UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-390/92-40 and 50-391/92-40

Licensee: Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Docket Nos.: 50-390 and 50-391 License Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection Conducted: November 20 through December 18, 1992

Inspectors: _____ 1/11/93
G. A. Walton, Senior Resident Inspector Date Signed
Construction

P. G. Humphrey, Resident Inspector, Watts Bar
K. D. Ivey, Resident Inspector, Watts Bar
J. F. Lara, Resident Inspector, Watts Bar
M. M. Glasman, Resident Inspector, Watts Bar
J. B. Brady, Project Engineer, RII
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Approved by: _____ 1/12/93
P. E. Fredrickson, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope:

This routine resident inspection was conducted in the areas of construction work activities, review of engineering data, preoperational test program implementation verification, special projects review, drawing and document control, and action on previous inspection findings.

Results:

The licensee's work activities and associated documentation were determined to meet acceptable performance standards. With the exception of some cable pulling concerns and drawing control revisions discussed in the report, the work efforts in the areas inspected were found to comply with applicable workplan instructions and site implementing procedures.

One apparent violation was identified involving falsification of plant records (paragraph 3). Two non-cited violations were identified involving the installation of cables with a different method of attachment than specified in the respective cable pull calculations (paragraph 2.b) and the failure to maintain controlled drawings in accordance with procedure requirements (paragraph 6).

The inspection results indicate that reviews by the Quality Assurance organization should have identified the concerns discussed in the cable installation NCV. This issue was discussed with the site Quality Assurance Manager and cable installation data sheets were revised to require Quality Control verification.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

T. Arney, Senior Quality Project Manager
M. Bellamy, Startup Manager
*R. Boren, Site Security Specialist
J. Chardos, Manager of Projects
*J. Christensen, Site Quality Manager
*J. Crittenden, Quality Audits Manager
S. Crowe, Site Quality Assurance Manager
*J. Cruise, Licensing Engineer
*W. Elliott, Engineering Manager, Nuclear Engineering
*L. Ellis, Concerns Resolution Staff Specialist
*S. Gilley, Corporate Licensing Engineer
*R. Hardin, Site Security Manager
*L. Jackson, Operations Manager
R. Johnson, Modifications Manager
*N. Kazanas, Vice President Completion Assurance
*C. Kelley, Protective Services Manager
*D. Koehl, Technical Support Manager
A. McLemore, Modifications Engineering Manager
*L. Maillet, Site Support Manager
*R. Mays, Licensing Engineer
D. Moody, Plant Manager
*W. Museler, Site Vice President
C. Nelson, Maintenance Support Superintendent
*R. Newby, Site Representative, Concerns Resolution Staff
*P. Pace, Compliance Licensing Supervisor
*G. Pannell, Site Licensing Manager
*R. Purcell, Plant Program Manager
T. Raley, Modifications Backlog Supervisor
*R. Stockton, Licensing Engineer
*D. Swank, Project Manager
*S. Tanner, Special Projects Manager
*J. Vorees, Regulatory Licensing Manager
*H. Weber, Engineering and Modifications Manager
C. Whitehead, Project Engineer

Other licensee employees contacted included engineers, technicians, nuclear power supervisors, and construction supervisors.

NRC Personnel
*A. Tillman, NRC Inspector, RII
*J. Brady, Project Engineer, RII

*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Construction Activities

The following work activities were evaluated for compliance with the specified requirements listed within the workplan and as discussed below.

a. WP D-11347-04, Install Cables (TI 2512/16)

This workplan pertains to the installation of cables to resolve ampacity deficiencies and requires replacement of seven cables specified in DCN M-11347-A. The inspector witnessed in-progress cable installations and associated workplan documentation for two of the seven cables and reviewed pull tension calculations for three of the seven cables. Inspector observations are described below:

1PL4943B (Cable identification number)

This cable set consisted of six 500 MCM single conductor cables (two conductors per phase) routed between 480 Vac shutdown board 1-BD-212-B1/9B-B and reactor vent board 1-MCC-232-B/1A1-B. The inspector witnessed the installation of two of the six 500 MCM conductors as they were installed in conduit 1PLC2536B from a pull box. The inspector noted that the cables were individually pushed through the lubricated conduit to facilitate installation. Following the cable installation, the inspector verified the installation of cable supports. Kellums support grips were installed in the pull box upstream of the conduit vertical run. The cable installation and support grips provided were determined to be in accordance with the requirements specified in MAI-3.2, Cable Pulling For Insulated Cables Rated Up To 15,000 Volts, Revision 7.

