

TENNESSEE VALLEY AUTHORITY
NUCLEAR MANAGER'S REVIEW GROUP (NMRG)
NMRG REPORT NO. R-86-02-NPS,
SUPPLEMENT TO APPENDIX B

Review of Maintenance at Browns Ferry,
Sequoyah, and Watts Bar Nuclear Plants

Fall 1986

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BACKGROUND

During the conduct of the subject review, the open items associated with Nuclear Safety Review Staff (NSRS) Report R-85-03-NPS, "Review of Nuclear Power Maintenance Program," were reviewed for satisfactory corrective action. As stated in Appendix B, item R-85-03-NPS-07, "Common Mode Failure-Generic," at BFN and WBN required additional evaluation to determine whether or not corrective action had been effective. A follow-up evaluation was performed for this item and the results are reported herein.

Finding

In discussions at both BFN and WBN, section supervisors and mechanical maintenance supervisors expressed an awareness much improved over that found during the conduct of NSRS review, R-85-03-NPS, regarding the means and importance of preventing common mode failure. At BFN that awareness was also seen at the foreman level. Both BFN and WBN maintenance supervisors stated the prevention of common mode failure is dependent upon adequate procedures, employee awareness, the conduct of appropriate PHT, and the use of QC personnel and other craft personnel during critical steps in maintenance activities.

At WBN, section-wide training was conducted for mechanical maintenance personnel on the potential for induced common mode failures. Similar training was provided at BFN for the mechanical maintenance foreman for all three units and the "common" maintenance group. Discussions with personnel receiving that training indicated a satisfactory level of awareness regarding common mode failure and the methods of preventing it. The training at both sites is considered effective.

Procedures at WBN were revised to incorporate appropriate common mode failure caution statements. In addition, a procedure in use at WBN and BFN to review maintenance instructions during preparation or revision using an "Instruction Evaluation Checklist," includes a provision to evaluate for common mode failure. At BFN, a mechanical maintenance section instruction letter on common mode failure has been issued. Both procedural systems are considered effective.

PHT was found to be in need of improvement, as documented in report R-86-02-NPS, finding I-1.

The remaining element of preventing common mode failure was the use of QC inspectors during critical steps in maintenance activities. Ongoing maintenance work activities were observed as a part of the NMRG maintenance review, and no deficiencies were recorded involving associated QC inspection activities.

Of the four basic elements of preventing common mode failure in mechanical maintenance activities, three were found to be functioning adequately. The fourth, PHT, was found to be in need of improvement. Corrective action will be tracked through finding I-1 of the maintenance review report, R-86-02-NPS. Therefore, the common mode failure item is closed for WBN and BFN.

ENCLOSURE 3

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO : Those listed

FROM : W. T. Cottle, Assistant Manager of Nuclear Power, LP 6N 38A-C

DATE : December 10, 1986

SUBJECT: NUCLEAR MANAGER'S REVIEW GROUP (NMRC) MAINTENANCE REVIEW -
CORRECTIVE ACTION ASSIGNMENTS

Reference: Memorandum from R. K. Seiberling to S. A. White dated September 30, 1986, "Nuclear Manager's Review Group (NMRC) Report No. R-86-02-NPS; Review of Maintenance at Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants" (Q01 860929 801)

The findings and recommendations of NMRC Report No. R-86-02-NPS have been reviewed with the NMRC, Sequoyah, and the Division of Nuclear Engineering (DNE) management. Based upon this review, the findings have been classified as follows:

- Category 1 - Those findings specifically required to be addressed for Sequoyah in order to support the return to service of the first unit.
- Category 2 - Those site-specific findings that will be addressed individually at the respective site.
- Category 3 - Those longer-term programmatic findings which are required to improve the accomplishment of maintenance activities.

The overall responsibility of developing maintenance policies and programs for ONP has been assigned to Operations Engineering Services (OES), DNE, and that organization has been charged with the oversight of implementing the programs at all sites. As a part of this charge, OES will ensure that all the NMRC findings are properly addressed and the tracking to resolution is accomplished. While OES has the overview responsibility, the findings have been classified into the above categories and assignments made as to who has the prime responsibility for each finding as categorized in the attachments.

DNE will submit quarterly status reports on the overall maintenance corrective action program to the Manager of Nuclear Power. The initial submittal is due by January 15, 1987, and will establish an overall management approach and proposed schedule.

TO: See list on page 2



Those listed
December 10, 1986

**NUCLEAR MANAGER'S REVIEW GROUP (NMRC) MAINTENANCE REVIEW -
CORRECTIVE ACTION ASSIGNMENTS**

TO: H. L. Abercrombie, ONP, Sequoyah
J. P. Darling, ONP, Bellefonte
R. W. Cantrell, W12 A12 C-K
R. J. Johnson, P'OTC-C
J. L. McAnally, LP 5N 38A-C
R. C. Parker, LP 4N 45A-C
H. P. Pomrehn, Browns Ferry
C. G. Robertson, LP 5S 83E-C
R. K. Seiberling, 716C KB-C
G. Toto, ONP, Watts Bar

LOT 6000

RWC:RAS:EFH:ML

Attachments

cc (Attachments):

- RIMS, MR 4N 72A-C
- C. H. Fox, Jr., LP 6N 38A-C
- C. C. Mason, LP 6N 38A-C

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Attachment 1
Category 1 Findings

<u>NPRG Findings</u>	<u>Action Required for SQM Startup</u>	<u>Responsible* Organization</u>	<u>Who is Responsible for Action</u>
A-1 (partial) Need corporate direction for maintenance	Assign responsibility and authority to corporate org.	Manager of OHP	Manager of OES
A-5 Identify acceptable substitute for teflon tape	Test and approve substitute thread sealant	DNE	NEB
	Establish site policy on use of teflon	SQM	Plant Manager
E-1 (partial) PM not identified or performed on some equipment	Identify PM requirements from tech spec and FSAR	SQM	Plant Manager
E-3 SQM not properly documenting all waivers, extensions, or deferrals of PM	Revise plant procedures	SQM	Plant Manager
E-5 (partial) SQM PM activities not tied to commitment or regulatory requirements	Identify PM requirements from tech spec and FSAR	SQM	Plant Manager
F-1 Work instructions are not always followed	Train maintenance personnel in procedural adherence—stress consequences	SQM	Plant Manager
F-2 Some instructions are not clear or contain insufficient information	Revise Maintenance Instruction Writers Guide. Stress requirement to halt activity if required to obtain procedure change	SQM	Plant Manager

*OES will coordinate resolution of finding at other sites.

Attachment 1 (Continued)
Category 1 Findings

<u>MPRG Findings</u>	<u>Action Required for SQM Startup</u>	<u>Responsible* Organization</u>	<u>Who Is Responsible for Action</u>
F-3 SQM procedure revisions delayed by word processing	Improve word processing	SQM	Site Director
G-2 SQM work not being performed to current instruction or drawing	Upgrade procedures to require verification that latest revision of instruction is being used	SQM	Plant Manager
G-5 Consolidated equipment classification list not available	Combine list on EQIS showing classification	SQM, DNE, DNCA	Site Director & OES
H-1 Minor design changes not being processed in timely manner	Revise processing procedure to allow quicker handling	DNE/Projects	Project Engineer
H-6 Some safety-related MRs not PORC reviewed	Review procedure for processing MRs, revise if necessary, train personnel	SQM	Plant Manager
H-7 Some MR work instructions do not contain sufficient guidance	Review procedure for processing MRs, revise if necessary, train personnel	SQM	Plant Manager
I-1 Post maintenance testing not always defined or performed	Revise procedures to require PNT be considered, train personnel	SQM	Plant Manager

*OES will coordinate resolution of finding at other sites.

Attachment 1 (Continued)
 Category 1 Findings

<u>NPRG Findings</u>	<u>Action Required for SQN Startup</u>	<u>Responsible* Organization</u>	<u>Who is Responsible for Action</u>
L-4 Defective rigging not segregated from acceptable	Item identified at BFNP, review SQN practices and program	SQN	Site Director
M-1 (partial) Need more involvement of maintenance management/supervision in ongoing maintenance activities	Stress more supervisors time in workplace	SQN	Plant Manager
O-1 QA review of MRs not identifying significant weaknesses	Train QA reviewers, providing stronger guidance	DNQA	SQN QA
O-2 QA identified corrective actions have not been effective	Strengthen corrective action requirements - complete NQAM revised	SQN, DNQA	Site Director

*OES will coordinate resolution of finding at other sites.

Attachment 2
Category 2 Findings

<u>NPRG Findings</u>	<u>Responsible Organization</u>	<u>Who Is Responsible</u>
D-1 Additional maintenance shop and office space needed	BFN, SQN, MBN	Site Director
E-2 BFN and MBN PM activities not properly controlled	BFN, MBN	Plant Manager
E-4 MBN oil additions not properly verified	MBN	Plant Manager
G-1 BFN maintenance scheduled and authorized before prerequisite conditions are satisfied	BFN	Site Director
G-3 BFN ISI corrective action work not completed in timely manner	BFN	Site Director
H-2 BFN did not have effective method of prioritizing maintenance work for planning purposes	BFN	Site Director
H-3 BFN and MBN MRs signed off without completing all necessary work	BFN, MBN	Plant Manager
H-4 BFN and MBN manpower not always effectively used	BFN, MBN	Plant Manager
H-6 (repeat) MBN, some safety-related MRs not PORC reviewed	MBN	Plant Manager
J-3 Some BFN material stored in locations that delay issue	BFN	Site Director
L-4 (repeat) BFN defective rigging not segregated from acceptable	BFN	Site Director
O-4 BFN and MBN, QA surveillance limited in scope	BFN, MBN	Site Director

Attachment 3
Category 3 Findings

<u>MFRG Findings</u>	<u>Responsible Organization</u>	<u>Who Is Responsible</u>
A-1 (partial) Need corporate direction for maintenance	DNE/OES	OES
A-2 Need to define performance indicators for evaluation of maintenance effectiveness	DNE/OES, BFM, SQM, MBN	OES & Plant Manager
A-3 Need corporate guidance in overall PM program	DNE/OES	OES
A-4 Root Cause Analysis needs to be expanded	DNE/OES, BFM, SQM, MBN	OES & Plant Manager
C-1 Training needed for planners	DNE/OES, POTC, BFM, SQM, MBN	OES, POTC, Site Director
G-4 Maintenance activities need to be coordinated to prevent duplication and excessive equipment downtime	DNE/OES, DNS	OES & Information Management Staff
H-5 Inability to make minor changes to MR instructions causes work delay	DNE/OES, DNQA	OES, DNQA, Site Director
J-1 MAMS does not reflect current status of parts and material inventory	ONP Staff	McAnally
J-2 Stock materials not reordered in timely manner	BFM, SQM, MBN, DNQA, G&P Staff	McAnally
J-4 At SQM, unavailable material delays maintenance activities	BFM, SQM, MBN, ONP Staff	McAnally
L-1 MBN has a good tool room inventory control system (No action required)	Good Practice at MBN	Plant Manager
L-2 BFM and SQM do not have adequate control with existing tool room inventory system	BFM, SQM	Plant Manager
M-1 (partial) Need involvement of maintenance management/supervision in ongoing maintenance activities	BFM, SQM, MBN	Plant Manager

Attachment 3 (Continued)
Category 3 Findings

<u>NPRG Findings</u>	<u>Responsible Organization</u>	<u>Who Is Responsible</u>
M-1 Maintenance history program does not provide meaningful, complete, and useful information	BFN, MBW	Plant Manager
M-2 Maintenance history not used for planning maintenance or identifying needed modifications	BFN, SQW, MBW	Plant Manager
O-3 NQAM inconsistencies create unnecessary work, delay work, and inconsistent site implementation	DNQA	DNQA

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TENNESSEE VALLEY AUTHORITY
NUCLEAR SAFETY REVIEW STAFF
NSRS REPORT NO. R-86-01-SQN

SUBJECT: SEQUOYAH NUCLEAR PLANT (SQN) - NUCLEAR SAFETY REVIEW STAFF
(NSRS) FOLLOW-UP REVIEW OF OPEN ITEMS FROM PREVIOUS NSRS REVIEWS
AND INVESTIGATIONS.

DATES OF
REVIEW: FEBRUARY 3-25, 1986

REVIEWERS:	<u>V.S. O'Block</u>	<u>3-21-86</u>
	V. S. O'BLOCK	DATE
	<u>H.W. Bennett</u>	<u>3-21-86</u>
	H. W. BENNETT	DATE
	<u>A.G. Debbage</u>	<u>3-20-86</u>
	A. G. DEBBAGE	DATE
	<u>V.S. O'Block /pr (per telecon) 3-21-86</u>	<u>3-21-86</u>
	K. G. LAWLESS *	DATE
APPROVED BY:	<u>R.D. Smith</u>	<u>3/21/86</u>
	R. D. SMITH	DATE

* February 3 and 4, 1986, only.

