Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381

FEB 2 1 1995

U.S. Nuclear Regulatory Commission
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Gentlemen:

In the Matter of the Application of	)	Docket Nos. 50-390
Tennessee Valley Authority	)	50-391

WATTS BAR NUCLEAR PLANT (WBN) - VALIDATION OF CAUSES OF EIGHT CONSTRUCTION ISSUES

In August and September 1994, eight construction deficiencies were identified by NRC during reviews of TVA closure documentation. TVA provided to the NRC its analysis of those issues in a series of meetings (October 19, 1994, November 29, 1994, and January 12, 1995) and a November 14, 1994 letter. TVA's analysis included an assessment of the underlying causes and extent of conditions of the identified problems, and a description of the corresponding corrective actions. To provide additional assurance of the validity of the analysis, TVA elected to conduct further reviews of two major areas: (1) the corrective action document and NRC open item closure verification process and (2) engineering and field activities. This letter provides the results of those reviews.

Review of Closure Verification Process

TVA conducted an extensive review of its corrective action document and open item closure verification process, including a review of all condition adverse to quality documents (CAQs) and open items closed during a twelve month period. (The results of that effort are contained in Enclosure 1.) The major findings of these verifications are:

- There was no wide-spread problem or a programmatic breakdown in the WBN closure verification process.

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- No additional causes or corrective actions were identified in the further reviews.

- Line accountability is improving. Line organizations are responding positively to the continued reinforcement of quality inspections by site management and Nuclear Assurance (NA), as evidenced by the acceptance rate for corrective action document closures and QC inspections. Nuclear Assurance's review of corrective action documents and open item packages is continuing to monitor this improvement.

- With increased focus and resource reallocation, Nuclear Assurance is now better positioned to detect the types of concerns represented by the eight construction issues.

Review of Engineering and Field Activities

TVA conducted an extensive and independent review of its engineering and field activities, including technical reviews of a broad cross-section of design output to confirm adequacy of design and installation. The review emphasized the electrical and instrument and control areas. The assessment included: (1) a calculation review, (2) a review of electrical specifications to installation procedures, (3) a review of the residual heat removal system (RHR), and (4) an assessment of field installations. (The results of this effort are contained in Enclosure 2.)

The assessment team included over 50 engineers and specialists, many with significant experience in performing similar assessments. While the team made many helpful observations that will improve TVA's work practices and programs, it identified only a limited number of deficiencies, none of which would have adversely impacted the safe shutdown of WBN Unit 1. (In this regard, one issue relating to damaged cable identified by NA and separately confirmed by the assessment team is still undergoing additional evaluation to assess its scope and significance.) Major findings of this review are:

- The review validated the causes and corrective actions contained in TVA's previous analysis.

- There is reasonable assurance that the RHR System will perform its intended safety function. Design of the RHR System is adequate and design attributes of the system are retrievable and verifiable.

- Because work sequence was not optimum, room/area turnover was impacted and the need for some rework was created.

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- With the exception of a small number of specific deficiencies, calculations were of "acceptable" to "high" quality and used correct and validated methodologies. Although the calculations were well understood by the TVA staff, some could be enhanced with "roadmap" guidance for ease of use and review.

- Watts Bar engineering and design documents were generally complete and adequate.

- There is good agreement between electrical and I&C design specifications and implementing procedures.

To assess WBN progress since a similar 1988 Vertical Slice Review, TVA compared the results of the two assessments. The comparison (contained in Enclosure 3) clearly reflects significant progress at WBN. In 1988 the types of problems identified were generally very significant (e.g., missing calculations) whereas in the recent review the types of problems are much less significant and generally administrative in nature.

Conclusion

With the completion of these reviews, TVA has confirmed that the causes of the eight construction deficiencies are understood, their impacts have been bounded and appropriate corrective actions are being implemented. TVA's emphasis has now shifted to sustaining the resulting improvements and ensuring the WBN workforce continues its focus on quality and accountability as the plant transitions to the operating phase.

Enclosure 4 identifies the commitments provided in this letter.

If there are any questions on the information, please contact me at (615) 365-8758.

Sincerely,

Dwight E. Nunn
Vice President
New Plant Completion
Watts Bar Nuclear Plant

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cc: See page 4

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ENCLOSURE 1

ASSESSMENT OF

CORRECTIVE ACTION AND OPEN ITEM

CLOSURE VERIFICATION PROCESS

WATTS BAR NUCLEAR PLANT

FEBRUARY 20, 1995

ASSESSMENT OF CLOSURE VERIFICATION PROCESS

I. INTRODUCTION

In August and September 1994, eight construction deficiencies were identified during reviews of TVA closure documentation. TVA provided to the NRC its analysis of those issues, including an assessment of the underlying causes and extent of conditions of the identified problems, and a description of TVA's corresponding corrective actions. To provide further assurance of the validity of the analysis, TVA elected to conduct extensive reviews of two major areas: (1) the corrective action document and NRC open item closure verification process, and (2) engineering and field activities. This assessment provides the results of the review of the closure possess. The assessment also provides additional observations developed during the review, including the involvement of Nuclear Assurance in the eight construction deficiencies.

II. SCOPE

The assessment of the closure verification process involved the following activities:

- A review by the WBN line organizations of all corrective action documents closed in the twelve month period from October 6, 1993 to October 6, 1994, and all NRC open item closure packages closed or submitted for closure during the same twelve month period (Section III.A.).

- A Nuclear Assurance assessment of the line organizations' review, noted above (Section III.B.).

During the course of this assessment, observations were made regarding the following related issues:

- The involvement of Nuclear Assurance in the eight construction issues (Section IV. A.).

- Areas of improvement for Quality Control (Section IV.B.).

A summary of the conclusions and evaluation results are consolidated in Section V.

III. CLOSURE VERIFICATION PROCESS ASSESSMENT

A. CAQ AND NRC CLOSURE PACKAGE REVIEW BY WBN LINE ORGANIZATIONS

1. Review Scope:

The packages reviewed by the line organizations in this effort included:

- Corrective action documents (SCARs, PERs, and FIRs) closed in the 12-month period (808 packages)

- NRC open item packages closed in the 12-month period (260 packages)

- NRC open item closure packages that had been provided to the NRC for closure but were not yet closed (40 packages).