1PL4965B (Cable identification number)

This cable set consisted of six 500 MCM single conductor cables (two conductors per phase) routed between 480 Vac shutdown board 1-BD-212-B1/10B-B and control and auxiliary building vent board 1-MCC-214-B1/1A1-B. The inspector witnessed the installation of two of the six 500 MCM conductors as they were installed in cable trays and conduit 1PLC4717B. The inspector noted that the cables were individually pushed through the conduit with the conduit being lubricated to facilitate the installation.

Cable Pull Tension Calculations

The inspector also reviewed the cable pull tension calculations for three cable sets which were installed through this workplan. The calculations for the following cable sets were reviewed:

Cable ID	Conduits
1PL4942B	1PLC798B, 1PLC2534B
1PL4943B	1PLC817B, 1PLC4022B
1PL4945B	1PLC799B, 1PLC4024B, 1PLC2554B

The calculations were determined to be adequate in considering the various inputs which included cable type, number of cables, conduit size and method of pulling attachment. The workplan documentation provided evidence that the pull tension limits were not exceeded through the use of tested and qualified breaklinks, use of a dynamometer or cables being pushed through conduit segments.

The inspector concluded that the above cable installation activities were performed in accordance with the requirements specified in MAI-3.2, Cable Pulling For Insulated Cables Rated Up To 15,000 Volts, Revision 7. The workplan also reflected the status of the cable installation at the time of the inspector's review.

No violations or deficiencies were identified.

b. WP D-11378-15, Install Cables (TI 2512/16)

This workplan pertains to the replacement of system 213 cables to resolve ampacity deficiencies. This workplan installed various cables specified in DCN M-11347-A. On December 14, 1992, the inspector witnessed the partial installation of cable set 2PL4935A and reviewed associated workplan documentation including cable pull tension calculations.

This cable set consisted of six 500 MCM single conductor cables (two conductors per phase) routed between 480 Vac shutdown board 2-BD-212-A1/8B-A and control and reactor MOV board 2-MCC-213-A1/1A1-A. The inspector witnessed the installation of the cable set as it was partially pulled through conduit 2PLC3649A. This conduit is routed from junction box 0-JB-213-6548A to junction box 0-JB-213-6547A with a pull box in between. The inspector witnessed the cable installation as it was pulled from junction box 0-JB-213-6548A to the mid-run pull box. The inspector noted that the conduit was lubricated to facilitate the pull and the cable set was being pulled with one basket weave (mare's tail) attachment and breaklink 92-630-075. This breaklink had been tested and qualified with a break strength of 1700 pounds. The inspector reviewed the cable pull tension calculations and noted that the calculation results (Tmax) were based on the use of two weave basket grips (mare's tail) whereas the actual pull configuration only used one grip. This difference in the number of grips results in the maximum allowable pull tension (Tmax) being limited by the conductor tension (Tc) limits instead of the sidewall pressure (Tswp) limits as shown below:

Number of Mare's Tail Grips

	1 (field)	2 (in calculation)	
Tc	2000	4000	(pounds)
Tswp	2045	2045	(pounds)
Tmax	2000	2045	(pounds)

Tc maximum pull tension based on conductor limits
Tswp maximum pull tension based on cable SWP limits
Tmax maximum pull tension that can be applied to cables based on lesser of Tc and Tswp

The inspector discussed this discrepancy with personnel involved with the cable installation including craftsmen, QC inspectors and field engineers. The existing one grip attachment was replaced with two attachments to conform with the calculation configuration, and the cable pull was completed from the pull box to junction box 0-JB-213-6547A.

