virtually anyone could initiate a procurement action with little or no training. No one was found in the procurement process that knew the process much beyond their sphere of involvement. That resulted in unrealistic expectations being placed upon the system by the originator with regard to delivery time, and in perpetuation by others in the process who did not correct the problems or expectations. One of the more cumbersome and redundant review processes occurred within the NCO, and the removal of that review process on October 1, 1984, with the transfer of people to the sites, will help streamline the process provided the Central Office problems were not also transferred to the sites. To correct the problems with the system, drastic introspective management analysis and action are required (see sections V.B.1, .2, .3, .4b; V.D; and V.H).

Recommendations

R-84-17-NPS-01A
The Procurement Problem Task Force recommendation to eliminate all unnecessary steps in the procurement cycle with the goal of placing very few, if any, steps between the requisitioner and the purchasing agent should be given the highest priority.

R-84-17-NPS-01B
A formalized, documented training program covering the entire procurement process should be developed and required for all personnel within the procurement cycle from the originator (requisitioner) through the purchasing agent.

R-84-17-NPS-01C
A realistic timeframe(s) should be established for routine non-special order procurements, based upon past experience, to cover the time required from procurement origination through receipt of the material onsite. A mechanism should be included in the procurement system to periodically evaluate and adjust that timeframe as necessary, as well as communicate the timeframe to involved personnel (planners, procurers, etc.).

R-84-17-NPS-01D
Material availability and procurement timeframes should be included in all maintenance and modification planning activities. (NOTE: This recommendation is predicated upon information that NUC PR is developing a maintenance and modification planning and

scheduling function at each site. Also see NSRS Report R-84-27-SQN/BFN on outage control.)

B. R-84-17-NPS-02, Lack of Approval of Onsite Vendor Services at SQN

Conclusion

The OQAM, Part III, Section 2.1, paragraph 10 requires and identifies three acceptable methods for evaluating and accepting the work performed onsite by vendors. Contrary to that requirement SQN received services on three separate occasions and could not provide, after repeated requests, objective evidence that the service had been evaluated and accepted in accordance with the OQAM requirement. It is therefore concluded that OQAM, Part III, Section 2.1, paragraph 10 is not being implemented at SQN. (See section V.B.4.a.)

Recommendation

SQN should develop and implement a program that satisfies the requirement and intent of OQAM, Part III, Section 2.1, paragraph 10.

C. R-84-17-NPS-03, Excessive Review of Requests for Deliveries (RDs) on IQT Contracts

Conclusion

NUC PR was reviewing and approving RDs with the same rigor as the IQT contract, against which the RDs were written. That constituted a redundant effort costing 20 days or more delay in receipt of the commodity or service. (See section V.B.4.b.)

Recommendation

NUC PR should streamline its procedure for the review and approval of RDs, with no change of contract involved, to be in line with the requirements of the TVA Procurement Manual.

D. R-84-17-NPS-04, Insufficient Documentation for Transferred Material

Conclusion

ID-QAP 4.3 requires the original contract to be reviewed by the site receiving the transferred material for technical and QA requirements. No objective evidence could be found substantiating compliance. Sites requesting material to be transferred to them by another TVA organization or location did not specifically identify documentation requirements or require a copy of the original contract the material was purchased under. Therefore, the receiving site had a limited basis for accepting material during the receipt inspection process. The site assumed that all

applicable documentation had been sent by the transferring organization without knowing exactly what the original specifications (technical/QA) were. (See sections V.B.4.c and V.B.5.)

Recommendation

NUC PR should implement the requirements specified in ID-QAP 4.3 regarding transferred material. A copy of the original contract should be in the possession of and used by the receiving site during receipt inspection, and QC documentation required with the transfer should be specifically identified.

E. R-84-17-NPS-05, Cable Assemblies at BFN with Assigned QA Level I Designations Fabricated by TVA from QA Level II Parts with No Mechanism to Upgrade QA Classification

Conclusion

Cable assemblies manufactured by TVA were improperly classified QA level I items. The assemblies were manufactured from parts with a lesser QA level II designation and no mechanism was found that was capable of upgrading the QA level designation. (See section V.B.4.d.)

Recommendation

BFN should take whatever steps are necessary to assure that the cable assemblies, identified in section V.B.4.d, in stock, in use, and fabricated in the future satisfy the technical and QA specifications required.

F. R-84-17-NPS-06, BFN Power Stores Receipt Inspected Material Not Trained to Inspect

Conclusion

Power Stores receipt inspectors are not trained to receive material with Certificates of Compliance or Certificates of Conformance (COC), Certified Mill Test Reports (CMTR), or other similar QC documentation. On at least two separate occasions BFN Power Stores personnel receipt inspected and accepted material with CMTRs. One CMTR was for different material than specified in the contract and was not nonconformed. The other CMTR was for similar material substituted by the vendor but no TVA approval of the substitution was found. While the OQAM, Part III, Section 2.2 does not prohibit Power Stores personnel from receipt inspecting material with QC documentation, they should not be allowed to receipt inspect shipments with QC documentation they have not been trained to interpret. (See section V.B.5.)

Recommendation

NUC PR should revise the OQAM to prohibit receipt inspection of material with QC documentation by Power Stores and that BFN evaluate and take corrective action as necessary for the items identified in section V.B.5.

G. R-84-17-NPS-07, Material With Limited Shelf Life Not Reordered In a Timely Manner

Conclusion

The OQAM and DPM system of procedures required the periodic inspection of material with limited shelf life at one half the shelf life. Through DPM revisions that OQAM requirement was deleted. Prior to deletion of the requirement, periodic inspection was being performed (before the shelf life expired) at BFN but not at SQN. BFN required (BF 16.4) reordering shelf life material with a three-month lead time, but SQN had no requirement. Neither BFN nor SQN were reordering material with sufficient lead time to have new material in place before the existing material shelf life expired. Considering the latest industry philosophy regarding shelf life material, as contained in ANSI/ASME NQA-1-1979, the deletion of inspection requirements and reordering of items with insufficient lead times to assume an adequate supply of fresh material is considered inappropriate. (See sections V.B.6 and V.B.2.)

Recommendation

NUC PR should revise the OQAM to establish programs to inspect and reorder shelf life material to assure an adequate supply of fresh material. Also, the current three-month reorder lead time specified in DPM N77A2 should be reevaluated and adjusted as necessary.

H. R-84-17-NPS-08, Materials Management System (MAMS) Under Utilized

Conclusion

The MAMS system was being under utilized in that its capability to track inventory items usage and to reorder inventory items automatically was not being used. Considerable manpower was being expended to perform those functions manually and the MAMS system was not receiving all sources of inventory item usage. One deterrent to a more complete utilization of MAMS was the fact that its program did not have any quality assurance control to prevent unauthorized changes to specifications or other QC information. Efforts were reported to be underway to prepare a quality control feature for MAMS which NSRS highly endorses. (See section V.C.1.)

Recommendation

NUC PR, Power Stores, and the Materials Management Services Section should jointly increase efforts to utilize the MAMS in the most effective and efficient manner possible.