During the reviews, the appropriate line organization assessed each package to verify that corrective actions and recurrence controls were fully implemented and are being maintained. Where hardware was involved, field verification was performed to ensure that hardware discrepancies had been corrected and had remained corrected. During the re-look effort, items were observed that required corrections or enhancements to packages that were not within the scope of the re-look effort (i.e., were not related to closure verification). These are discussed in Appendix A.

2. Detailed Results--Corrective Action Documents:

Appropriate line organizations reviewed 808 CAQs (SCARS, PERs, and FIRs) as part of the re-look effort. Three instances were identified where corrective actions had not been fully implemented. They are as follows:

a. WBPER910296 (closed August 9, 1994) identified that structural members had been installed across the duct bank to the Intake Pumping Station (IPS) shake space, thus, defeating the purpose of the shake space. Part of the corrective action was to install caution tags in this area. During re-look of this CAQ it was determined that the tags had not been installed. The Design Change Authorization (DCA) to install the tags was omitted from the workplan and, therefore, not implemented.

b. WBPER920113 (closed August 23, 1994 for Unit 1) identified that survey tubes were not installed in accordance with drawings for CVCS cation bed and demineralizer mixing beds A & B. Field verification as part of re-look of this CAQ determined that the cation bed was corrected but tubes had not been corrected on demineralizer beds A & B.

c. WBFIR930083308 (closed February 20, 1994) identified instances where CAQs had not been reviewed for generic implications at other sites and for Unit 2 applicability. Part of the corrective action required that closed CAQs be supplemented as necessary to demonstrate that generic implications and Unit 2 applicability had been considered. During re-look of this FIR, the CAQ supplements could not be located. Apparently documentation had not been transmitted to DCRM.

3. Detailed Results--Closed NRC Open Item Packages:

This portion of the re-look effort involved the review of 260 NRC open item packages that had been submitted to and closed by the NRC. No additional closure verification concerns were identified during the re-look effort. There was, however, the following known issue related to one of the packages that indicates a closure verification concern:

NOV 390/93-20-03 (submitted January 1994) identified that software had been released without following the controls of Site Standard

Practice (SSP)-2.12. After this NOV had been closed, NA performed an assessment and identified similar problems that should have been corrected as part of this NOV.

In addition, one package was supplemented to provide minor clarification.

4. Detailed Results--Open NRC Closure Packages:

This portion of the re-look effort included review of 40 NRC open item closure packages that had been completed by TVA but had not been through NRC total review and closure. The following concerns were identified:

a. CDR 390/90-01 (submitted August 1994) identified that the configuration of a Control Building Pressurization subsystem was different than the system description and that the location of certain radiation monitors compromises their ability to meet design requirements. During re-look of this package, the following problems were identified: to logic diagram did not show monitor location; sample line supports exhibited dimensional, configuration problems; and recurrence control did not include HVAC system. In addition, walkdowns and evaluations by personnel involved in the radiation monitoring special program identified nonconformances to design criteria.

b. CDR 390/92-12 (submitted September 1994) addresses temperature switches installed in safety-related applications which were not qualified as safety-related. Part of the corrective action was to replace the items. A re-look at the closure package identified that the seismic qualification test had not been approved for the replacement switches, the replacement switches had not been installed in accordance with design/vendor requirements, the contract number in the calculation was not changed to reflect replacement switches, and shipping tubes and environmental plugs had not been removed at installation of replacement switches.

c. NOV 390/86-18-01 (submitted September 1994) identified failures to translate design requirements and vendor requirements into specifications, drawings and procedures. A re-look at the closure package for this item identified that the calculation comparing field installation to vendor orientation requirements did not include some solenoid valves. The re-look also noted that recurrence control was not fully implemented in that a note that was to be added to a drawing to identify limitations for valve orientation was not added. The Design Change Notice (DCN) to add the note had been canceled.

d. NOV 390/93-27-01 (submitted August 1994), Example 1, identified an instance where work was accomplished using unapproved vendor documents. Example 2 of the NOV identified a failure to perform an equivalency evaluation for replacement items. Part of the extent determination for Example 2 was to review a sample of Procurement Engineering Group (PEG) packages for this problem. During re-look efforts, documentation that the review had been accomplished could not be located.

e. URI 390/93-30-04 (submitted December 1993) discusses a potential problem with management control of the design process in that a design change to provide backup cooling water for CCP 1A-A was incomplete. During re-look at this package, it was determined that the design change failed to address needed changes to the system descriptions and the FSAR.

f. NOV 390/94-22-01 (Submitted September 1994) was written because corrective actions described in a PER dealing with computer program control was inadequate. Recently, QA performed an assessment that identified additional examples of software that had been released but did not meet procedure requirements. It appears that the extent of condition and/or recurrence controls for the PER were not sufficient.

5. Results Summary:

Three of the 808 CAQ packages, one of the 260 closed NRC open item packages, and six of the 40 NRC open item packages submitted for closure exhibited closure verification problems (a total of 10 problem packages out of a population of over 1100 sampled).

Significantly, five of the six NRC open item packages with closure verification problems were submitted to the NRC (and closed by TVA) between June and September 1994. Two of the three CAQs with closure verification concerns were closed during this same time frame.

6. Conclusion and Evaluation of Results:

With very few exceptions, the closure verification process was effectively implemented at WBN. The problems identified with corrective action documents (three problems out of 808 packages) and closed NRC open item packages (one problem out of 260 packages) were few (i.e., less than one-half percent of the population). However, during the period of June 1994 through September 1994, the packages reviewed by the line organizations contained an unacceptable level of problems similar to the construction issues which gave rise to the NRC's concerns contained in packages closed during the same time period. The results of these reviews further confirm the time frame of concern.

To adequately evaluate these results, events leading up to this suspect time frame are noted below:

In October 1993, NA initiated a corrective action document because of problems found with a Final Safety Analysis Report (FSAR) submittal and two commitment closures. In December 1993/January 1994, additional weaknesses with closure packages were identified. Actions were initiated to resolve these concerns. In February 1994, the NRC identified two violations resulting from open item closure packages. To verify adequacy of corrective actions, NA elected to perform 100 percent reviews of open item closure packages. The Site Vice President issued a memorandum on March 15, 1994, to communicate this decision to the site managers.