MAI-3.2, Cable Pulling For Insulated Cables Rated Up To 15,000 Volts, Revision 7, Step 6.3.10, states that changing the attachment method will require revision to the pull calculation. The licensee initiated PER WBPER920282 to document that the calculation was not revised when the field modification personnel changed the method of attachment (i.e., changed from two to one mare's tail). Since only one mare's tail was used during the pull, the revised maximum allowable pull tension should have been 2000 pounds as shown above. Although Tmax changed from 2045 to 2000 pounds, the safety significance of this occurrence is minimal due to the fact that the difference between the revised and original pull tension limits is small and the breaklink used provided sufficient margin below the revised pull tension limits (i.e., breaklink strength of 1700 pounds versus pull tension limit of 2000 pounds). Therefore, the cable pull tension limits were not exceeded. Furthermore, the length of the pull during this occurrence was only approximately 25 feet.

The licensee initiated PER WBPER920282 to document the above discussed condition. Immediate corrective actions included installing two mare's tail attachments as identified in the cable pull calculations for the remainder of the cable pull route. The inspector noted that QC inspections of this activity failed to identify this deficiency. This was discussed with the site QA manager who believed the data sheet was not specific enough for the QC inspector to identify the deficiency. The licensee is enhancing MAI-3.2, Cable Installation/Pullback Data Sheet and Step 6.3.10, to further clarify the requirements that if basket weave grips are used to pull the cable, the number of grips shall be recorded on the data sheet and changing the number of grips will require a revision to the pull calculation. The method of cable

connection will require the QC inspector to verify the correct method of connection was used.

The failure to revise the applicable cable pull calculation to reflect the actual attachment configuration as required by MAI-3.2 is identified as a violation of 10 CFR 50 Appendix B, Criterion V, which requires that activities affecting quality be performed in accordance with written instructions. This item is identified as NCV 50-390, 391/92-40-01, Failure To Revise Cable Pull Calculations. This NRC identified violation is not being cited because the criteria specified in Section VII.B(1) of the NRC Enforcement Policy were satisfied.

The inspector also witnessed the partial installation of cable 2PL4935A as it was pulled from junction box 0-JB-213-6548A into conduit 2PLC3652A. The cable was pulled using two mare's tail attachments as specified in the cable pull tension calculation, and this tension was monitored through the use of a tested and qualified breaklink. The cable installation was observed to be performed in accordance with the workplan instructions.

c. WP D-11986-03, Rework Conduit (TI 2512/20)

This workplan pertained to resolving conduit installation deficiencies described as "Christmas Tree" configurations. Christmas tree configurations refer to multiple conduit fittings attached to the free end of conduits creating increased cantilever forces thus resulting in the conduits being susceptible to support failure during a postulated seismic event. This issue is included as part of the Electrical Issues CAP.

The scope of this workplan consisted of the lifting and pullback of existing cables, reworking the conduit and supports, and re-installing the cables for safety injection flow control valve 1-FCV-063-3-A. Although the valve itself is powered from a Class 1E power supply, the cables to be pulled back and re-installed were classified as non-safety since they only provide valve position indication. On November 19, 1992, the inspector reviewed the in-process workplan documentation in the workplan library, and the results of this review are discussed below.

Cables 1M138, 1M247, 1M248, and one additional cable to be abandoned were pulled back to allow reworking of the associated conduits and supports. Since these cables were to be re-installed after the conduit rework (except for the abandoned cable), the pull back tension of the cables was required to be monitored as the cables were being pulled back. This ensures that the pull tension limits specified in MAI-3.2, Cable Pulling For Insulated Cables Rated Up To 15,000 Volts, Revision 7, are not exceeded. The inspector noted that the pullback data sheets for the above three cables routed in conduit MC271 did not specify the method of pull tension monitoring to ensure that the Tmax limit of 210.43

pounds was not exceeded. Further review by the licensee indicated that the pull back tension was not monitored during the removal of the cables. The cables were subsequently re-installed and the pull tension was monitored. PER WBPER920267 was issued on November 23, 1992, to document this condition.

MAI-3.2 allows certain conditions which must be met if pull tensions are not to be monitored. These criteria were not met for this particular pull-back and therefore the pull tension should have been monitored. However, the safety implications for these particular cables is minimal due to the short vertical conduit length (approximately 15 feet), the fact that the pull tension was monitored during the re-installation of the cables, and that these cables are classified as non-safety related. A QC inspector was aware of this practice and, even though the cables are non-safety relatad, should have ensured that the procedure requirement was implemented. Because the cables are not safety related, a violation is not being issued. However, the licensee's corrective action program requires that the nonconforming condition, including the QC inadequacies, be resolved and adequate corrective actions implemented prior to closing the PER.