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I. SCOPE

This follow-up review was conducted to assess the status of open items related to the Sequoyah Nuclear Plant (SQN) that had been identified during ten previous Nuclear Safety Review Staff (NSRS) investigations and reviews. Two of these items (R-82-04-NPS-1 and R-85-02-SQN/WBN-01) were also reviewed for status at the Watts Bar Nuclear (WBN) plant. The status of the following 44 open items was reviewed:

- o R-80-03-NUC PR-C1, C2 (see reference A.1)
- o R-80-05-SQN-4 (see reference A.2)
- o R-81-07-SQN-7 (see reference A.4)
- o R-82-04-NPS-1 (see reference A.6)
- o I-82-20-SQN-1, 2 (see reference A.7)
- o R-82-21-SQN-2, 4, 5, 6, 7, 9 (see reference A.11)
- o I-84-12-SQN- 1 through 23 (see reference A.25)
- o R-84-17-NPS-2 (see reference A.41)
- o R-85-02-SQN/WBN-1, 2 (see reference A.42)
- o R-85-03-NPS-1, 4, 6, 7, 8 (see reference A.54)

This follow-up review consisted of discussions with the Office of Nuclear Power (ONP) personnel and evaluation of TVA documentation and corrective action associated with each open item.

II. CONCLUSIONS AND RECOMMENDATIONS

During this follow-up review, the status of 44 open items related to SQN from 10 NSRS review and investigation reports was reviewed. The NSRS considers 40 items closed and 4 remaining open with 1 additional recommendation generated. Of the four open items, the NSRS considers it necessary that the corrective action associated with the two recommendations R-80-05-SQN-4B and R-85-02-SQN/WBN-02 be completed prior to restart. The other two open items (R-85-03-NPS-07, -08) and the new recommendation (R-86-01-SQN-01) are not deemed necessary to be resolved prior to restart; however, corrective action should be expedited. The status and details of these four open items is provided in sections III and IV, respectively. The additional recommendation follows.

NEW

A. R-86-01-SQN-01, Improvements in Overall As Low As Reasonably Achievable (ALARA) Program

Conclusion

During the follow-up review of the NSRS recommendation I-84-12-SQN-13 (see section IV.2), it was determined that there are weaknesses in the overall SQN ALARA program in the following areas:

1. Inadequate staffing to support the ALARA engineering effort.
2. Lack of a plant ALARA review committee with responsibility for overall coordination of the ALARA program.
3. Ineffective ALARA employee suggestion program.
4. Ineffective ALARA coordination between site functional organizations.

5. Detailed knowledge of ALARA techniques for many individuals responsible for ALARA implementation.

Recommendation

NSRS recommends that actions be taken to improve the effectiveness of the SQN ALARA program. The following suggestions should be used when determining what actions SQN will take:

1. ALARA Engineer Staffing Support. Determine the appropriate Health Physics (HP) technician staffing level required to effectively perform ALARA duties during normal and off-normal working hours. This determination needs to consider all plant functions which require ALARA considerations; such as, maintenance, operations, test, modifications, outage planning, design, and site services. A job-task analysis could be used to determine an effective staffing level.
2. ALARA Review Committee. Establish an ALARA review committee composed of members from the major functional areas with the responsibility for overall coordination of the ALARA program. Specific functions would include:
 - a. Review exposure reduction plans for specific jobs with exposure estimates greater than 25 man-rem.
 - b. Direct the implementation of approved ALARA suggestions.
 - c. Review planning schedules.
 - d. Review specific and timely ALARA problems; such as, reports of unnecessary loitering in dose areas.
 - e. Review personnel contamination reports.
 - f. Review corrective action on delinquent postjob ALARA reports.
 - g. Review status of ALARA projects.
 - h. Other.

The ALARA Committee composition and responsibilities should be incorporated into a plant instruction, e.g., an SQN Standard Practice or Radiological Control Instruction (RCI).

3. ALARA Employee Suggestion Program. Increase employee participation in the ALARA employee suggestion program. Adoption of an awards program could be a way to increase participation.

4. Department ALARA Coordinators. ALARA coordinators should be assigned to all site functional organizations, e.g., modifications, operations, maintenance, test, design, and site services, to provide these groups with the expertise necessary to support all aspects of the ALARA program. This would be an expansion of the current plans of the HP Section to assign an M-3 HP to assist planners with ALARA.
5. Training. An ALARA training program should be prepared and given to those individuals directly responsible for the ALARA plant efforts, e.g., ALARA Committee members, department coordinators, plus those individuals responsible for preparation of ALARA preplans and postplans. The training program should be extensive and incorporate as basic elements: the physics of radiation; fundamentals of radiation attenuation; types of radiation sources; review of industry experience; methods to reduce exposure, e.g., changing test frequency or time of test, changing preventive maintenance frequency or time of maintenance, relocate components with high failure rates to lower radiation fields, and/or add permanent shielding, flushing systems, etc.

See section IV.SS for details of this recommendation..

III. STATUS OF OPEN ITEMS

A. R-80-03-NUC PR-C1, Additional Training for STA

In the original review, NSRS recommended that additional training be provided to SQN Shift Technical Advisors (STAs) to assure cognizance of existing requirements for reviewing shift engineer's journals. By reviewing on-the-job training material and having discussions with the Reactor Engineering Unit Supervisor and an STA it was determined in this follow-up review that adequate requirements exist in the training material for review of night order books, journals, and logs and that the on-the-job training provides the STA with an adequate understanding of these review requirements. This item is closed (see section IV.A for details).

B. R-80-03-NUC PR-C2, Adequate STA Training Records

In the original review, NSRS recommended that SQN review training records to assure that adequate training records are available to demonstrate that training has been completed. For this follow-up review, it was determined that the Power Operations Training Center (POTC) maintains the on-the-job-training records for the SQN STAs. Several of these on-the-job training records were reviewed and determined to be adequate. Discussion with one of these STAs verified that the individual had completed the training and possessed a thorough knowledge of the requirements for STA log and journal review prior to and after assuming the STA shift. This item is closed (see section IV.B for details).

C R-80-05-SQN-04, Electrical Deficiencies

Part A - Four specific electrical deficiencies were found in the original review. Three of these were closed by a follow-up review the same year, the fourth was verified complete in this follow-up review. This item is closed (see section IV.C, Part A, for details).

Part B - In the original review, NSRS recommended revising the configuration control program to require verification of plant configuration once per refueling cycle. The configuration control programs have improved considerably since 1980. NSRS believes that once a baseline configuration is established, the configuration control programs will serve to maintain control over the configuration such that verification once per refueling cycle will not be required. This item remains open pending verification of the configuration baseline for critical structures, systems, and components (CSSC) by completion of the following actions prior to restart (see section IV.C, Part B, for details):

- a. Completion of Phase I of the plan for conversion to configuration control drawings for those drawings previously identified by the plant as necessary for CSSC configuration control.
- b. Selection, by the plant, of a number of CSSC systems for complete walkdown to verify that the actual configuration agrees with the CSSC configuration control drawings verified as part of the Phase I effort.
- c. Walkdown of the selected systems and correction of any discrepancies found. If significant problems are found, additional systems should be selected for walkdown.

Part C - In the original review, NSRS recommended that programs be implemented or revised for all employees to emphasize the need for and maintenance of configuration control. NSRS found in this follow-up review that employees are made aware of the need for configuration control and their responsibilities through normal orientation and training in instructions and through regular exposure to configuration control in the instructions they normally use. Employee awareness of configuration control appears to be adequate. This item is closed (see section IV.C, Part C, for details).

In summary, Parts A and C are closed and Part B remains open.

D. R-81-07-SQN-07, Unreviewed Temporary Alteration Control Forms

Part 1 - In the original review, NSRS found discrepancies between the division procedure manual and AI-1.9, "Control of Temporary Alterations and Use of the Temporary Alteration Control Order." In this follow-up review, NSRS found that the discrepancies between AI-1.9 and the new upper-tier document, the NQAM, were resolved. This item is closed (see section IV.D, Part 1, for details).

Part 2 - In the original review, NSRS found many CSSC temporary alterations that had been in effect for nearly a year and recommended that the status of outstanding unit 2 CSSC temporary alterations be reviewed prior to fuel loading. For this follow-up review, NSRS found no evidence that this had been done. However, PORC review of all outstanding temporary alterations is now required every six months, monthly status reports are issued to managers and supervisors, a commitment was made to INPO to close specific old temporary alterations, and the number of outstanding temporary alterations have been steadily decreasing. This indicates an appropriate level of attention to the control of temporary alterations. This item is closed (see section IV.D, Part 2, for details).

E. R-82-04-NPS-01, Containment Spray Test Line at SQN and WBN.

In the original review, NSRS recommended that automatic isolation of the containment spray test line at SQN and WBN be provided to enable isolation of this test line in the event an accident occurs requiring the use of the containment spray system when testing is in progress. For this follow-up review, it was determined that rather than automatic isolation being provided, the SQN containment spray pump test instruction SI-37, "Containment Spray Pump Test," was modified to require an Assistant Unit Operator (AUO) be stationed near the manual isolation valves during conduct of the pump testing and be in constant communication with the control room. Thus, if an accident requiring the containment spray system occurred during testing, the AUO would be instructed to close the test line valves. This change was determined to be acceptable to NSRS. The WBN instruction SI-4.0.5.72-P, "Containment Spray Pump Test," has been revised in the same manner as the SQN instruction, namely, requiring an AUO to be stationed at the test line isolation valves and be in contact with the control room during conduct of the test. This item is closed (see section IV.E for details).

F. I-82-20-SQN-01, Administration of KI to Plant Personnel

As a result of the original investigation, NSRS determined that applicable procedures did not address the administration of KI uniformly and recommended that consistent guidance be provided. For this follow-up review, NSRS found that the appropriate documents have been revised to provide consistent guidance. This item is closed (see section IV.F for details).

G. I-82-20-SQN-02, Upgrade of Field Team Van

As a result of the original investigation, NSRS recommended the addition of a permanent seat in the rear and compartmentalized labeled equipment storage for the field team vans. For this follow-up review, NSRS found that these recommendation have been implemented. This item is closed (see section IV.G for details).

H. I-82-21-SQN-02, Emphasize Pre-Job Planning

As a result of the original investigation, NSRS recommended that additional emphasis should be placed on prejob planning and procedure development with review by both the Nuclear Central Office and SQN to ensure that hazards were identified and reduced to an acceptable level of risk and that proper equipment was available in working order prior to commencement of the activity. For this follow-up review, it was determined that new positions of maintenance planners have been created at SQN and are filled. Their job descriptions require them to do these necessary functions before the job is started which includes the removal of persons from situations where hazards are not adequately controlled. This item is closed (see section IV.H for details).

I. I-82-21-SQN-04, Establish Program to Evaluate Unusual Health Physics Conditions

As a result of the original investigation, NSRS identified a need for a program to evaluate unusual health physics conditions with emphasis placed on reduction of exposure potential. The program elements should contain trend analysis of exposures, contamination incidents, incremental increases in dose and dose rates plus a variety of other indicators of problem areas. For this follow-up review, it was determined that computerized ALARA information system user procedures have been developed. An ALARA engineer was placed at SQN to evaluate plant conditions and identify reasonable methods to reduce radiation exposures. The procedures, reports issued, and trend charts were examined and determined to satisfy the intent of the recommendation. This item is closed (see section IV.I for details).

J. I-82-21-SQN-05, Emphasize Safety-First Policy to All Employees

As a result of the original investigation, NSRS recommended that the TVA Board of Directors safety-first policy be impressed upon all employees. For this follow-up review, it was determined that shortly after the thimble tube ejection incident, the TVA Board of Directors issued a memorandum to all TVA employees which expressed the safety-first policy. This item is closed (see section IV.J for details).

K. I-82-21-SQN-06, Practice of Removing Cap from Vial of Na-24 be Reevaluated

As a result of the original investigation, NSRS recommended that the practice of removing the cap from a vial of Na-24 be reevaluated and the use of a tool be considered. For this follow-up review, NSRS found that the tests requiring the use of Na-24 will not be conducted again at SQN. One procedure had been cancelled and the remaining procedure will be cancelled when open items associated with the test are closed. This item is closed (see section IV.K for details).

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L. I-82-21-SQN-07, Adjust Extremity Exposure Records to Reflect Reasonable Maximum Exposure

In the original investigation, NSRS concluded that exposure records for employees involved in the 10 rem extremity exposure incident did not reflect the probable actual exposure. For this follow-up review, NSRS found that extremity exposure records for the employees involved had been revised to show calculated values for reasonable maximum exposure. This item is closed (see section IV.L for details).

M. I-82-21-SQN-09, Evaluate Extremity Monitoring Program at TVA and Particularly SQN

As a result of the original investigation, NSRS recommended that the extremity monitoring program be evaluated for the capability of identifying extremity exposure sources and interpreting extremity exposures from all radiation sources encountered with emphasis on seemingly point sources. For this follow-up review, NSRS found that an evaluation of the extremity monitoring program has been performed. The Radiological Protection Plan and plant instructions provide for the identification of extremity exposure hazards, ALARA preplanning, and the appropriate use of extremity monitoring devices to ensure that extremity doses are accurately measured. This item is closed (see section IV.M for details).