As planned, Nuclear Assurance performed in-line reviews of 24 open item packages (covering 25 issues) until May 1994. The results of the review were provided in a report issued on June 9, 1994, from the

Site Quality and Site Licensing managers to the General Manager, Nuclear Assurance and Licensing. The report concluded that corrective actions were effective and open item packages were adequate.

NOTE: As part of site evaluation of eight construction issues, these 24 packages were reviewed again and found to be acceptable. This confirmed the adequacy of those NA in-line reviews.

At this point, because of the successful review results of NA, resources involved in the 100 percent review were reallocated to other areas.

In June, however, the "closure organization" was modified (to a more matrixed organization) and personnel involved were physically relocated. This was done to allow them to focus fully on closures in order to increase the number of package closures. Significantly, ten of fourteen inadequate packages occurred shortly after this change (between June and September, 1994)--NRC reviews identified eight inadequate packages and TVA reviews of 40 packages pulled back from the NRC identified six inadequate packages (see Figure 1).

In July 1994 a self-assessment of NA oversight of Corrective Action Programs (CAPs) and Special Projects (SPs) revealed that NA field verification time was insufficient and reviews too focused on documentation and programmatic aspects. This resulted in the mobilization and resource orientation toward field verification which was in place in late September. This effort has resulted in the identification of hardware-type problems similar to the NRC identified eight issues.

An analysis of the eight issues identified in NRC reviews and the additional issues identified in the TVA reviews reveals that there is no underlying hardware, discipline, or organizational theme. There is, however, a correlation between most of the identified problems and a significant period of change. The failure of line and QA management to recognize this change period as a vulnerable time contributed greatly to the eventual outcome--an increase in the number of problems with the closure verification process. This cause (failure to consistently maintain management's expectations) was identified in TVA's earlier analysis and validated here.

B. NUCLEAR ASSURANCE ASSESSMENT OF LINE ORGANIZATIONS' REVIEW

1. Review Scope:

Nuclear Assurance performed an assessment of the line organization re-look effort described in Section III.A., above.
The assessment was conducted to verify the adequacy of the line organizations' re-look effort. A sample of packages (109) was selected from the population previously reviewed by the line organizations. These packages were then reviewed, including extensive field verification, to confirm that either corrective actions were implemented and maintained, or that inadequacies identified were already detected by the line organizations during the re-look effort.