No violations or deviations were identified.

d. WO 92-12297-00, Containment Penetration Splices (TI 2512/16)

This work order required the inspection and installation of field and vendor splices located at containment penetration 1-PENT-293-6-A in the Unit 1 annulus. The inspector reviewed the work order documentation in the field after the splices were already made. The inspector reviewed the work activities associated with the following cables:

<u>Cable 1V2140A</u>	
WBN-SPL-5363	Vendor splice on penetration conductor
WBN-SPL-5364	Vendor splice on penetration conductor
WBN-SPL-5365	Vendor splice on penetration conductor
WO-92-12297-00	Penetration conductor repair
WBN-SPL-5386	Field splice
<u>Cable 1V816A</u>	
WBN-SPL-5385	Field splice

The inspector inspected the above splices and repair to determine if they met the requirements specified in MAI-3.3, Cable Terminating, Splicing, and Testing For Cables Rated Up To 15,000 Volts, Revision 5. The splices and repair were observed to be of good quality with the proper Raychem material and seal length. Each splice was found to be properly installed in accordance with

the procedure and was identified in accordance with the MAI-3.3 procedural requirements.

No violations or deviations were identified during this review.

3. Review of Engineering Data

The inspector was advised by the licensee of a potential falsification of records involving Ebasco, an onsite contractor. Ebasco is contracted to TVA Engineering and is performing calculations at Watts Bar. The licensee has notified the TVA Inspector General regarding the potential falsification issue and has not completed their investigation at this time. The questionable activities occurred between July 1992 and November 30, 1992.

The licensee reported that calculations WCG AB-1296-2239, WCG AB-1296-2305, and WCG AB-1296-2569 contain selective pages exhibiting the preparer's initials and date both of which were entered by someone other than the preparer. This condition was identified by the preparer during the week of November 30 during review of a calculation of which he had previously processed and signed off on the cover sheet in July 1992. The preparer recognized that on several sheets his initials as the preparer had been entered by someone other than himself. Two other calculations in which the same preparer had been involved also contained initials he did not recognize as his own on selected pages. All three calculations had a common checker, design verifier and approver, and were processed during the same time frame. Ebasco's interview with the checker established that he, the checker, entered the preparer's initials during the checking process. The checker indicated that in certain cases he made necessary corrections within the subject calculations and because the initial preparer was not available, the checker also entered the preparer's initials in the block provided. The checker stated that this was his decision, and his decision alone, to make the entries of the preparer's initials. After review the contractor terminated the employment of this individual. The licensee's re-review of the three calculations by the initial preparer indicated that the issued calculations, with changes made by the checker, were technically adequate. The licensee verbally notified the NRC on December 3, 1992, of the issue. Based on an initial NRC review, both the licensee and the contractor appeared to address the problem promptly. Pending completion of the investigation by the licensee and review by the inspector of the final conclusions and disposition of the issue, this problem is being reviewed as an apparent violation of 10 CFR 50.9 and is identified as Apparent VIO 50-390, 391/92-40-02, Potential Falsification of Engineering Calculations.

4. Preoperational Test Program Implementation Verification (70302)

The inspector reviewed activities associated with system testing and completion during the reporting period. These activities included reviews of JTG meetings, system and component testing, pipe flushing, and associated documentation. Although non-safety related systems are

emphasized less than safety related systems, random inspections were performed by the inspector to ensure these systems were properly tested and each will function as designed to prevent system failure and unnecessary challenge to safety systems.

The results of the inspections are summarized as follows:

- Joint Test Group Meetings
  The inspector attended JTG meetings 1-92-044 and 1-92-046. JTG meeting 1-92-044 on November 23, 1992, was to evaluate and approve test procedure ATI-238-01, 120v AC Preferred Power System for Testing. JTG meeting 1-92-046 was held on November 25, 1992, to review and approve test procedure PTI-200-01, Revision 1, Preferred Offsite Power System.

  During review of these JTG meetings, the inspector determined that the committee members reviewed contents of the test documents, and related comments were resolved to the satisfaction of all JTG members.