N. I-84-12-SQN-01, Inadequate Corrective Measures to Alleviate the Degraded Condition of the Thimble Tubes

As a result of the original investigation, NSRS recommended that responsibility for overall system operability be assigned to plant engineers. This responsibility would be to periodically assess system performance, operations, maintenance and testing, and to assure problems are promptly identified and corrected. For this follow-up review, NSRS determined that a new procedure was recently issued which identifies the assignment of each plant system to a designated plant section, e.g., the Reactor Engineering Section is responsible for the incore flux detectors. Two reactor engineers are currently assigned to this system (one engineer for each reactor unit). The engineers are responsible for performing all the tasks in the NSRS recommendation. System status is reviewed on a continuing basis. This item is closed (see section IV.N for details).

O. I-84-12-SQN-02, Inadequate Survey and Feedback to Field Services Group (FSG) Personnel

As a result of the original investigation, NSRS recommended that assignments be given to those knowledgeable and that they be held responsible for the success and safety of the operation to be accomplished. For this follow-up review, it was determined that since the thimble tube event, it has been stressed to all staff personnel that they will have responsibility and be held accountable for the success and safety of operations to be accomplished. Based upon the review of documentation and discussions with supervision,

NSRS found no reason to doubt that work assignments would not be given to those most knowledgeable and are available to perform the operation. Planning of activities is comprehensive, as indicated in the unit 2 target schedule with the items receiving close management attention, particularly if they are likely to produce potential problems or delays. This item is closed (see section IV.O for details).

P. I-84-12-SQN-03, Inadequate Decision Making Process

As a result of the original investigation, NSRS recommended that management identify and thoroughly evaluate hazards associated with unique activities and that techniques such as systematic hazard analysis methodology be used. For this follow-up review, it was determined that SQN uses the hazard assessment methodology to evaluate the safety of unique operations. NSRS examined several hazard assessment worksheets and they were adequate. Also, it was determined that Management Oversight Risk Tree (MORT) analysis was used to assess the safety of performing the unique activity of entering the unit 1 pressurizer enclosure to do repairs with the unit at full power. The work was subsequently performed safely as the hazard analysis concluded. This item is closed (see section IV.P for details).

Q. I-84-12-SQN-04, Assignment of Work Function to the FSG as an Ordinary Work Activity

As a result of the original investigation, NSRS recommended that sufficient time and information be provided to properly plan the activity and that the knowledge and background of workers assigned is adequate. For this follow-up review, it was determined that management has stressed to employees the importance of safety first, advance planning is taking place, maintenance planner positions have been established and staffed, and trained and knowledgeable personnel are being assigned to perform tasks. This item is closed (see section IV.Q for details).

R. I-84-12-SQN-05, Selection of an Inappropriate Instruction for the Control of the Work Activity

As a result of the original investigation, NSRS recommended conducting an awareness program to stress the importance of procedure controls, compliance with procedures, the proper change process for inadequate procedures, and SQN policy as stated in SQA 129. For this follow-up review it was determined that it has been conveyed to plant personnel the importance of compliance with procedures, TVA safety-first policy, foremen and craft personnel have been informed on how to use plant instruction change forms, the daily Plant Manager meetings discuss any failure to follow procedures, and the SQA 129 policy has been stressed to employees. This item is closed (see section IV.R for details).

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S. R-84-12-SQN-06, Inadequate Job Safety Analysis and Hazards Assessment

As a result of the original investigation, NSRS recommended that the job safety analysis program be upgraded; that an effective hazards assessment methodology be established as a tool to analyze the identified radiological and industrial aspects of the job, the probability of an accident, and the impact on the workers, plant, and the public; and that the recommendations of the NSRS Report No. I-82-21-SQN be implemented.

For this follow-up review, it was determined that the remaining open items from report I-82-21-SQN have been satisfactorily resolved (sections IV.H through IV.M of this report); hazards assessment methodology is established and it uses conservative accident assumptions; job safety planning instructions exist and are being used; ALARA preplanning criteria and checklist have been expanded to cover radiological hazards; maintenance planning positions with overall responsibility for job safety have been established and staffed. This item is closed (see section IV.S for details).

T. I-84-12-SQN-07, Inadequate Field Quality Engineering (FQE) Review of Maintenance Request (MR) and Reference Work Instruction

As a result of the original investigation, NSRS concluded that the quality of the FQE review process of MRs should be improved to assure the quality of referenced work instructions, the proper program controls are identified and the instructions are appropriate for the job. For this follow-up review, it was determined that an evaluation of the MR process was conducted by the Quality Engineering group. They identified the need for training of personnel involved in the MR planning process and adjustments were made to upgrade the QA review program. The training records for QA reviewers, section instruction letters and MR review reports were examined and determined to adequately address the recommendation. This item is closed (see section IV. T for details).

U. I-84-12-SQN-08, Noncompliance with Requirements of RWP No. 01-1-00102

As a result of the original investigation, NSRS recommended to emphasize compliance with requirements of RWPs to employees for their own protection. For this follow-up review, it was determined that the RWP cover sheet has been modified to state that entry into containment will be performed in accordance with AI-8 "Access to Containment". AI-8 has been modified to require that the incore detector system be tagged with a hold order prior to issuing an RWP for the lower containment or annulus and specifies that the hold order will be issued to the HP shift supervisor by title. Other modifications to AI-8 were made to eliminate confusion on coordination of maintenance activities and access to the lower containment or annulus. Also, clearance procedure training has been conducted for appropriate personnel as discussed in section IV.V of this report. RWPs and RCI-10, "Minimizing Occupational Radiation Exposures," training has been given to a significant number of SQN personnel. This item is closed (see section IV.U for details).

V. I-84-12-SQN-09, Noncompliance with Requirements of Section 5.1.4 of AI-3, "Clearance Procedures"

As a result of the original investigation, NSRS recommended that strict compliance with the requirements of AI-3, "Clearance Procedures," be emphasized and enforced. For this follow-up review, it was determined that the following corrective actions were taken to resolve this recommendation: (a) formal training on AI-3 was conducted and only those personnel that passed the exam were included in the revised clearance authorization list in Appendix A to AI-3, (b) AI-8 "Access to Containment" was modified to require the shift engineer to issue the hold order clearance on the incore detector system to the HP Supervisor by title and controls access to the lower containment or annulus based upon the status of the incore detector system, (c) hold order concerns have been discussed in outage critique meetings, (d) hold orders were discussed at crew safety meetings and (e) planners are instructed to minimize use of hold orders. This item is closed (see section IV.V for details).

W. I-84-12-SQN-10, Modification of Cleaning Tool Base Supports Without Performing a Technical Evaluation or Testing

As a result of the original investigation, NSRS recommended that it be emphasized to the plant staff that changes to tools and equipment affecting work on critical structures, systems and components can be made only after conducting a thorough technical evaluation. For this follow-up review, it was determined that a standard practice SQM 63 for special or modified tooling has been prepared and is being used. Twenty special tool evaluations have been prepared. This item is closed (see section IV.W for details).

X. I-84-12-SQN-11, Violation of Work Instruction

As a result of the original investigation, NSRS recommended that management emphasize that adherence to PORC reviewed, plant manager approved instructions is mandatory and periodic assessment of compliance with instructions should be initiated and corrective action taken. For this follow-up review, it was determined that adherence to procedures is being emphasized by SQM management as discussed in sections IV.Q and IV.R of this report; the Plant Manager discusses events involving failure to adhere to procedures at his daily management meetings; the Quality Surveillance Section performs periodic assessments of compliance with instructions. This item is closed (see section IV.X for details).

Y. I-84-12-SQN-12, Lack of Control of Egress Capability from Containment

As a result of the original investigation, NSRS recommended that a policy and methodology be established to require an evaluation of the effect on work in progress and notification of affected workers, as necessary, before granting permission to incapacitate egress routes from the reactor containment. In addition it was recommended that the risks of working in containment and established controls for containment integrity be emphasized to employees. For this follow-up

review, it was determined that the instruction AI-8 "Access to Containment" has been revised to require notification be given to personnel within containment to use an alternate exit if an airlock door should be made intentionally inoperable. The actions taken in response to recommendations I-84-12-SQN-6, - 8, - 9, - 13-, -20 and I-82-21-SQN-5 (sections IV. S, U, V, Z, GG, and J of this report) adequately discuss the employee job safety and awareness aspects of this recommendation. This item is closed (see section IV. Y for details).

Z. I-84-12-SQN-13, Breakdown in the ALARA Preplanning Program

As a result of the original investigation, NSRS recommended that it be emphasized to the plant staff that compliance with ALARA preplanning requirements as specified in RCI-10, "Minimizing Occupational Radiation Exposures," must be accomplished. For this follow-up review, it was determined that positive corrective action has been taken by: (a) making extensive modifications to RCI-10 to require an ALARA preplan based upon eight criteria rather than the previous single criteria and adding an extensive 41 item preplan and post-plan checklist, (b) training on RCI-10 and RWP has been given to a significant number of SQN employees, and (c) HP participation in PORC subcommittee biennial review of existing and all newly proposed plant instructions and, where appropriate, adding a precaution to have personnel contact HP for applicable RWP, AI-33 shielding and ALARA preplanning. This item is closed (see section IV.Z for details).

AA. I-84-12-SQN-14, Need for Formal Documentation for Upper Plant Management Approval to Work in Radiation Dose Rate Fields Greater Than 50 Rem/Hour

As a result of the original investigation, NSRS recommended that SQN establish formal requirements and provide a method to document the authorization to work in dose rate fields greater than 50 rem/hour. For this follow-up review, it was determined that Radiological Control Instruction RCI-14 "Radiation Work Permit (RWP) Program", has been revised to require formal documentation of the review of all RWPs when the work area dose rate equals or exceeds 50 REM/hour or prior to any entry inside the polar crane wall when the reactor is at power. This item is closed (see section IV.AA for details)

BB. I-84-12-SQN-15, Availability of Communications Following the Accident

As a result of the original investigation, NSRS recommended that anytime the telephone is out of service in the airlock, alternate communication methods should be considered. Also, the availability of communications should be considered during the performance of job safety analysis and job planning. For this follow-up review, it was determined that the instruction AI-8, "Access to Containment," was modified to require: (a) the Public Safety Officer unlocking the airlock ensure that the phone inside the airlock is checked for

proper operation prior to the first person entering containment and fill out a data sheet related to phone operability, (b) if the phone is not working an immediate attention maintenance request is initiated to Electrical Maintenance for repair, and (c) entry into containment during the period the phone is out of service shall be approved by individual supervision or the Shift Engineer when the supervisor is not present.

Also, the RCI-10, "Minimizing Occupational Radiation Exposure," was revised to add a prejob ALARA planning report checklist. This checklist requires that a determination be made on whether special communications equipment is needed to enable workers to communicate effectively. This item is closed (see section IV.BB for details).

CC. I-84-12-SQN-16, Effective Cleaning of the Thimble Tubes by NUS Corporation

As a result of the original investigation, NSRS recommended that SQN advise WBN of the effectiveness of the NUS cleaning method over the Teleflex method. For this follow-up review, it was determined that the SQN Plant Manager informed WBN of the NUS cleaning method. The WBN instruction MI-94.3, "Incore Flux Thimble Cleaning and Lubrication," has been modified to require the use of the NUS cleaning equipment and methods. This item is closed (see section IV.CC for details).

DD. I-84-12-SQN-17, Poor Quality Cleaning Procedures and Inadequate PORC Review

As a result of the original investigation, NSRS had expressed concerns with the adequacy of maintenance instructions and the PORC procedure review process. It was recommended that an evaluation be made of the PORC procedure review process with consideration given to supplementing the review process with expert subcommittees; cancel SMI-0-94-I; do not use SMI-0-94-2 until it has been revised to include quality elements; perform a generic review of all maintenance and special maintenance instructions to ensure adequacy. For this follow-up review, it was determined that SMI-0-94-1 and SMI-0-94-2 were cancelled and a thimble tube cleaning procedure MI-1.10 "Incore Flux Thimble Cleaning and Lubrication," issued. The Plant Manager stated that an evaluation of the PORC procedure process has been conducted and that the work load needed to be reduced and that steps have been taken to reduce this load. Subcommittees are being used for the procedure review process. This item is closed (see section IV.DD for details).

EE. I-84-12-SQN-18, Noncompliance with Serious Accident Reporting and Accident Scene Preservation Requirements

As a result of the original investigation, NSRS recommended that corrective action be taken to ensure future compliance with TVA established requirements for accident reporting and scene preservation. For this follow-up review, it was determined that an

ONP procedure for serious incident investigations was issued in May 1985 and a SQN site procedure SQS 29 issued in July 1985. These documents satisfactorily address accident reporting and scene preservation requirements. This item is closed (see section IV.EE for details).

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FF. I-84-12-SQN-19, Limited NUC PR Accident Investigation

As a result of the original investigation, NSRS recommended that in future accident investigations potential conflict of interest should be avoided; the investigation initiated as soon as possible with sufficient time for its conduct; it should encompass all aspects of the accident; the ONP recommendation that consideration be given to leaving the inner door open should be deleted. For this follow-up review, it was determined that the ONP procedure for serious incident investigations and the SQN site procedure SQS 29 adequately address these items.