Open Item Closure Packages
Deficient Packages vs Time

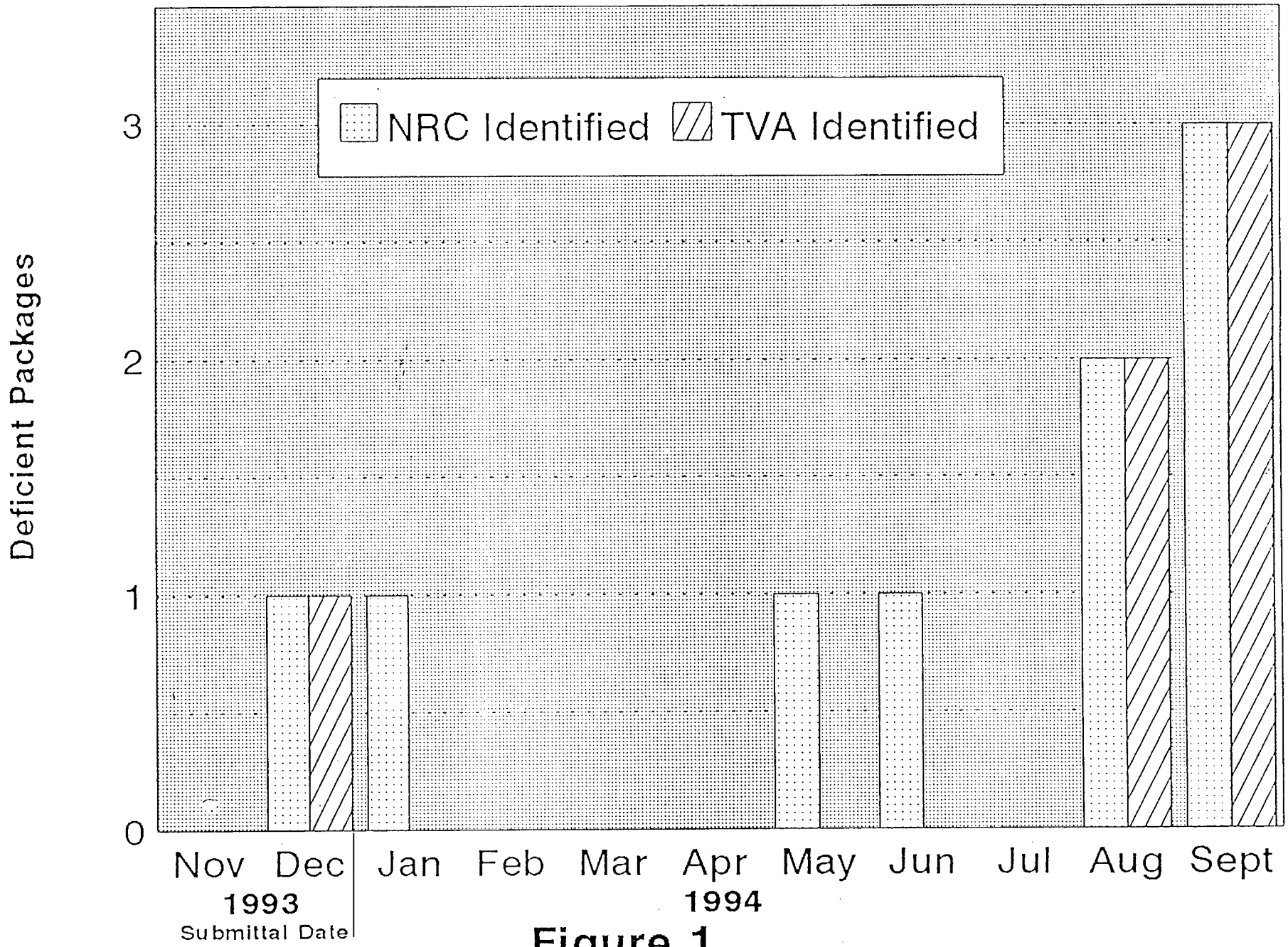

Figure 1

The assessment utilized the statistical sampling plan A-1 of QMP-110.3 Revision 2, "Statistical Sampling Plans." Applying this sample plan to the population of approximately 1100 NRC open item closure packages and corrective action documents for a 99 percent confidence level, yielded a sample number of 100. An additional nine items were added in case the population size increased over the original estimate. The final population numbered 1108 items, therefore, the sample size used is conservative. This sample included work representative of individual organizations (Startup and Testing, Plant, etc.), disciplines within those organizations (civil, electrical, mechanical, etc.), and hardware/non-hardware issues.

During the assessment, several items were observed that required corrections or enhancements to packages but were not within the scope of the re-look effort (i.e., were not related to closure verification). These are discussed in Appendix A. Discrepancies identified during the on going NA 100 percent review of NRC open item closure packages are also discussed in Appendix A.

2. Detailed Results:

Of the 82 CAQs (SCARs, PERs, and FIRs) and 27 NRC open item closure packages reviewed as part of the NA assessment, one instance was found where corrective actions had not been fully implemented and this condition had not been detected by the line organization (in this case, Modifications) in the re-look effort:

> WBPER940183 (closed September 21, 1994) identified safety-related cable routed in non-safety related conduit. Part of the corrective action was to retag the upgraded conduit in accordance with DCN W-30601-A. During NA field verification, it was found that not all tags had not been installed. A PER was generated to document this problem and obtain resolution. As part of the resolution, Modifications determined that the condition was the result of personnel error by the individual performing the re-verification. All other reverification work performed by this individual was reviewed with no additional problems identified. Nuclear Assurance is performing additional reviews in this organization to confirm the extent of condition.

3. Results Summary:

The assessment identified one instance (out of a sample of 109) where corrective actions had not been fully implemented and had not been detected by the line organization during its re-look effort. The line organization investigated this condition and determined that the condition was limited to this instance.

4. Conclusion and Evaluation of Results:

The results of the assessment indicate that the re-look effort by the line organizations was effectively performed. Only one case was identified where the re-look effort was not sufficiently thorough. However, as a result of previously identified problems, NA will continue the review of 100 percent of the corrective action documents and NRC open item closure packages to monitor improvements in line performance and until sustained positive performance is obtained.

Based on review of the site cause analysis of the eight issues and the results of the independent evaluations, NA concurs with the two major causes described in TVA's November 14, 1994, letter to the NRC:

- Management failed to provide balanced allocation of management attention and resources.

- Management failed to consistently reinforce expectations and hold personnel accountable.

Additionally, NA's analysis concluded that especially during periods of change (e.g., organizational changes, production increases, physical relocation) an increased emphasis on quality expectations needs to be reinforced.

Regarding NA involvement in the open item process and the potential for detection of the eight (and similar) issues:

- Nuclear Assurance's decision to reallocate resources after the satisfactory performance of the line during the 100 percent review (April - May 1994) was appropriate.

- Nuclear Assurance failed to respond to the changes that occurred in the administration of open item closures. Increased oversight during the periods of change is a lesson learned by NA and site management.

- The decision of NA to increase field verification of CAP/SPs activities and other oversight areas was appropriate. However, the decision was implemented too late to aid in the detection of the types of concerns represented by the eight issues. With the increased focus on field verification, conditions similar to the eight construction issues have been identified.

IV. NUCLEAR ASSURANCE'S OBSERVATIONS ASSOCIATED WITH ISSUES RELATED TO THE CLOSURE PROCESS ASSESSMENT

During its review of these, NA made observations regarding its performance. These observations and suggested areas of improvement are noted below.

A. NUCLEAR ASSURANCE INVOLVEMENT WITH THE EIGHT CONSTRUCTION ISSUES

Of the eight construction issues giving rise to the concerns addressed in this assessment, NA had involvement in two of them. That involvement is discussed below:

1. 6.9kV Splices

One of the NRC issues involved incorrect crimping of the 6.9kV butt splices. These butt splices had been QC-inspected and accepted. None of the Thomas and Betts splices (requiring R-suffix die crimping) reviewed by visual or x-ray had been properly crimped in accordance with the manufacturers' instructions. As a result, TVA initiated a review of the medium voltage splicing and NA initiated a review of the qualification and certification programs.

The evaluation of the medium voltage splicing was previously submitted and discussed with the NRC on a technical basis. Therefore, this discussion is limited to the QC inspection involvement.

The crimping of the splice connectors was not acceptable and should not have been accepted by QC. The primary cause of the problem was attributed to an incorrect statement in the installation procedure that indicated only four crimps were required. To resolve this concern for future applications, the TVA Electrical Level III Inspector from the In-Service Inspection Organization in TVA corporate performed the following:

- Evaluated crimping procedure of medium voltage cable.
- Monitored each SWEC QC inspector performing crimping inspections on mock-up.
- Evaluated craft/QC training on revised crimping procedure.
- Administered written and practical tests for medium voltage crimping to SWEC QC inspectors.
- Monitored SWEC QC and craft prejob briefing.
- Monitored SWEC QC performing inspection of medium voltage crimping operations (including prep, crimps, and splicing).
- Reviewed x-ray films of medium voltage cable crimping for a number of crimps.
- Monitored SWEC QC performing electrical inspections (general observations).

No problems were noted during these monitoring activities.

The review of the QC certification program was performed to determine if any weaknesses exist that would have contributed to the 6.9kV crimping problem. The review included:

- Frequency of recertification.
- Site-specific training adequacy.
- Adequacy of overview and monitoring of inspection activities.

No problems were identified as a result of this review.