- System Flushing and Cleaning

  On November 23, 1992, the inspector reviewed flushing activities associated with system 67, Emergency Raw Cooling Water. The activities reviewed were performed in accordance with procedure, CP-067-01, Revision 0, Section 6.13, Air Condition Equipment, 1A. Acceptance criteria of water flows with solids not greater than 1/8" x 1/16" were specified.

- Hydrolasing

  The inspector witnessed activities in progress on November 27, 1992, involving the use of water blasting and hydrolasing to clean the Unit 1 auxiliary feedwater pumps suction piping. This work effort was performed in accordance with work instructions specified on WO 92-08871-00, Hydrolase Auxiliary Feedwater Suction Piping From the CST Down To Auxiliary Feedwater Pumps 1A-A, 1B-B, And 1A-S Suction Spool.

- Non-Safety Related System (Acceptance Test) Reviews, System 206-1, 480v Auxiliary Building Common Board A and B.

  The inspector reviewed activities in progress associated with the performance of ATI 206-1, Revision 0. The review included steps 6.6.15 through 6.6.25, and the inspector found the testing activities to be in accordance with SMP-8.0, Revision 4, Administration of Preoperational Test Procedures.

No violations or deviations were identified in the areas reviewed.

5. Special Projects Review, RIP Closure Package Book

The subject of a letter dated November 12, 1992, from NRC to TVA discussed documentation packages to support inspections of corrective action plans and special programs. This letter was sent to TVA to clarify NRC's expectations for the documentation closure packages that TVA was preparing for each CAP and SP and to identify how NRC intends to use closure packages. The inspector reviewed the licensee's RIP closure package book prepared for the NRC 75% RIP inspection. The purpose of the review was to assess the approach that TVA was taking for the closure packages compared with the NRC's expectations addressed in the November 1992 letter.

The inspector found that the RIP CAP closure package book lacked an adequate description of the applicable items, description of the corrective action taken for the items, and their respective completion status. The inspector reviewed the contents of the letter with the licensee and discussed the importance of licensee management's determination that the packages represent the status of the program. The licensee stated that they would assess the inspectors review and improve package content.

No violations or deviations were identified during this review.

6. Drawing and Document Control

On November 25, 1992, the inspector reviewed the drawings for system 32, Control Air. These drawings were located at the controlled drawing station adjacent to the technical support center. During the drawing review, the inspector found that most of the drawings filed at the subject controlled file station were not the latest revision. The drawings reviewed, the revision filed at the drawing station, and the latest issued revision are listed as follows:

Drawing Number	Filed Drawing Revision	Latest Revision
1-47W846-1 CC	08	10
1-47W846-2 CC	08	09
1-47W846-3 CC	00	01
1-47W848-1 CC	08	09
1-47W848-2 CC	07	08
1-47W848-3 CC	04	04
1-47W848-4 CC	06	09
1-47W848-5 CC	06	08
1-47W848-6 CC	06	09
1-47W848-7 CC	04	06
1-47W848-8 CC	05	07
1-47W848-9 CC	04	06
1-47W848-10 CC	06	09
1-47W848-11 CC	03	04
1-47W848-12 CC	02	02

As shown above, 13 of the drawings reviewed failed to have the latest revision filed at the drawing station. The findings were immediately brought to the attention of the document control organization. The inspector subsequently found that this drawing control station was intentionally removed from the drawing revision update schedule because of building modifications in the general area. The licensee provided an internal memorandum dated July 16, 1992, which suspended the requirement to update the controlled drawings and documents at the subject area. The inspector was informed that a sign was required to be posted at the drawing station location stating that these drawings were not to be used as controlled drawings.

The inspector revisited the controlled drawing station and questioned an operator in the area as to whether the subject drawings were utilized by the operators. The operator indicated these drawings were occasionally used as study guides and thought this was an acceptable practice since the drawings were "controlled" prints as indicated on each page. He was not aware the drawings were not the latest revision because they were identified as "controlled drawings". The inspector advised the operator that these drawings had been taken off the revision update program and were not always the correct revision. The inspector also determined that the sign disallowing the use of the drawings was not posted as required.