The recommendation for leaving the inner door open was not implemented since AI-8, "Access to Containment," was appropriately modified. This item is closed (see section IV.FF for details).

GG. I-84-12-SQN-20, Needed Reemphasis on the TVA and SQN Employee Expression of Concerns for Safety and Safety-First Policies

As a result of the original investigation, it was determined that during the thimble tube cleaning the employees did not relate their increasing concerns for the safety of the job to upper management. It was recommended that it should be emphasized to all SQN employees that they are responsible for voicing their views on safety and that all supervisors, engineers, and foremen must evaluate responsible concerns expressed to them. For this follow-up review it was determined that the recently implemented employee concern program satisfactorily resolves this recommendation. This item is closed (see section IV.GG for details).

HH. I-84-12-SQN-21, Ineffective SQN ISEG Activities

As a result of the original investigation, NSRS recommended that SQN reorganize or reassign functions as necessary to provide ISEG personnel adequate independence from line responsibility and pressure and to limit their functions to ISEG type duties as required by the Technical Specifications. For this follow-up review, it was determined that the ISEG/Compliance Staff has six engineers and one supervisor that perform the ISEG/Compliance function. Many of the compliance functions, e.g., LER preparation, potentially reportable events review, scram investigations, etc., are ISEG-type functions. Based upon the review of several of the ISEG reports and discussions with several engineers, nothing suggested that the ISEG-type work was being compromised by the dual responsibilities. Also, proposed Technical Specification changes with justification have been submitted to the NRC that show the ISEG/Compliance Staff reporting to the Site Director with the staff having dual responsibilities. Per discussions with plant management, this current reporting arrangement has been discussed with NRC personnel. In addition, the ONP organization changes are being

considered that could impact the ISEG reporting arrangements. The resolution of the proposed Technical Specification change with NRC combined with potential revisions to the ONP organization will result in resolution of this item. Because positive action has been taken and a resolution with NRC is being pursued at the highest levels of TVA nuclear power management, this item is closed (see section IV.HH for details).

II. I-84-12-SQN-22, Significant Breakdown in the SQN Procedure Process for Maintenance Activities

As a result of the original investigation, NSRS recommended that the procedural process for maintenance activities be thoroughly evaluated. Corrective actions should be initiated to: (1) improve the knowledge of personnel preparing and using procedures as to what constitutes an appropriate procedure, quality elements to be incorporated into a procedure, and the change process for the procedures; (2) improve quality of PORC and biennial reviews, and (3) compliance with procedures. For this follow-up review, discussions were held with supervisors and engineers in Maintenance and Quality Assurance and documents related to the preparation, review, and implementation of maintenance instructions were examined. It was determined that the following actions have been taken to improve the procedural process for maintenance activities: (1) meetings were held with craft and foreman to inform them how to use plant instruction change forms, (2) reviews of procedures are being made in the draft stage, (3) the craft are now required to review draft instructions or new revisions, (4) a draft procedure writing guide has been developed by Mechanical Maintenance, (5) a procedures review checklist has been developed and is being used, and (6) a commitment has been made to NRC to review all Maintenance Instructions with a fully developed checklist by July 1987. Additional discussion on PORC reviews is provided in section IV.DD of this report. Emphasis on adherence to procedures is addressed in sections IV.Q and IV.R of this report. This item is closed (see section IV.II for details).

JJ. I-84-12-SQN-23, Inadequate Reporting of the Event to NRC

As a result of the original investigation NSRS recommended that SQN revise the licensing event report (LER) to reflect the true nature of the leak, the adequacy and violation of SMI-0-94-1, and the effective long term corrective action. For this follow-up review, it was determined that the NSRS thimble tube investigation report I-84-12-SQN and the NUC PR response were attached to a revised LER submitted to NRC thus making these documents part of the LER. The combination of these documents address the nature of the leak, procedure inadequacies and proposed corrective action. This item is closed (see section IV.JJ for details).

KK. R-84-17-MPS-02, Lack of Approval of Onsite Vendor Services at SQN

In the original review, NSRS recommended that SQN develop and implement a program that satisfies the requirement and intent of OQAM, part III, section 2.1, paragraph 10. The original review cited three examples of vendor services for which no QA documentation was

provided to demonstrate that the work was accomplished in accordance with QA requirements. Since no documentation was initially provided, NSRS assumed none existed. For this follow-up review, subsequent documentation of the three cited cases was provided to NSRS. Review of this documentation and telephone conversations with one of the vendors was sufficient to demonstrate that proper QA control was applied to the vendors and adequately monitored by SQN. This item is closed (see section IV. KK for details).

LL. R-85-02-SQN/WBN-01 (NUC PR) Office-Wide Awareness Bulletin for Tube Fitting Maintenance Activities

NC 85-02-03-001

In the original review, NSRS recommended that a ONP office-wide awareness bulletin be sent to the nuclear plants which discusses: tube fitting design; assembly, reassembly, and inspection criteria; policy on interchanging components; failure modes; hazards involved in working on pressurized fittings; precautionary measures and that the bulletin be incorporated into a permanent instruction at each plant for new employees. For this follow-up review, it was determined that a safety awareness bulletin was sent to WBN, BLN, SQN and BFN. The bulletin addresses many of the recommendations and identified the prime elements contained in a tube fitting installation training program that had been prepared by the POTC. All of the plants are committed to provide this training to the crafts persons working with compressed fittings by virtue of the TVA commitment to obtain INPO accreditation of the craft training program. The active nuclear sites are in various stages of completion in providing this training. The combination of the awareness bulletin, the POTC training programs, and INPO accreditation program satisfies all of the elements of this recommendation. This item is closed (see section IV.LL for details).

MM. R-85-02-SQN/WBN-02, Maintenance, Operating, and Test Instructions

NC 85-02-03-001

In the original review, NSRS concluded that SQN instructions were not sufficiently clear and did not include sufficient precautions and other measures to preclude degradation of the high pressure seals. NSRS recommended changes to several instructions to fix those problems and also recommended that the primary system pressure not be increased while the thimble tubes are disconnected from the overhead path transfer system. The latter recommendation was intended to preclude the ejection of a thimble tube in the event of failure of a high pressure seal. For this follow-up review, NSRS determined that several recommendations had been incorporated and others were being addressed in proposed procedure revisions. This item remains open pending completion of the following actions (see section IV. MM for details).

1. Issuance of the proposed MI-1.11, "Thimble Tube Installation," which will replace SMI-1-94-5 and addresses several of the original recommendations.

2. Issuance of the proposed revision to SMI-0-94-3 that requires the use of an appropriate thread lubricant, and cautions against allowing fitting bodies to turn.
3. Further revision of SMI-0-94-3 to include a precaution against working on the high pressure seals when the primary system is pressurized above atmospheric.
4. Revision of appropriate instructions to preclude pressurizing the primary system with the thimble tubes disconnected from the overhead path transfer system or at least preclude any work on the seals with the primary system pressurized above atmospheric and the thimble tubes disconnected from the overhead path transfer system.

NW. R-85-03-NPS-01, Inadequate Definition of Responsibility

X
In the original review, NSRS concluded that the responsibility for determining the identification and availability of spare parts was not clearly defined in procedures. SQM responded that this responsibility was in the job descriptions for maintenance planners. For this follow-up review, NSRS determined that the maintenance planner job descriptions do include this responsibility and that the maintenance planners were aware of their responsibilities. This item is closed (see section IV.NW for details).

OO. R-85-03-NPS-04, ASME, Section XI Postmaintenance Valve Testing - SQM

X
In the original review, NSRS determined that the Instrument Maintenance Section did not identify the need for ASME Section XI valve testing and recommended training in the Section XI pump and valve program. For this follow-up review, NSRS determined that an appropriate annual training course had been implemented and that Instrument Maintenance Section planners were aware of ASME Section XI requirements for components within the responsibility of the Instrument Maintenance Section. This item is closed (see section IV.OO for details).

PP. R-85-03-NPS-06, Postmaintenance Testing Program-Generic

X
In the original review, NSRS determined that no guidelines were available to ensure that postmaintenance tests verified that the component or system still functioned as designed. For this follow-up review, NSRS determined that Standard Practice SQM-2, "Maintenance Management System," has been revised to include appropriate criteria for postmaintenance testing, planners were aware of the requirements, and postmaintenance tests were being specified in maintenance requests. This item is closed for SQM (see section IV.PP for details).

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QQ. R-85-03-NPS-07, Common Mode Failure-Generic

In the original review, NSRS determined that the Mechanical Maintenance Section had no program to address common mode failure. For this follow-up review, NSRS determined that Mechanical Maintenance Section Instruction Letter MMSL-A36, "Common Mode Failure - Maintenance Initiated," has been issued. MMSL-A36 addresses the requirements of the NQAM with two exceptions. This item remains open for SQN pending revision of MMSL-A36 to address the role of calibrated tools in potential common mode failures and to meet the intent of "redundancy of people" as stated in the NQAM (see section IV.QQ for details).

RR. R-85-03-NPS-08, Surveillance of Maintenance Program-Generic

In the original review, NSRS determined that surveillance of maintenance activities was inadequate and recommended more indepth surveillance including reviews for proper CSSC classification, postmaintenance testing, ASME Section XI testing, and common mode failure. For this follow-up review, NSRS determined that all the items were addressed in Management Review Guidelines except common mode failure, and that no surveillance checklist had been prepared for postmaintenance testing. This item remains open pending revision of the surveillance program to include common mode failure, issuance of the postmaintenance testing surveillance checklist, and NSRS review of the implementation of surveillances on the maintenance program and postmaintenance testing (see section IV.RR for details).

IV. DETAILS

A. R-80-03-NUC PR-C1, Additional Training for STA

In the original review (reference A.1), NSRS recommended that additional training be provided to STAs to assure cognizance of existing requirements for reviewing the shift engineer journal. For this follow-up review, it was determined that the on-the-job training being provided to the STAs adequately defines their responsibilities for reviewing logs and journals prior to and after assuming shift duty.

The SNP Engineering Instruction Letter ES SIL All, "Station Shift Technical Advisor Training," establishes the requirements for the on-the-job training for the routine duties, duties prior to assuming shift, delineates the responsibility for administering this training, and defines record retention. The purpose of the training is to provide the STA with the skills necessary to correctly perform these duties without assistance when filling the on-shift STA position.

Upon completion of the training, the trainee will be able to successfully (not a total list): (1) state which Administrative Instruction defines the responsibilities of the STA, (2) list the routine duties of the STA, and (3) list the requirements for shift turnover and state what actions should be taken by both parties to ensure essential information is transferred. The training documents related to these administrative responsibilities are AI-27, "Shift Technical Advisor" and AI-5, "Shift and Relief Turnover", respectively. The portions of these instructions related to journal review follows:

Section III. 7 of AI-27 states:

Review of reports, technical information, and other related nuclear experience review material in accordance with SQA-26; review of STA's and shift engineers daily journals and night order book in accordance with AI-5; and regular review of appropriate control room logs and/or daily journals in order to maintain cognizance of each unit.

Section 2.2.4 of AI-5 states:

Operators (all classifications) and STA's--Transfer of Authority and Responsibility: Oncoming operating personnel shall be responsible to acquaint themselves with the equipment status and any activities under their jurisdiction before assuming the duty for the shift. As a minimum it shall include reviewing the journal entries back to his last shift worked or back five (5) calendar days (7 days for STA's), whichever is less; observance of control boards, alarm panels, etc.; determination of plant status as related to technical specifications as. . . .

Thus, training and adherence to these instructions ensures review of the shift engineers journal. Based upon discussions with an STA and Reactor Engineering Supervisor, review and signoff of the shift engineer journal is not required prior to assuming shift responsibility. However, once responsibility is assumed, the plant status and review of logs and journals (including shift engineer) is performed. Based upon the review of the STA on-the-job training instruction, and discussions with the STA and the Reactor Engineering Supervisor it is concluded that adequate training is provided to assure cognizance of and compliance with the the requirement to review the Shift Engineer journal. This item is closed.

B. R-80-03-NUC PR-C2, Adequate STA Training Records

In the original review (reference A.1), NSRS recommended that a review of STA training records be made to assure that adequate records are available to demonstrate that training has been completed. For this follow-up review, it was determined that the shift technical advisor training documentation requirements as specified in section 4.3 of ES SIL All, "Station Shift Technical Advisor Training," requires:

When the STA trainee has demonstrated proficiency in meeting the objectives by performing the various duties without supervision, the person administering the training will document the trainee's satisfactory performance by completing a signoff sheet similar to Attachment 2 (page 10). The Power Operations Training Center (POTC) will retain the completed signoff sheet in their files for verification that the trainee has satisfactorily completed training and is certified by a qualified STA to be capable of assuming the STA shift.

Several completed signoff sheets obtained from POTC were reviewed. They verify that individuals received on-the-job STA training and certified that they demonstrated satisfactory proficiency to be qualified to assume the STA shift. Conversations with the Reactor Engineering Supervisor and an STA confirm the training was provided and that the STA possessed a good working knowledge of the review requirements provided in the training. This item is closed.