Additionally, the Electrical Level III Inspector reviewed implementing work instructions, and where possible, work/inspection activities for infrequently performed inspection activities. (The infrequent performance of the crimping activity was likely a contributing factor to the resulting problem.) The following infrequently performed inspection activities were monitored:

- Medium voltage crimping
- Kapton operations

- Stress cone installations
- 3 Material Wrap
- Soldering
- Conax (PSCA) penetration

For the following activities, procedures have been reviewed and will be monitored in the future when additional work in these areas is performed: Conax installation (valves); Energy Wrap; and Nuclear Instrumentation System connectors.

The results of this review indicate that the work instructions were adequate (some enhancements were recommended and implemented) and the inspector activities were satisfactory.

The installation of Thermo-Lag is a major inspection activity that has not been performed previously. A TVA Level III Inspector monitors:

- Craft/QC training
- Modification/Addition Instruction 3.10
- Modification/Addition Instruction training and/or test
- QC Modification/Addition Instruction training
- Prejob planning (craft and QC)
- Work package review
- QC certification reviews
- Inspection performance

No concerns were identified during this monitoring activity.

2. Reactor Coolant Pump (RCP) Coatings

QC performed a surveillance of the reactor coolant pump coatings. During the surveillance, the inspector questioned the apparent disparity between the motor size and the screen. The technical consultant involved in the effort indicated to the inspector that the condition was acceptable. The inspector accepted this statement. Nuclear Assurance determined that preparation for the surveillance was inadequate in that a surveillance plan and acceptance criteria had not been developed.

3. Conclusions:

The main contributing factor to 6.9kV crimping issue was the inadequate crimping instructions contained in the procedures covering this activity. Also, because crimping is an infrequently performed inspection, this likely contributed to this issue. Evaluation of other infrequently performed inspections did not reveal any additional similar problems. In some

instances, the inspector did not follow procedure requirements. These instances were addressed on an individual basis.

The QC training and certification program is adequate. The QC training and certification program meets ANSI N45.2.6/NQA-1 training requirements. Recertification is performed at proper intervals. Training materials are complete and comply with requirements. However, additional training on crimping was warranted because of the different requirements for different brand connectors.

In regard to RCP coatings, if adequate preparation had been performed, the inspector would have been aware of the requirements and would have identified the disparity as an unsatisfactory condition. Failure to perform the appropriate preparation was determined to be an isolated instance.

B. QUALITY CONTROL IMPROVEMENT AREAS

Nuclear Assurance, through self-evaluation, identified the need for increased management involvement and improved field observations. These expectations were communicated to all groups within NA (e.g., Quality Assurance, Quality Engineering, QC, etc.). As a result of communicating expectations and management involvement, two areas within the QC function were identified that required improvement. These are discussed below.

1. Failure To Document Deficiencies At The Time Of Inspection

Quality Control (QC) inspectors were not always documenting unsatisfactory conditions. This mainly involved minor documentation errors in work implementing documents, but also included minor hardware discrepancies such as arc strikes, tightening of lugs, etc. As a result of this discovery, TVA assembled a team of senior- and line-level managers from the QC contractor (Stone and Webster Engineering Corporation (SWEC)) and TVA NA to investigate this issue.

The investigation revealed that there are no concerns regarding the correction of the unsatisfactory conditions or inspector independence. The main concern was that QC was inappropriately relieving the line of the responsibility to ensure work was complete and correct in all respects before presentation for inspection. QC was in effect performing preinspections and allowing minor observed discrepancies to be corrected before performing an "official" inspection. Failure to document the unsatisfactory conditions inadvertently resulted misleading acceptance rates and trend analysis. Therefore, feedback to management to address recurring deficiencies was lacking.

The major contributor to this issue was the perception of some inspectors that identifying and allowing the craft to correct minor unsatisfactory conditions was simply acting as a team. The need to document even minor unsatisfactory conditions when an item of work is presented for inspection was emphasized to the inspectors. The initial result of this reinforcement of standards was a reduction in the reported inspection acceptance rates. Since that time, acceptance rates began to improve, thus indicating improved line accountability. The expectation to document all unsatisfactory conditions is continually being reinforced and implementation is monitored.

2. Inappropriate Methods Used to Document Out-of-Scope Unsatisfactory Inspection Results.

QC documented unsatisfactory out-of-scope conditions on out-of-scope inspection reports. As a result, appropriate trend analyses and reportability evaluations were not being performed. A team, similar to that discussed above, was charged to investigate this concern.

The investigation revealed that, with the exception of performing reportability reviews, QC was complying with the procedures in effect at the time. QC had incorrectly assumed the line organizations were performing these reviews. There was, however, an apparent lack of TVA management involvement in the process.

Actions taken to address this issue included:

- The use of out-of-scope inspection reports was curtailed. Unsatisfactory conditions are now documented on work requests or PERS, as appropriate. Procedures were revised to reflect this change.

- Prior out-of-scope inspection reports are being evaluated and dispositioned including the initiation of a corrective action document, where appropriate.

The actions taken will adequately resolve the concerns associated with the use of out-of-scope inspection reports.

3. Overall Conclusions:

The QC inspection function has been performing adequately. By identifying and addressing the above issues, overall effectiveness has improved. The identification of these discrepancies is evidence that increased management involvement and communication of expectations are having the desired effect.

V. SUMMARY OF CONCLUSIONS AND EVALUATION

This assessment reports on the WBN line organizations' review of the closure process and NA's evaluation of that effort. In addition, observations and recommendations associated with these efforts are included. Based on this assessment, TVA has drawn the following overall conclusions:

1. Additional reviews of closed corrective action documents, and closed NRC open item packages are not deemed necessary.

Basis:

The re-look effort performed by the line organizations and the NA assessment of that effort confirmed that, although some improvement was needed, there was not a breakdown in the closure verification process. No significant issues were identified with closed documents. It would be expected that conditions in other closed packages would be similar to the results obtained by the line organizations re-look effort and the NA assessment of the re-look effort.

2. No additional recurrence control actions are necessary to address closure verification concerns.

Basis:

WBN performed a cause analysis of the eight construction issues and identified the following major causes:

- Management failed to provide a balanced allocation of management attention and resources.

- Management expectations and personnel accountability were not consistently reinforced.

Nuclear Assurance performed an evaluation of the cause analysis and concurred with the results. The re-look effort performed by the line organizations and the assessment performed by NA did not reveal any new causal factors.