C. R-80-05-SQN-04, Electrical Deficiencies

Part A

In the original review (reference A.2), NSRS found four specific electrical deficiencies during a walkdown inspection of the plant. Three of these items were corrected and verified complete in NSRS follow-up review R-80-11-SQN. The last item remained open. This item concerned exposed cables between penetration 25 and the cable tray leading to the penetration in the annulus. For this follow-up review, NSRS inspected the cables and cable tray at penetration 25 (unit 2) and found the cable tray cover in place and the cables properly coated with mastic between the cable tray and the penetration. Part A of this item is closed.

Part B

In the original review, NSRS concluded from the electrical deficiencies found that configuration control was inadequate, and made the following recommendation:

Revise the existing configuration control program including appropriate instructions to require more frequent and indepth inspections such that the entire plant has been inspected once per refueling cycle.

For this follow-up review, NSRS examined the configuration control programs in place at the plant and reviewed the status of the TVA changeover to the Configuration Control Drawing system at SQN. A number of actions have been taken which improve the confidence that the "as-constructed" drawings and the actual plant configuration of CSSC systems agree. Some of these are:

1. Control of temporary alterations has been tightened over the years and a periodic PORC review of outstanding temporary alterations is required (AI-9, "Control of Temporary Alterations and Use of the Temporary Alterations Order").
2. Control of plant modifications (AI-19, Part IV "Plant Modifications: After Licensing") requires marking the required control drawings as soon as the modification is field complete and provides for marking the drawings for a partially completed modification if the system is to be operated.
3. All personnel are charged with immediately reporting discrepancies they find between the plant configuration and "as-constructed" drawings (AI-25, Part I, "Drawing Control After Unit Licensing").
4. MI-6.20, "Configuration Control During Maintenance Activities," provides a simple method of controlling temporary conditions during maintenance activities as an alternative to the Temporary Alteration Control Forms (TACFs). This reduces the number of TACFs, which makes that program easier to track and makes control of temporary conditions during maintenance easier and therefore less likely to be subverted.
5. System operating instructions now require double verification of the operational alignment configuration of critical systems.
6. Unit 1 and unit 2 control drawings that share common equipment were compared and discrepancies documented through AI-25.
7. Drawings with areas marked "incomplete" were updated with information obtained by researching construction work packages.

The preceding actions are examples of things that show that configuration control is notably improved since the 1980 review that resulted in this recommendation. The TVA wide change to the Configuration Control Drawing system currently being pursued should improve the situation further. Phase I of this effort is to establish the configuration baseline (which included ECN plus modification work) for the primary drawings (selected drawings on critical systems) on the "as-constructed" drawings without the aid of system walkdowns. At the time of this review, a list of drawings considered necessary for CSSC configuration control had been identified by the plant. The intent is to complete Phase I of the new program for these drawings prior to restart. Completion of this effort will also increase confidence in the configuration control program. In establishing the configuration baseline, NSRS considers it important to verify that the plant configuration and the "as-constructed" drawings agree by performing walkdown inspections. Adequate confidence in the CSSC configuration baseline may be achieved by walkdowns of selected systems, if so, walkdowns of all CSSC systems would not be necessary.

In consideration of the considerable improvement in configuration control since 1980, NSRS no longer considers it necessary to verify plant configuration every refueling outage. Part B of this item remains open pending verification of the configuration baseline. To achieve this, NSRS recommends the following actions be taken prior to restart.

1. Completion of Phase I of the plan for conversion to Configuration Control Drawings for those drawings previously identified by the plant as necessary for CSSC configuration control.
2. Selection by the plant, of a number of CSSC systems for complete walkdown to verify that the actual physical configuration agrees with the CSSC configuration control drawings verified as part of the Phase I effort.
3. Walkdown of the selected systems and correction of any discrepancies found. If significant problems are found, additional systems should be selected for walkdown.

Part C

In the original review, NSRS recommended that programs be implemented or revised for all employees to emphasize the need for and maintenance of configuration control. For this follow-up review, NSRS reviewed various instructions, training programs, surveillance reports, and maintenance requests, and interviewed personnel. NSRS found that employees are oriented and/or trained to the procedures and instructions that affect them, such as MI-6.20; AI-25, Part I; and AI-37, "Independent Verification." Problems with the implementation of various aspects of configuration control were identified in surveillances, but none of them were attributable to lack of awareness of the need for and maintenance of configuration control. NSRS concludes that employee awareness of configuration control is adequate. Part C of this item is closed.

D. R-81-07-SQN-07, Unreviewed Temporary Alteration Control Forms

Part 1

The NSRS found that AI-9, "Control of Temporary Alterations and Use of the Temporary Alteration Order," did not agree with DPM N07311 in two important areas and recommended that AI-9 be revised. AI-9 did not require PORC review and Plant Superintendent approval of temporary alterations, nor did it require issuance of a design change request for CSSC temporary alterations that are to remain in effect over 60 days.

Since the original review, DPM N07311 has been replaced by NQAM, part II, section 6.4. AI-9, revision 19, reflects the requirements noted above as stated in NQAM, part II, section 6.4, dated November 5, 1984, although the requirements have changed since the original review, and AI-9 is not identical to the NQAM. The NQAM states:

A DCR or FCR shall be submitted if an alteration is to remain in effect for more than 60 days unless the TA is to be removed prior to operation of the affected system(s).

AI-9 states:

A DCR or FCR shall be submitted if an alteration is to remain in effect for more than 60 days unless the TA is to be removed prior to operation of the affected system(s) or the TA is to be removed under an existing ECN.

The additional exception in AI-9 does not change the intent. Part 1 of this item is closed.

Part 2

The NSRS found that many unit 2 CSSC temporary alterations had been in effect for nearly a year at the time of the review and recommended that the status of outstanding unit 2 CSSC temporary alterations be reviewed prior to fuel loading.

During this follow-up review, NSRS found no evidence that the status of outstanding temporary alterations had been reviewed prior to fuel loading. However, because Unit 2 fuel Loading has occurred, review emphasis was placed on actions that have been and are being pursued since fuel loading. The status of all outstanding temporary alterations is reviewed by PORC every six months as required by the NQAM and AI-9. In addition, a monthly TACF Status Report is issued to section supervisors and others. This report includes a graph of the number of outstanding temporary alterations versus time with goals identified, and serves to keep managers and supervisors aware of their temporary alterations. SQN also committed to INPO to close all temporary alterations established prior to 1984 (148 outstanding at the time) by the unit 1 cycle 4 refueling outage (next refueling). The November 1985 and January 1986 Monthly TACF Status Reports show 96 and 84 temporary alterations in this category, respectively, showing that progress is being made on old temporary alterations as well as all temporary alterations. Because of the apparent emphasis on closing temporary alterations and the steady downward trends in all temporary alterations, CSSC temporary alterations, and old temporary alterations, Part 2 of this item is closed.

E. R-82-04-NPS-01, Containment Spray Test Line at SQN and WBN

In the original review (reference A.6), NSRS recommended that automatic isolation of the test line (recirculation line to refueling water storage tank) at SQN and WBN be provided to isolate this line if an accident occurs whenever the containment spray system is required to be operable. NSRS previously reviewed revision 16 of SQN SI-37 "Containment Spray Pump Test," which had the added requirement to station an AOU near the containment spray system valves in question and to be in communication by telephone or other means with the control room prior to and during the test. This action satisfied the intent of the recommendation. The WBN portion was not satisfied, thus the item remained open. For this follow-up review, it was determined that WBN has modified instruction SI-4.0.5.72-P, "Containment Spray Pump Test," to require an AOU to be stationed near the recirculation line valves in question and to be in communication by telephone or other appropriate means with the main control room prior to and during the performance of the test. This change satisfies the intent of the recommendation. This item is closed.

F. I-82-20-SQN-01, Administration of KI to Plant Personnel

In the original review (reference A.7), NSRS found that SQN-IP-20 recommended that field monitoring team members take KI when their pocket dosimeter reads 25 mrem, but MSEC-IP-9 made no KI recommendations. NSRS recommended that consistent guidance be provided for the administration of KI. For this follow-up review, NSRS compared SQN-IP-20, revision 3, and CECC-IP-9 (replaced MSEC-IP-9), revision 4, and found that they provide the same guidance for administration of KI. This item is closed.

G. I-82-20-SQN-02, Upgrade of Field Team Van

In the original review (reference A.7), NSRS recommended that ONP and the Radiological Health Staff (RHS) upgrade the field team vans to include a permanently mounted seat in the rear and compartmentalized, labeled equipment storage. RHS responded that all the vans would be renovated by July 1983. For this follow-up review, NSRS inspected the SQN van and found it had been upgraded as recommended. Some of the stick-on labels were beginning to peel off the shelves. The Health Physics Supervisor initiated correction of this problem by submitting Work Request B101960 to replace the stick-on labels with painted-on labels. HPSIL-28 "Quarterly Emergency Van Inventory," requires an inventory and restocking, if necessary, once per quarter and each time the van is used. NSRS compared the van contents to the most recent inventory and found only minor discrepancies which could have been due to the fact that a plant "open house" was held the previous day and many people had toured the van. These minor discrepancies were corrected by Health Physics personnel. This item is closed.

H. I-82-21-SQN-02, Emphasize Pre-Job Planning

In the original review (reference A.11), NSRS recommended that additional emphasis be placed upon pre-job planning and procedure development and review by both the Nuclear Central Office (NCO) and SQN to ensure that hazards associated with a job are identified and reduced to a level of risk acceptable to management and that proper equipment is assembled and in working order prior to the start of a job. The NUC PR response dated (reference A.15) stated that, as recommended, they would place additional emphasis on pre-job planning, procedural development, and review by both the plant and the NCO, as appropriate, to ensure that the safety hazards associated with the job are reduced to an acceptable level of risk. The response also stated that this is a continuing action and no follow-up would be provided.

For this follow-up review, it was determined that since then new positions of maintenance planners have been created at SQN. Four job descriptions were reviewed. One was approved May 5, 1985 and the others April 15, 1985. All contained the following duties and responsibilities in addition to other work details:

The incumbent is responsible for developing detailed work plans for individual maintenance activities at a nuclear power plant, including detailing the job sequences required to perform the tasks. The maintenance activities include preventive and corrective maintenance, forced and scheduled outage activities, and other work such as inspection of plant equipment. In the development of the respective maintenance work plan, the incumbent ensures that the required drawings, technical manuals, work instructions, parts/materials, special tools, and

required preconditions are identified and that support craft and services required for the accomplishment of the maintenance work are coordinated before the job is started. Inspects the worksite prior to planning the maintenance work as necessary to verify problem is correctly identified and to determine the need for special tools, permits, unusual conditions, preparatory work requirements, etc.

The incumbent is responsible for protecting the health and safety of employees and for safeguarding TVA property. This is accomplished by including proper safety precautions and instructions in the preplanned work instructions. Responsibilities include the permanent removal of employees or other persons from situations where hazards are not adequately controlled; understanding and implementing the provisions of the "TVA Occupational Health and Safety Program Plan," TVA code VIII OCCUPATIONAL HEALTH AND SAFETY, and Office and division administrative safety procedures; assuring employee compliance with established safety practices and procedures; and planning, supporting, and promoting health and safety as an integral element of the TVA mission.

Hazards associated with a job being identified and reduced to a level of risk acceptable to management is addressed in the details of recommendation I-82-21-SQN-04, section IV.I of this report. In addition there is a hazard assessment worksheet in HCI-G29, "Workplace Hazard Assessment," which can be used to establish priorities to correct identified hazards. The ALARA preplanning aspects of jobs has also been significantly improved. This is discussed in section IV.Z (I-84-12-SQN-13) of this report. This item is closed.

I. I-82-21-SQN-04, Establish Program to Evaluate Unusual Health Physics Conditions

In the original investigation (reference A.11), NSRS recommended that a program be established to evaluate unusual health physics conditions or results with emphasis being placed upon the reduction of exposure potential. Program elements should contain trend analysis of exposures, contamination incidents, incremental increases in dose, dose rates, contamination, and a variety of other indicators of problem areas.

The NUC PR response (reference A.23) stated that the situation was principally caused by the unavailability of exposure information and the responsibility for high dose exposure review not being assigned to a specific individual. A computerized ALARA information system and user procedures were being developed, and an ALARA engineer was being placed at each plant to evaluate plant conditions and to identify reasonable methods to reduce radiation exposures.

For this follow-up review, procedures were reviewed and discussions were held with the ALARA engineer and supervisors in the Health Physics area. It was confirmed that an ALARA program had been established and implemented. The Radiation Protection Plan, revision 2 (reference B.41), section 1.2.1.c, provides for the establishment of a program to encourage workers to suggest improvements in the radiation protections program. The "Radiological Hygiene Program," RCI-1, does not include the ALARA program but refers to the ALARA suggestion program described in SQA-145, "As Low As Reasonably Achievable (ALARA) Suggestion Program." Section V of RCI-1 notes that all major radiological incident reports (RIRs) were to be reported to the NSRS. The ALARA suggestions program is in effect but no suggestions had been received during 1986 at the time of this follow-up review. The SQN Objectives in Plant Operations for fiscal year 1986 includes goals for reduction in the personnel contaminations reports, RIRs, and radiation exposure.

The use of ALARA in planning is contained in RCI-10, "Minimizing Occupational Radiation Exposure." Section III states in part:

Included in the program is a computerized ALARA dose tracking system developed for each plant to actively track radiation exposure. This system allows for retrieval of dose information to detect variances between estimated and actual dose and to perform trend analysis so that corrective action may be taken to minimize radiation exposure.

Included in the RCI is a pre and postjob ALARA plan and checklist.

Details of the contents of ALARA reports is given in Health Physics Section Instruction Letter HPSIL-25, "ALARA Program." Reports are issued daily, monthly, annually, and post-outage. The Health Physics Section monthly report January 1986 was reviewed. The report listed the following:

- o number of RWPs issued
- o radioactive contamination in clean areas
- o respirator training
- o whole body counting
- o number of internal contaminations
- o TLD Badging
- o personnel radiation exposure
- o decontamination activities
- o ALARA activities

Also reviewed was the annual trend analysis of estimated section exposure dated February 6, 1986. The trend charts for the year 1985 were examined. With some exceptions these were monthly plots of the following:

- o RWP discrepancy Reports
- o personnel contamination reports
- o radiological incident reports
- o average dose per worker from RWPs
- o average dose per worker from TLDs
- o quarterly RWP vs. TLD man-rem
- o cumulative RWP vs. TLD man-rem
- o average dose per worker from RWPs
- o average RWP man-hours per worker
- o average noble gas skin dose per worker
- o total man-rem
- o total noble gas skin dose
- o total RWP man-hours
- o total RWP entries
- o average millirem per RWP entry
- o average RWP man-hours per RWP entry
- o average millirem per RWP man-hour
- o average noble gas skin dose per RWP entry

It is concluded that the ALARA program contains the elements of the recommendation to evaluate unusual health physics conditions with emphasis on reduction of exposure potential. The program contains trend analysis, contamination incidents, incremental increases in dose, dose rates, contamination and a variety of other indicators of problem areas. The instructions exist to define the tasks and data is being taken and evaluated. This item is closed.

J I-82-21-SQN-05, Emphasize Safety-First Policy to All Employees

In the original investigation (reference A.11), NSRS recommended that the safety-first policy of the TVA Board of Directors be impressed upon all employees. It was recommended that all Health Physics personnel at SQN, all sponsoring groups at SQN, and all Nuclear Central Office groups performing work at SQN should receive specific, formalized instruction on the meaning of safety-first.

Nuclear Power responded (reference A.15) that it had in place a program which emphasized that safety had priority over production. For this follow-up review, NSRS noted that there are in place a number of programs and methods where safety is emphasized. Following the incore instrumentation thimble tube ejection accident on April 19, 1984, the TVA Board of Directors issued a memorandum to all TVA employees on April 30, 1984. The subject was "TVA Policy on Reporting Nuclear Safety Matters" in which the safety-first policy was expressed. The Administrative Instruction Power and Engineering "Expression of Employee Views" was revised and issued June 11, 1985.

Section V.A.1 deals with Occupational Health and Safety Issues and V.A.2 with Nuclear Safety Issues.

A directive for implementation of the new TVA Employee Concern Program (ECP) by February 1, 1986, was issued by the Manager of Nuclear Power. This ECP emphasizes safety in all phases of the employees work. The ECP site representative for SQN commenced duties on February 3, 1986. Personnel at SQN attended orientation training sessions before February 14, 1986. Posters have been placed in various locations and all new employees receive information on the TVA ECP. Additional programs emphasizing safety and the safety first policy are discussed in section IV.GG (I-84-12-SQN-20) of this report. This item is closed.

K. I-82-21-SQN-06, Practice of Removing Cap from Vial of Na-24 be Reevaluated

In the original investigation (reference A.11), NSRS found that a 10 rem extremity exposure occurred in part because a vial of Na-24 was opened by hand. NSRS recommended that the practice of removing the cap be reevaluated and serious consideration be given to using a tool for cap removal.

The Nuclear Power response was:

This item has been incorporated into the Sequoyah turbogenerator acceptance test procedures along with other measures to decrease personnel exposure. The same central office group is responsible for performing this test at all units regardless of plant location so that the lessons learned will extend beyond Sequoyah. This revised acceptance test is being distributed to Watts Bar for their consideration should a comparable test be performed at that facility. This action is complete and no further reports will be provided.

For this follow-up review, NSRS found that the actions indicated in the response were not completed. One of the test procedures in question, SQ-STEAR-INST 82-12, "Turbine Benchmark Radioactive Tracer Test Unit 1," was cancelled rather than revised. The other procedure, SU-10.2, "Steam Generator Moisture Carryover Measurement, Units 1 & 2," was not revised or cancelled. The Reactor Engineering Supervisor stated that SQN elected not to perform the acceptance tests on unit 2, and therefore SU-10.2 was not, and will not, be used again. He also stated that when some open items were closed, he intends to cancel SU-10.2. This item is closed.

NSRS checked the WBN acceptance test program and found that the corresponding procedure did not contain specific instructions about opening the vial. The WBN engineering personnel were aware of the problem and stated that the procedure had not been revised because the Na-24 supplier was revising the packaging and shipping container and had not specified the final design. The WBN procedure is to be revised as necessary depending on the design of the packaging/shipping container.

L. I-82-21-SQN-07, Adjust Extremity Exposure Records to Reflect Reasonable Maximum Exposure

In the original investigation (reference A.11), NSRS found that the exposure records for employees involved in the 10 rem extremity exposure incident did not reflect the probable actual exposure. NSRS recommended that the extremity exposure records for Employees A, C, E, and H be adjusted to reflect the reasonable maximum exposure calculated by NSRS, and the reasonable maximum exposure be calculated for employees B, D, and F and their records adjusted accordingly.

For this follow-up review, NSRS examined the "Current Occupational External Radiation Exposure" printout dated February 19, 1986, for the extremity dose recorded for the employees in question. The records for employees C, E, and H had been changed as recommended. An error was found in the calculation for employee A in the report, the proper value calculated, and the record revised accordingly. The records for employees B, D, and F were revised to reflect a calculated reasonable maximum exposure, as requested. This item is closed.

M. I-82-21-SQN-09, Evaluate Extremity Monitoring Program at TVA and Particularly SQN

During the original investigation (reference A.11), NSRS found the extremity monitoring program lacking and made the following recommendation:

The extremity monitoring program for SQN in particular and TVA as a whole be evaluated for the capability of identifying extremity exposure sources and measuring and interpreting extremity exposures from all radiation sources encountered with emphasis on seemingly point sources.

The Radiological Health Staff responded that the program would be evaluated in the second quarter of 1983 and a final report would be submitted to NSRS. For this follow-up review, NSRS reviewed the "Special Evaluation Report - Evaluation of Extremity and Multibadging Dosimetry: Technical Review," part of the Radiological Protection Plan (RPP), and various SQN documents. The special evaluation report was found to be thorough and addressed the major areas of concern with the program. The recommendations made were appropriate. The RPP, revision 2, prescribes limits for extremity exposure and requires measurement of extremity doses when the extremity dose exceeds or is expected to exceed 25 percent of the quarterly limit.

The RPP also requires ALARA prejob planning. RCI-10, "Minimizing Occupational Radiation Exposure," requires a prejob ALARA planning report for several possible situations including the following:

1. "Handling of radioactive material where extremity dose rates are in excess of 10 rem/hour at the working distance for the extremity."
2. "If an individual has received, from actual past exposures, greater than 25 percent of the extremity quarterly limit in one calendar day under one RWP."

RCI-3, "Personnel Monitoring," states:

Extremity monitoring devices will be issued if an individual's extremity exposure rate exceeds the whole body exposure rate by a factor of five when the whole body exposure rate is greater than 100 mrem/hr; when the whole body exposure rate is less than 100 mrem/hr, but the extremity exposure rate exceeds 500 mrem/hr; or when the estimated extremity exposure is greater than 25% of the quarterly limit.

RCI-14, "Radiation Work Permit (RWP) Program," includes the following requirements:

1. Before issuing an RWP, the Health Physics representative must have a good working knowledge of the job location, equipment, radiological hazards which may exist in the area, and type of work to be accomplished.
2. Periodic radiological surveys will be performed in all areas covered by an active RWP.
3. Extremity and neutron sensitive dosimetry will be issued according to RCI-3 requirements. Individuals entering high radiation areas will comply with requirements listed in RCI-3.

Health Physics Section Instruction Letter HPSIL-1, "Radiation Surveys," prescribes how to conduct surveys and includes the following requirements:

1. Surveys will be made to determine dose rates, to detect any hazards to personnel that may exist, and to determine if the area is properly posted or barricaded. Surveys will also be made in potentially hazardous areas before entry by personnel.

2. Equipment surveys will be performed on items to be worked on or to be shipped or moved to other areas within the plant.
3. Survey the area completely to locate any areas of higher dose rates that may be caused by equipment or penetrations.
4. Check the equipment completely to find the maximum dose rate.
5. If employees are to work on the equipment, determine the surface dose rate to estimate extremity dose. Estimate the surface dose rate by taking a WC (window closed), WO (window open) reading. Subtract the WC from the WO and multiply the difference by the correction factor which was placed on the instrument during calibration. This is the beta dose rate. The WC reading is the gamma dose rate. Add the WC and corrected WO for a total dose rate. Also, set a whole-body exposure rate by taking a reading at the closest point where the person's body will be.

Review of all these documents together indicates that a program is in place to identify extremity exposure hazards, preplan work for ALARA, and employ extremity monitoring devices when needed to ensure that extremity doses are accurately measured. This item is closed.

N. I-84-12-SQN-01, Inadequate Corrective Measures to Alleviate the Degraded Condition of the Thimble Tubes

In the original investigation (reference A.25), NSRS recommended that responsibility for overall systems operability be formally assigned to plant engineers and those engineers be held accountable for periodically assessing the adequacy of the performance of the systems, the adequacy of instructions affecting the operation, maintenance or testing of the systems, and for assuring that problems are promptly identified and corrected in a quality manner. The responsible engineers should be required to keep informed of industry and TVA information relating to the different aspects of the systems and to periodically formally update plant management on the status of the system.

The Nuclear Power response in reference A.28 stated that while thimble tube blockage had existed and had been corrected several times during the life of SQN unit 1, it had never reached the post unit 1 cycle 2 blockage level. The response also addressed system responsibility by stating:

The reactor engineering section has overall system responsibility for the moveable detector system. This responsibility is recognized at the site. The reactor engineering section is aware of and actively following the proposed Westinghouse Owners' Group program to address the thimble tube blockage problem. Present assignments of "System Responsibility" are being reexamined as a consequence of the recent reorganization of the plant staff and site organization. This reexamination will be an on-going process.

The NSRS reply in reference A.29 stated that the response was acceptable.

For this follow-up review, discussions were held with supervision and engineers and documentation was reviewed. During discussions with engineering supervisors, it was confirmed that the Reactor Engineering Section has overall system responsibility for the moveable in-core detector system. A new procedure SQA 168, "System Engineering," was issued in January 1986 which assigned each plant system to a designated plant section (attachment A of SQA 168). The Reactor Engineering Supervisor is responsible for System #94, "Incore Flux Detectors." Two reactor engineers are currently assigned to this activity (one for each unit). They keep informed of industry and TVA information, including Westinghouse plant visits, Westinghouse Reactor Engineering Annual Seminar held in Pittsburgh, INPO, and NRC information notices, bulletins, etc. There is no periodical update since the system status is reviewed on a continuing basis. This item is closed.

0. I-84-12-SQN-02, Inadequate Survey and Feedback to Field Services Group (FSG) Personnel

In the original investigation (reference A.25), NSRS recommended that in the future work assignments of this nature should be given to those who are knowledgeable of and will be responsible and accountable for the success and safety of the operation to be accomplished. All available information should be identified and used.

The response in reference A.26 addressed recommendations I-84-12-SQN-02 and -03 as one item. The following is an extract.

Sequoyah reactor engineering personnel contacted five nuclear plants questioning if they had cleaned thimble tubes at power and any problems they had experienced. The results of this survey were molded into the overall plant decisionmaking process. The extent to which a survey of this nature should be carried out in order to constitute an adequate survey is subjective in nature. A survey is conducted only to establish an adequate information base to facilitate management decisions. In this case plant management felt that they had adequate information to proceed with at-power cleaning. SQNP believes the assignment of the survey to the reactor engineering section is consistent with their overall moveable detector system responsibility. While no survey can be all encompassing, the additional information resources identified in the NSRS report have been noted for future surveys.

SQNP acknowledges that the personnel performing the survey were not familiar with the cleaning instruction and had no experience with the actual cleaning operation. Again, the objective was to provide

management with part of the information necessary to make a decision regarding at-power cleaning. There was no need for the survey personnel to interface directly with FSG personnel since FSG management participated in the discussions leading to the ultimate decision to conduct at-power cleaning and were fully cognizant of survey results when making subsequent work assignments.

In retrospect SQNP does not take issue with the fact that the process used for cleaning the thimble tubes should not have been performed at power. SQNP believes the decisionmaking process itself was sound even though weaknesses were evident in the implementation process.