Nuclear Assurance is continuing to perform reviews of 100 percent of corrective action documents and NRC open item packages to monitor improvement until it is apparent that the line organizations clearly understand their accountability by consistently applying lessons learned and management expectations.

3. The QC inspection function is performing effectively.

Basis:

Quality Control (QC) inspector qualification and certification program was evaluated and determined to be satisfactory.

Independent monitoring of QC inspector activities by TVA Level III Inspectors shows good inspector performance.

Out-of-scope deficiencies are being identified during inspections and are being documented using the appropriate corrective action document.

QC has raised quality standards by documenting minor documentation deficiencies in work documents. This additional feedback during quality accountability sessions with the line has resulted in improved work document packages.

4. Nuclear Assurance is now in a better position to detect the types of concerns represented by the eight construction issues.

Basis:

Additional management/resources have been directed to WBN. This has resulted in additional focus on problem areas and provided the means to improve verification activities, such as increased field verification. It should be noted that the detection of the areas needing improvement within the QC function was the result of additional management involvement.

Increased focus on field verification is in place and is identifying substantive issues. Recent examples include:

- Field location of EQ equipment not in agreement with documentation
- Cable damage that was not encompassed by corrective actions of prior corrective action document
- Instrument lines that did not meet separation requirements

The management expectation to observe beyond the specific verification task has resulted in identifying issues such as:

- Containment Spray piping hangers pulled from structure
- Unauthorized personnel in limited access areas
- Out of scope unsatisfactory conditions during closure verification of corrective action documents

As a result of increased management involvement and reinforcement of expectations NA has become more aggressive and sensitive to periods of change when planning/scheduling assessment and surveillance activities.

5. Line accountability is improving.

Basis:

Nuclear Assurance and site management have raised the standards for quality expectations. For example, NA is rejecting corrective action document packages for even minor administrative discrepancies. Quality Control is now documenting all unsatisfactory conditions that are detected at inspection, including documentation discrepancies in work plans. The line organizations are responding to these raised standards.

The acceptance rate resulting from NA review of 100 percent of corrective action documents has shown overall steady improvement (see Figure 2).

Immediately after QC began including minor deficiencies in inspection acceptance rate data in October, 1994, the acceptance rate declined. However, as attention was applied to these type rejects, the acceptance rate began a steady improvement (see Figure 3). Similarly, Quality Engineering demanded high quality standards in their review of work orders. Initially, there was a decline in the acceptance rate. However, acceptance rates soon began to improve as the line organizations began to understand these expectations (see Figure 4). Similar results were seen in procurement documents (see Figure 5).

Single point accountability for corrective action documents was implemented in October 1994. Since implementation of this policy,

the Management Review Committee indicates there has been some improvement in the development of corrective action plans, etc.

However, as discussed above, NA will continue 100 percent review in some areas until it is apparent the line organizations are consistently meeting management expectations for accountability and quality.

6. Nuclear Assurance has incorporated lessons learned and is transitioning from construction to operations.

Basis:

The management in place and the additional experienced resources allocated to WBN provide an aggressive, involved organization that will minimize repetition of problems. This has already resulted in, for example: increased field verification and the attendant identification of substantive issues, higher quality standards, and critical self-evaluation.

These resources also provide the experience and expertise to improve programs that will better serve an operating plant. Examples include the corrective action program and the trend program.

Nuclear Assurance has successfully performed oversight of key milestone events such as Hot Functional Test (HFT), and Integrated Test Sequence (ITS). These oversight activities have been effective in identifying and resolving issues that could have resulted in regulatory action.

Nuclear Assurance is performing comprehensive operational readiness assessments of all programs. This is providing baseline knowledge to verification personnel.