The NSRS reply in reference A.29 stated that the response, including corrective actions, was acceptable.

For this follow-up review, discussions were held with supervision. Based on discussions with supervisors and managers, it was determined that there was no reason to doubt that work assignments would be given to anyone other than those with the most knowledge and who were available. Since the event, it has been stressed to everyone that they are responsible and accountable for operations they are to accomplish. The staff also appears to be more sensitive to the possibility of other accidents. During preparation for the outage for unit 2, the revision 2 target schedule was developed. It is more comprehensive than previous outage plans since it includes all items that could impact unit 2 start up. In addition to modifications, maintenance, engineering tests, operations, and design, it includes SCR evaluations, NRC schedules, IE bulletins, employee concerns, NSRS reports, environmental qualification program items, etc.. These items receive close management attention, particularly if they are likely to produce potential problems and delays. This also aids supervision in identifying knowledgeable individuals for work assignments.

With respect to the action taken above, combined with the corrective action taken for the other thimble tube report recommendations, it is concluded that the decisionmaking process and assignment of knowledgeable personnel to tasks has shown significant improvement. This item is closed.

P. I-84-12-SQN-03, Inadequate Decision Making Process

In the original investigation (reference A.25), NSRS recommended that for unique activities, plant management should take the time necessary to identify and thoroughly evaluate hazards associated with the activities using readily available inputs and obtaining information from knowledgeable personnel who will be responsible and accountable for the activity to be performed. Techniques such as a

systematic hazard analysis methodology to identify and derive an independent assessment of the hazards involved should be used.

The Nuclear Power response in reference A.28 stated:

Management meetings were held to discuss this activity and the potential hazards associated with it. Discussions included the facts that (1) the work was to be performed on a pressurized system, (2) any leakage from a thimble tube could not be isolated, and (3) there were radiological hazards associated with the work. The only weakness with this process may have been the lack of management involvement in the details of the work associated with the accomplishment of this maintenance activity. SQNP management is committed to ensuring future maintenance activity comply with normal plant practices. This includes procedure adherence, hazards and analysis planning (see our response to I-84-12-SQN-6), and encouraging input from those responsible and accountable for the maintenance activity.

The NSRS reply in reference A.29 stated that the response, including corrective actions described, was acceptable. For this review it was verified that the workplan hazard assessment worksheets were designed primarily as a tool to identify plant physical deficiencies and to determine the degree of hazard. Several hazard assessment worksheets were reviewed and appeared to be adequate for the intended purpose. One request, dated November 29, 1985, from the Health and Safety Committee was for the Industrial Safety Staff to prepare an assessment on CO² protected areas at SQN. Subsequently, the Industrial Safety Staff discussed the results of this assessment with the Committee.

It was also determined that MORT analysis has been used for job safety analysis. The Site Director needed to know if entry could be made safely into the unit 1 pressurizer enclosure with the unit at full power. The object was to open and close one root valve to the instrument line. The analysis performed in November 1984 verified that the work could be performed safely and was subsequently implemented. The staffing of the "new" maintenance planner positions also increases the effectiveness of planning unique work. This is described in detail in section IV.H (I-84-12-SQN-02) of this report. The corrective action taken for this recommendation combined with that taken for all of the other thimble tube report recommendations, as discussed in this report, leads one to the conclusion that the decisionmaking process has been significantly strengthened. This is particularly true for those jobs involving safety and/or significant hazards. This item is closed.

Q. I-84-12-SQN-04, Assignment of Work Function to the FSG as an Ordinary Work Activity

In the original investigation (reference A.25), NSRS recommended that it should be emphasized to plant management that it is a fundamental responsibility of management to assure that the knowledge and background of workers assigned to work functions is adequate and that sufficient time and information be provided to properly plan and execute the work activity. The response in reference A.28 discussed the involvement of management and the plant sections in the decisionmaking process and that it was not the intent of management to create a sense of urgency to complete this job, but rather a responsible management decision was made that provided time to demonstrate the success of the at-power cleaning technique. The fact that a job normally performed with the unit shutdown was being performed at power may have produced an unnecessary sense of urgency with the workers. In the future, the potential for this type of mistaken worker perception will be eliminated by better communication between management and workers regarding operational schedules.

In reference A.29, NSRS concurred with the SQN response. For this follow-up review, it was determined that SQN has taken actions to emphasize management's responsibilities, that the knowledge and background of workers assigned is adequate, and that sufficient time and information are provided to properly plan and execute the work activity. With respect to communication and time allotment a memorandum dated October 25, 1984, was sent to key SQN managers which stated in part:

SQN management is committed to ensuring that future maintenance activities comply with normal plant practices. This includes procedure adherence, hazards and analysis planning, and encouraging input from those responsible and accountable for the maintenance activity. To eliminate the perception workers had concerning thimble tube cleaning at-power and any future task that is performed at an unusual time, better communication will be established between management and workers regarding operational schedules and the urgency associated with them.

The managers acknowledged this memorandum by providing written statements that they had meetings with their employees on the memorandum. Additionally, the creation and staffing of the maintenance planner position discussed in section IV.H (I-82-21-SQN-02) of this report makes provision for better planning, and scheduling and safety hazard identification and analysis. The assignment of the most knowledgeable workers has been addressed in section IV.O (I-84-12-SQN-02). Additionally, SQN is undergoing, in the near future, INPO accreditation for the crafts training program. This program has the fundamental element of assigning only those persons to perform tasks only if they have received specific training related to that task. This is discussed in section IV.LL

(R-85-02-SQN/WBN-01) of this report. The emphasis of the safety-first policy is discussed in section IV.J (I-82-21-SQN-05) of this report. Proper planning and execution will occur if it is done well in advance of job performance. Review of the unit 2 schedule dated February 18, 1986, indicates that detailed planning and scheduling is occurring. Based upon the review of the above items, it is concluded that SQN is placing proper emphasis on assigning knowledgeable workers to jobs, performing detailed planning and scheduling, emphasizing safety before schedule, and focusing responsibilities for proper planning and safe performance of jobs on the appropriate individuals. This item is closed.

R. I-84-12-SQN-05, Selection of an Inappropriate Instruction for the Control of the Work Activity

In the original investigation (reference A.25), NSRS recommended that management should conduct an awareness program to reaffirm supervisor, engineer, and worker knowledge of the importance of procedure controls, compliance with procedural requirements, and the proper change process for inadequate procedures. Emphasizing the SQN policy as stated in SQA 129, which states that following instructions and taking the time to correct those which are inadequate are methods to achieve nuclear safety.

The Nuclear Power response in reference A.28 addressed recommendations 5, 7, 11, 17, and 22 as one item. The following is an extract:

In the future, a detailed scheduling process for incore thimble tube maintenance will be incorporated into the outage schedule and any deviations from scheduled work will be justified to plant management. . . . A problem existed in the coordination of the hold order and RWP associated with this maintenance activity. To alleviate this problem, Administrative Instruction AI-8 will be revised to clarify what moveable detector system maintenance requires a hold order and hold order requirements for RWPs will be modified to indicate AI-8 will be followed.

NSRS replied in reference A.29 that the response, including corrective actions, was acceptable.

A memorandum (reference A.33) was sent on October 25, 1984, to plant management listing items that managers needed to stress to their personnel on a continuing basis. Included was the affirmation of compliance with procedures and management policy being safety first. The safety-first aspects are discussed in detail in section IV.J, (I-82-21-SQN-05) and section IV.GG, (I-84-12-SQN-20) of this report. Better communication was to be established between management and workers regarding operational schedules and the urgency associated with them. The managers responded when they implemented the policies in the reference A.33 memorandum.

Section 1 of SQA 129 states that: ". . . following instructions and taking the time to correct those which are inadequate are methods to achieve nuclear safety". At the 8:15 a.m. Plant Managers daily meeting, the question is asked whether there were any failures to follow procedures. This emphasizes procedures controls. Also, it was determined that: (1) the current outage schedule details tasks for the incore thimble tube, (2) AI-8, Access to Containment," has been modified to clarify hold order clearance and RWP issuance for lower containment related to the incore flux drive, as discussed in section IV.U, (I-84-12-SQN-08) of this report, (3) the RWP coversheet has been modified to state that "Entry into containment will be performed in accordance with AI-8.", as discussed in section IV.U (I-84-12-SQN-08) of this report, and (4) the emphasis on the change control process for inadequate procedures is being satisfactorily pursued, since training on the use of plant instruction change forms has been provided as discussed in detail in section IV.II, (I-84-12-SQN-22) of this report.

It is concluded that the corrective actions described above satisfactorily emphasize procedure compliance and change control and the safety policy. This item is closed.

S. I-84-12-SQN-06, Inadequate Job Safety Analysis and Hazards Assessment

In the original investigation (reference A.25), NSRS recommended that the job safety analysis program be upgraded. An effective hazards assessment methodology should be established as a tool to be used to analyze the identified radiological and industrial aspects of the job; the probability of an accident; and the impact on the workers, plant, and the public. Additionally, implement the recommendations of NSRS Report No. I-82-21-SQN.

The Nuclear Power response in reference A.28 stated that both a job safety analysis and a work place hazard assessment methodology are in place for evaluating, preventing, and/or mitigating accidents at SQNP. The office of Nuclear Power will continue to examine the existing workplace hazard assessment methodology to determine its applicability as a tool in job safety analysis. The Industrial Safety Engineering Section subsequently (reference A.32) determined that the workplace hazard assessment methodology cannot be used effectively in job safety planning, but it is effective in qualifying and prioritizing physical deficiencies. The reference A.32 also referenced the job safety planning procedures used at SQN, which is considered to be appropriate.

For this follow-up review it was determined that the recommendations of NSRS report I-82-21-SQN have been implemented. Sections IV. H, I, J, K, L, and M (I-82-21-SQN-2, -4, -5, -6, and -7, respectively) of this report documents the closure of the items that were open from this report at the beginning of the follow-up review. ALARA preplanning criteria is incorporated in RCI-10 "Minimizing Occupational Radiation Exposures," as discussed in section IV. 2 (I-84-12-SQN-13).

The safety aspects of the job has been improved by the newly created and staffed positions of maintenance planner, whose job description includes safety responsibilities as described in section IV. H (I-82-21-SQN-02) of this report.

Prior to the thimble tube event there were two safety groups--plant and field services. These were combined in August 1984. This consolidation of safety skills should result in improved safety reviews and assessments.

More detailed analysis and planning of unusual activities was verified as being conducted in the review of the pressurizer enclosure entry with the unit at full power hazard analysis which is described in section IV. P (I-84-12-SQN-3) of this report.

Although probabilities of accidents are not quantified in the job safety analysis and/or hazards assessment methodologies, conservative failure/effects assumptions adequately address failure probabilities and potential impacts on workers and the public.

The incorporation of extensive ALARA preplan requirements detailing radiological hazards into RCI-10; creation and staffing of a maintenance planner position with safety responsibility; performance of hazard assessments; the existence and use of procedures for job safety planning, the combination of two plant safety groups; the use of conservative failure modes in hazard assessments; and satisfactory corrective action being taken on all of the NSRS recommendations from the I-82-21-SQN report, satisfactorily resolves this item. This item is closed.

T. I-84-12-SQN-07, Inadequate Field Quality Engineering (FQE) Review of Maintenance Request (MR) and Reference Work Instruction

In the original investigation, NSRS recommended that SQN should improve the quality of the FQE review process of MRs to assure the quality of the referenced work instructions, the proper program controls are used, and the instructions are appropriate for the activity being performed.

The Nuclear Power response in reference A.28 addressed recommendations 5, 7, 11, 17, and 22 as one item. The following is an extract:

The MR was reviewed by FQE as part of their responsibility to ensure an adequate procedure exists for the performance of the work. A job safety analysis was performed by the maintenance foreman as required by the MR process.

After thoroughly analyzing this event and the NSRS conclusions, SQN acknowledged that the MR and FQE's review of the MR did not meet the requirements of the Sequoyah standard practice on maintenance management, SQM 2. SQN was to review the MR system and QA review process to ensure no programmatic deficiencies existed. NSRS replied in reference A.29 that the Nuclear Power response, including corrective actions described, was acceptable.

For this follow-up review, it was determined that an evaluation of the MR process was conducted by the Quality Engineering Group. The evaluation indicated the need for training personnel involved in the MR planning process and to have more supervisory involvement in the process. Adjustments were made to upgrade the QA review program. Also, the recent training records for QA reviewers were examined. Initial MR review training was conducted January 30, 1986, and final MR review conducted February 6, 1986. A review of the QE Section Instruction Letter (SIL 5.3) in effect during 1984 shows it to have been adequate. The rejection rate of final MRs indicates a thorough check of the MRs, but also indicates a need for improvement of MR preparation. Sections IV.R, X, DD, and II (I-84-12-SQN-5, -11, -17, and -22, respectively) of this report address other satisfactory corrective actions related to procedure adequacy, reviews, and controls. This item is closed.

U. I-84-12-SQN-08, Noncompliance with Requirements of RWP No. 01-1-00102

In the original investigation (reference A.25), NSRS recommended that it be emphasized to plant employees that compliance with the requirements of RWPs is essential for their own protection.

Nuclear Power responded in reference A.28 that the noncompliance resulted from confusion existing in AI-8, "Access to Containment," with respect to hold order removal. The response also stated that special instructions for RWPs would be modified to indicate AI-8 requirements were to be followed and AI-8 would be revised to remove the confusing instructions on hold order removal. NSRS, in reference A 29 concurred with the acceptability of the Nuclear Power action.

For this follow-up review, it was determined that the RWP cover sheet and AI-8 were revised to eliminate potential confusion, and the RWP coversheet [form TVA 7903B (DNP-9-84)], has been revised to add an item 5 that states: "Entry into containment will be performed in accordance with AI-8".

AI-8, section 2.4, has been revised to clarify hold order removal as follows:

Prior to entry into lower containment or the annulus the incore flux detectors shall be verified to be in the storage position or inserted to within ten (10) feet of the core. The SE shall initiate a hold order clearance on the incore flux drive motors control power. This hold order shall remain in affect until the SE is assured all personnel have been cleared from containment and the personnel access is locked. Prior to issuing a radiation work permit (RWP) for lower containment or annulus, HP shall verify incore detector system is tagged with a hold order. The SE

will issue incore detector system hold order clearance to HP Shift Supervisor by title. The incore detector hold order clearance will remain issued to HP Shift Supervisor by title at all times except when running core maps or performing incore detector system to be operated while persons are in the incore instrument room.

Maintenance work that requires the incore detector system to be operated while persons are inside the incore instrument room shall be coordinated by Operations, HP, and the applicable maintenance section. (Other work in progress in lower compartment or annulus will be evaluated for continuation by this group.)

The SE will contact HP to verify no one inside lower containment or annulus and Public Safety to verify access is locked prior to releasing clearance on incore detector system except as outlined above.

The modifications to the RWP coversheet and AI-8, combined with the following, adequately resolve this recommendation: emphasis on compliance with RWPs is provided in GET training; RWP and ALARA training has been given to a significant number of plant personnel as described in section IV.Z (I-84-12-SQN-13) of this report; personnel safety issues have been emphasized as discussed in sections IV.I, S, Z, and GG (I-84-12-SQN-04, -06, -13, -20, respectively) of this report; adherence to hold order clearance procedures training has been provided to those personnel authorized to receive clearances as discussed in section IV.V (I-84-12-SQN-09) of this report. This item is closed.

V. I-84-12-SQN-09, Noncompliance with Requirements of Section 5.1.4 of AI-3, "Clearance Procedures"

In the original investigation (reference A.25), NSRS recommended that since the hold order system is the method used at SQN for the protection of workers, the public, and equipment, strict compliance with the requirements of AI-3 should be emphasized and enforced. NUC PR responded in reference A.28 by stating that additional emphasis will be placed on making all personnel aware of the requirements for the person responsible for work to be on the clearance. This will be accomplished in preoutage briefings, existing clearance procedure training classes, and the periodic management safety meetings which are attended by managers, foremen, and engineering personnel. In reference A.29 NSRS concurred with this corrective action.

For this follow-up review, discussions were held with operations training personnel and a review of training documentation was performed. SQN management determined that a total retraining to AI-3, "Clearance Procedures," was necessary for those personnel authorized to receive clearances, as specified in Appendix A of AI-3. This retraining was performed in the timeframe of April

through September 1985 to the AI-3 lesson plan (reference I.12). The three hour retraining contained a formal written examination. A grade of a least 80 percent is passing. At the completion of the retraining program, the clearance authorization list of Appendix A to AI-3 was revised (December 16, 1985) to reflect only those personnel identified by management and had successfully completed the retraining were to be placed on the authorized list. A random selection of three of the persons on the Appendix A list of December 16, 1985, and their examination results revealed that these individuals had achieved a passing grade on the clearance procedure retraining examination. The Operations Section did not take this specific AI retraining since the licensed personnel receive clearance procedure training in their requalification effort.

The instructions AI-3 and AI-8, "Access to Containment," have been modified to clarify the hold order initiation and removal requirements. Section 4.3 of AI-3 states:

The SE shall, issue the hold order clearance on the incore detector systems to health physics shift supervisors by title, per AI-8 (both units).

Section 2.4 of AI-8, "Access to Containment," has been clarified with respect to issuance of an RWP and hold orders as discussed in section IV. U (I-84-12-SQN-08) of this report. Additional evidence of hold order discussions was determined to have taken place as follows:

1. The SNP unit 1 cycle 2 outage critique meeting minutes documents management concerns on hold order usage and recommends retraining personnel on AI-3. As stated previously, this has been accomplished. Thus, there is evidence that hold order clearance problems are reviewed in outage briefings.
2. Employee crew safety meeting reports (SQS 7) from November 1985 through January 1986 were reviewed and it was determined that an electrical day crew and machinist midnight crew had held discussions on hold orders.
3. The planning supervisor stated that the planners are instructed to minimize the number of hold orders.

SQN has adequately addressed the recommendation by revising procedures, retraining personnel on clearance procedures, discussing hold order clearances in periodic safety meetings and outage critique meetings, and minimizing the use of hold orders. This item is closed.

W. I-84-12-SQN-10, Modification of Cleaning Tool base Supports Without Performing a Technical Evaluation or Testing

In the original investigation (references A.25), NSRS recommended that it be emphasized to the plant staff that changes to tools and equipment affecting work on critical structures, systems and components (CSSC) can be made only after a thorough technical

evaluation has been made on the effect it will have on the system and used only after the modified tool or equipment has tested satisfactorily. Nuclear Power responded in (reference A.28) that SQN will review "special tools" and evaluate the need for modification controls for these types of tools. In reference A.29, NSRS concurred with the Nuclear Power response.

For the follow-up review, it was determined that a SNP Standard Practice SQM-63, "Special or Modified Tooling-Primary Systems," has been prepared and is in use at SQN. The stated purpose of the instruction is:

. . .to provide a means to evaluate special or modified tooling that is used in conjunction with maintenance or modification activities which could directly or consequently cause adverse effects to primary systems.

The requirements of this practice are applicable to special or modified tooling which could directly or consequently cause adverse effects to primary systems. The instruction specifically states:

In general, special tools used on equipment fitting the following criteria fall within the scope of this instruction.

- 2.1.1 Components which are in service, pressurized or energized.
- 2.1.2 Components which, if the tool caused failure of the component, could cause loss of primary coolant or the loss of uncontrollable amounts of radioactivity contaminated water during the use of the tool.
- 2.1.3 Components which, if the tool caused failure of the component, could cause the loss of safety function while the tool is being used.

It was determined that the SQN personnel have knowledge of the existence of this standard practice and that it is being actively used for special tool evaluations for components other than those described above, e.g. a special tool evaluation for a motor lifting eye. Although the instruction does not specifically identify CSSC within the scope, the items 2.1.1, 2.1.2, and 2.1.3 above combined with the knowledge of and evidence of its use in a general manner, satisfies the intent of this recommendation.

The testing aspect of the special tooling and/or modification thereof is covered in section 5.4.b of SQM 63 which states:

If the engineer determines that an evaluation is needed, he performs the evaluation based on the following criteria:

- a. Plant condition while tool is being used (i.e., Mode, system pressurized, system isolated and drained, and unit at power, etc.)

- b. Testing, if feasible (such as mock-up of the tool as it is proposed to be used).
- c. Technical evaluation (such as a stress analysis of the tool when used as proposed).
- d. Logical assessment of the tool using engineering principles to deduce the effects of the tool.
- e. Vendor recommendations, if the tool was procured for a special task.

Testing is specified as one way to evaluate the tool and the alternatives specified are considered to be acceptable to demonstrate adequacy, thus satisfying the intent of the recommendation.

Based on discussions with the mechanical maintenance engineering section supervisor, 100 percent of all their Maintenance Instructions were reviewed and special tooling was identified. The special tools were evaluated according to SQM 63. Conversations with the electrical maintenance engineering supervisor verify that he has a working knowledge of SQM 63. This section recently completed a special tool evaluation per SQM 63 for a containment air fan motor lifting eye. A review of twenty special tool evaluations verifies that the SQM personnel are using the special procedure in the daily operations. This item is closed.

X. I-84-12-SQN-11, Violation of Work Instruction

In the original investigation (references A.25), NSRS recommended that management should emphasize to the plant staff that adherence to PORC reviewed, plant manager approved plant instructions is mandatory and a requirement of the Technical Specifications and that instructions and controls established to assure nuclear and industrial safety. Periodic assessments of compliance with instructions should be initiated and corrective actions taken to correct weaknesses observed.

Nuclear Power replied in reference A.28 stating:

SQNP did not believe generic program weaknesses have been indicated by this event. However, SQNP management understands their detailed involvement in how the job was to be implemented during the evaluation to determine its feasibility may have unintentionally sent a message to key implementing employees creating the impression they had authority to proceed without adherence to normal plant practices.

For this follow-up review, it was determined that in the staff meetings held at 8:15 a.m. each morning at SQN, the Plant Manager questions whether there were any failures to follow procedures. In this way, the requirements for adherence to PORC-reviewed, plant manager approved plant instructions is made perfectly clear.

A review was made of the 1985 Quality Surveillance Section Annual Plan. Periodic assessments of compliance with instructions had been conducted through December 1985. All plant activities with the exception of site emergency plans had been conducted. Additional corrective actions on quality of and compliance with procedures is discussed in section IV. GC (I-84-12-SQN-20) and IV.GC (I-84-12-SQN-22) of this report. This item is closed.

Y. I-84-12-SQN-12, Lack of Control of Egress Capability from Containment

In the original investigation (reference A.25), NSRS recommended that a policy and methodology be established requiring an evaluation of the effect on work in progress and notification of affected workers as necessary before granting permission to incapacitate egress routes from the reactor building containment. Emphasize to plant managers and workers that working in the reactor building containment involves some risks and controls for containment integrity are established. Identify the risks involved and established controls to the employees.

In (reference A.28) Nuclear Power responded: (1) that the submarine hatch was nearby and available as an unhindered egress route, (2) agreed that the reactor building egress should not be impaired when maintenance or other activities within containment are necessary while the unit is at power conditions, (3) good communications are essential and policies regarding communication were being reviewed to ensure effectiveness while maintaining flexibility for the shift engineer to evaluate such situations on an individual basis and determine the extent of notification required, and (4) SQN acknowledged that the FSG personnel were not adequately aware of the Technical Specification requirements associated with the containment airlocks and that future emphasis would be placed on ensuring responsible maintenance personnel are made aware of the Technical Specifications associated with the airlocks on a job-by-job basis.

NSRS responded to the Nuclear Power response in (reference A.29) generally concurring with the position that workers are entitled to know of any condition which could impair their egress from containment should rapid egress be necessary. This is fully consistent with TVA's safety-first policy. Although the Nuclear Power response commits to a review of present policies regarding communications, NSRS stated it would be looking for specific actions taken following this review activity.

The NRC investigation of the thimble tube event stated that the failure to establish guidance or positive controls in AI-8 to the operations staff for changes in airlock access status during Modes 1 through 4 was a further example of TS 6.8.1 violation.

For this follow-up review, it was determined that AI-8, "Access to Containment," has been modified to address egress capability when airlock doors are made intentionally inoperable. Section 2.6 of AI-8 was added and states:

The upper and/or lower containment airlock doors shall not be intentionally made inoperable (prevent personnel egress) while personnel are inside containment. If the doors must be made inoperable with personnel inside, they will be instructed to use an alternate exit.

Additionally, section 2.4 of AI-8 requires that a survey of the lower containment and annulus be made for personnel presence prior to releasing the clearance on the incore detector system, as discussed in section IV. U (I-84-12-SQN-8) of this report.

Those portions of the recommendation related to emphasizing to plant managers and workers of risks involved is addressed in GET training and work instructions. Specific on-the-job safety concerns are addressed further in the details of sections IV. H, J, S, U, V, Z and GG (I-82-12-SQN-2, -5 and I-84-12-SQN-6, -8, -9, -13, -20) of this report. This item is closed.

2. I-84-12-SQN-13, Breakdown in the ALARA Preplanning Program

In the original investigation (reference A.25), NSRS recommended that it be emphasized to the plant staff that compliance with ALARA preplanning requirements as specified in RCI-10 must be accomplished.

Nuclear Power responded to this recommendation in reference A.28. The response stated:

SQNP supports and practices ALARA preplanning based on expected doses with consideration given to potential doses. In concert with corporate policy, it is the plant's goal to maintain radiation doses ALARA in all our work activities. . . . Since the time of the thimble tube ejection incident, RCI-10 has been revised to include specific ALARA preplanning criteria.

The NSRS response in reference A.29 stated that further discussions in the area of ALARA preplanning would be required.

For this follow-up review, additional documents were reviewed and discussions were held with Health Physics personnel. It has been determined that significant positive actions have been taken and are ongoing to improve the ALARA preplanning program. These are: (1) modification of RCI-10, (2) ALARA/RCI-10 training has been for some operations, HP, mechanical maintenance personnel, and instrumentation maintenance weekly safety meeting, and (3) participation in PORC subcommittee biennial review of existing plant instructions and for new instructions. The following provides a brief discussion related to these efforts.