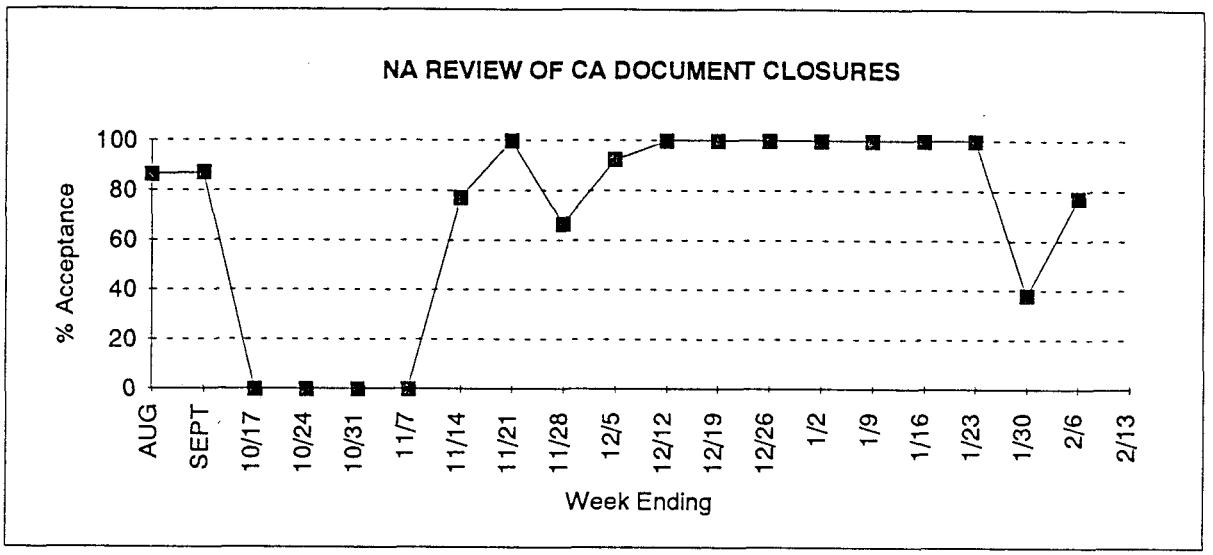

Figure 2

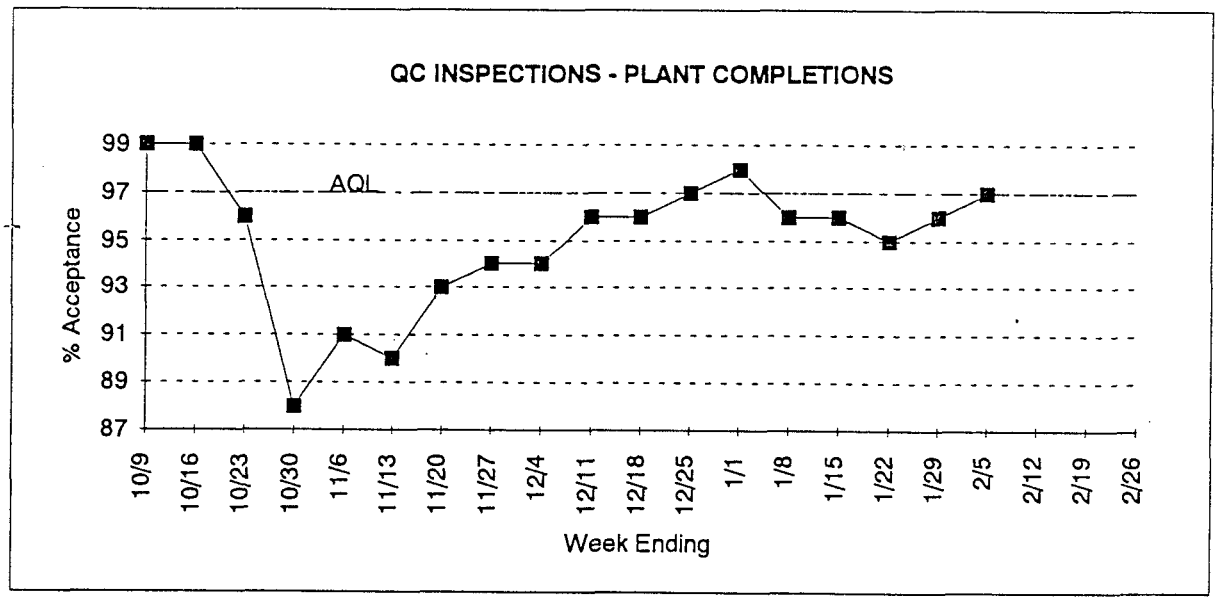

Figure 3

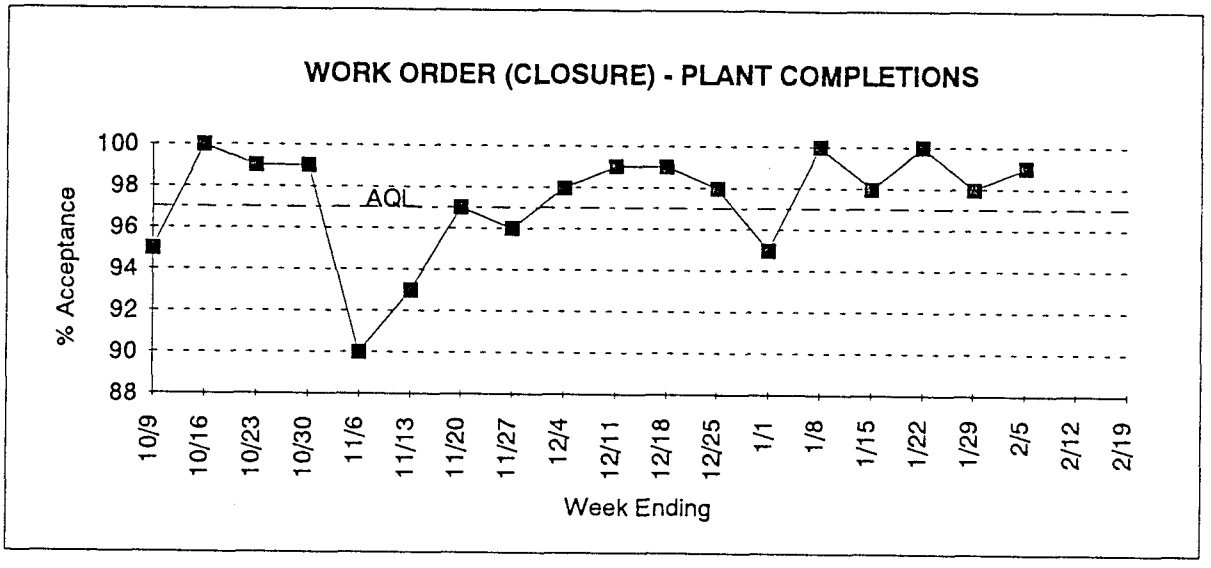

Figure 4

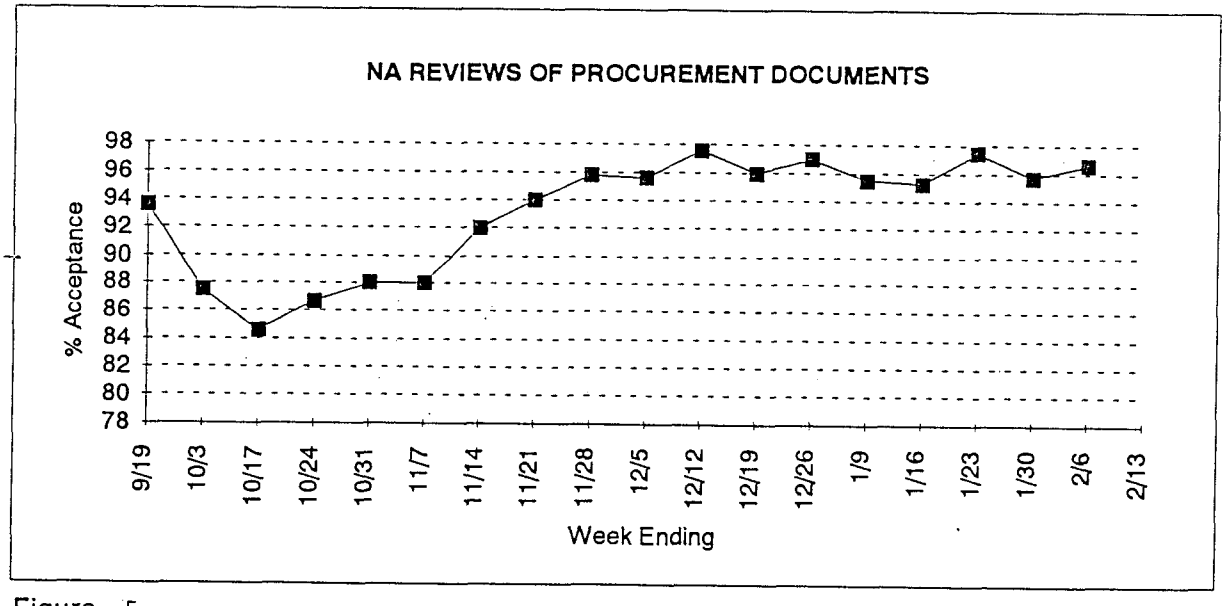

Figure 5

APPENDIX A

OUT-OF-SCOPE CONDITIONS IDENTIFIED DURING LINE ORGANIZATIONS RE-LOOK AND NUCLEAR ASSURANCE ASSESSMENT AND CONDITIONS IDENTIFIED DURING NUCLEAR ASSURANCE 100 PERCENT REVIEW OF NRC OPEN ITEM PACKAGES

I. INTRODUCTION

The re-look effort and the NA assessment of the re-look effort, and the NA review of 100 percent of NRC open item packages, identified items that required correction or resulted in enhancements to corrective action document packages or NRC open item packages. These are discussed below. Where appropriate, discrepancies identified are being resolved through the corrective action program.

II. LINE ASSESSMENT OF CLOSURE PROCESS (RE-LOOK EFFORT)

NOV 390/93-45-01 identified discrepancies between walkdown package information on a support and actual support configuration. Subsequent to development of the closure package, an FDCN was issued to modify the support for reasons not related to the NOV. During re-look, QC determined that the installed material thickness is 1/4 inch less than required. This problem is not related to the closure verification of the NOV.

A PER, WBPER940120, identified that a support required for HFT had not been modified as required by an open DCN. Part of the corrective action was to complete the modification. As part of the closure of the CAQ, verification that the support had been modified was performed. However, during the re-look of this CAQ, it was determined that the support dimension/orientation was not in accordance with design output. It would not be expected that a detailed examination of dimensions would have been performed to verify closure of this CAQ. (In addition, preliminary investigation indicates dimensions may have changed as a result of thermal movement during HFT). Therefore, this is not considered a problem with the original closure verification.

The re-look effort identified approximately 85 packages that are being supplemented to address typographical and administrative discrepancies, clarify wording, provide additional justification for extent of condition determinations, etc. Examples:

- Reference to a QA assessment report was added to a CAQ package to provide additional justification that the extent of condition was limited as originally stated in the CAQ.

- The closure statement to a CAQ referred to the incorrect version of a installation procedure. The package was supplemented to correct the discrepancy.

III. NUCLEAR ASSURANCE ASSESSMENT OF LINE'S EFFORTS

- WBP880420PER - During QC field verification activities in the intake pumping station, out-of-scope problems were identified with watertight connection seals in nearby junction boxes.

- WBPER930304 - QC field verification revealed conduit supports which did not meet minimum edge distance requirements (5 inches required versus 3 inches actual on 1 of 6 supports.)

- WBNMEB8688SCA - QC field verification observed unpainted washers on installed air-handling units. The work orders, which required washers to be painted when reinstallation was performed, had been signed as complete.

- WBP900528PPER - Physical damage to pipe support clamps was discovered during QC field verification. Pipe clamps were tightened until the clamp ears made contact. Part identification was not verified, and components were not tagged or marked.

Ten conditions were observed that warranted correction using the work request process. Examples:

- Paint observed on spherical bearings on both ends of a pipe strut.

- Missing Raychem sleeve and missing "High Voltage" tag discovered.

- Minor damage (loose hardware, scratches, and dents) to fire door.

- Missing conduit support identified.

Fifteen packages required correction to address administrative discrepancies. Examples:

- Reference to an incorrect drawing by MODS during their re-look effort.

- Closure statement did not address incorrect valve tags which were corrected.

- Typographical error in closure justification.

- Equipment Management System (EMS) serial numbers found to disagree with field configuration.

- Snubber number incorrect; package supplement issued to correct.

IV. NUCLEAR ASSURANCE 100 PERCENT REVIEW

Nuclear Assurance has reviewed, to date, seven of the 40 NRC open item packages previously submitted to the NRC for closure. The results are as follows:

IFI 390/94-16-01 No deficiencies identified

URI 390/94-36-02	No deficiencies identified
IFI 390/93-88-01	No deficiencies identified
IFI 390/94-25-01	No deficiencies identified
DEV 390/94-30-01	Required to be supplemented for clarity. Cover sheet required minor administrative corrections.
CDR 390/91-34	The "Verification Checklist" was not in the package. The response, corrective actions, and completed actions required clarifications. Training records and procedures needed to be added to the package. SCARs WBP880474SCA and WBSCA910275 needed to be supplemented to explain the extent of condition review and clarify the corrective actions taken. Some minor, but related issues were found: the pages of WBP870752 were misnumbered and the final version of WBP870752 could not be found.
NOV 390/93-45-01	No deficiencies identified

Nuclear Assurance has reviewed, to date, eight other NRC open item closure packages. The results are as follows:

IFI 390/93-59-07	• Package required clarification of how condition was bounded. • Unit 2 applicability not addressed
CDR 390/94-07	No deficiencies identified
NOV 390/94-51-02	• Closure checklist marked incorrectly • Vendor involvement in problem not addressed • Loose fitting noted during field verification • ASME tag not located correctly
NOV 390/92-40-02	No discrepancies identified
NOV 390/93-61-01	Administrative corrections required to make closure form consistent with contents of package
DEV 390/94-78-01	Associated PER required to be supplemented to provide additional information on extent of condition
CDR 50-390/94-11	• Justification for sampling plan required to be added • Not all documentation included (e.g., vendor letter) • Referenced DCN in package is mis-coded in DCCM
URI 390/93-61-02	• Extent of condition required clarification • FSAR figure did not clearly reflect changes • Reference to a DCN was missing