The licensee immediately removed the drawings and other controlled documentation from the area. The inspector determined that the licensee's immediate corrective actions to remove the controlled drawings and other controlled documents from the area, combined with the issuance of PER WBPER920274 were adequate. Since this was the only known location where a decision was made to not maintain drawings to the most current revision, the inspector determined that this problem was an isolated case. In addition, the inspector did not identify any instances where the drawings from this station were used in any safety related activity.

The failure to maintain controlled drawing files to the latest revision is contrary to the licensee's procedure, SSP-2.08, Controlling Drawings, Revision 6, Section 2.4.c. Failure to follow procedures as required by 10 CFR Appendix B, Criterion V, Instructions, Procedures and Drawings, is identified as NCV 50-390, 391/92-40-03, Failure to Maintain Controlled Drawings. This NRC identified violation is not being cited because criteria specified in Section VII.B(1) of the NRC Enforcement Policy were satisfied.

7. Actions on Previous Inspection Findings (92701)

a. (Closed) VIO 50-390, 391/87-18-01, DNE Training

In October 1987 this violation identified that training of the nuclear engineering staff failed to meet the requirements of NEP-1.2, Training, Revision 2. A NRC inspection in May and June 1989, documented in IR 50-390, 391/89-07, revealed the licensee's

corrective actions were not effective and problems continued to exist. An inspection conducted in October and November 1991 documented in IR 50-390, 391/91-25 that an engineering training coordinator was selected and a system was developed that identified all required training and monitored training completion for the engineering staff. This inspection report documented that engineering training was adequate to support construction restart and that an adequate system existed to identify training requirements and monitor their implementation.

During this inspection, the inspector met with the project services engineering manager and the engineering training manager, and reviewed the current training matrices for each engineering unit, reviewed the November 30, 1992, Weekly Engineering Project Training Report along with the December 2, 1992, Nuclear Employee Training Notification Report of Required Training for Site Engineering Project Services. These and other documents were reviewed to determine whether the engineering training program was continuing to be implemented properly since 1991.

A matrix exists for each engineering unit showing the training required for each individual. The required training is determined by each supervisor in conjunction with the training coordinator. Each week the training coordinator receives a printout showing new and revised procedures which is sent to the unit supervisor for his determination of training needs and then used to update the matrices. The training coordinator sends each supervisor a weekly NETS printout that identifies each individual in the unit for whom training is overdue. Each engineering supervisor and manager receives a copy of the weekly training report showing the delinquent training in each unit for that week and several previous weeks (the report for the week of November 30, 1992, included data for previous weeks back to the week ending November 11, 1992).

Watts Bar Engineering has established goals to complete 95 percent of procedure training required before procedure implementation date and to maintain 90 percent completion of all training required. The training report for November showed that these goals were met or exceeded for the engineering organization as a whole. Out of 13 engineering units, one did not meet the 90 percent goal (maintaining 89 percent of the required training) while the average for the 13 units was 96 percent completion.

The inspector determined the system is being implemented properly and gives each engineering supervisor the information needed to determine what training is needed for each individual, highlighting overdue training.

A related recent violation, VIO 50-390, 391/92-18-02, identified that in May and June 1992 engineers were signing off on the SPAE package for system 211 prior to their receiving training in the

controlling procedure EAI-3.07, System Plant Acceptance Evaluation, Revision 0. Based on the actions discussed above and the action to resolve VIO 390/92-18-02, the inspector concluded that the engineering training program was adequate and was adequately implemented. This item is closed.

b. (Closed) VIO 50-390/92-18-02, Failure to Conduct Training Prior to Performing Safety Related Activities

This violation identified several persons in engineering were signing off on the system 211 SPAE prior to receiving training in the controlling procedure EAI-3.07, System Plant Acceptance Evaluation, Revision 0. Subsequently, TVA identified several other instances in which signoffs occurred prior to persons receiving training on the governing procedures.

The inspector reviewed the corrective action described in the response to the violation dated September 14, 1992, and also in II-W-92-013, Revision 0, dated August 17, 1992. The root cause was that the SPAE reviewers were unaware that documentation of reading training of EAI-3.07, Revision 0, was required prior to signing the SPAE package. Contributing causes were identified as: (1) management expectations on training were not understood; (2) supervisors did not communicate the need to document training or ensure that training requirements were met; and (3) formal notice to supervisors to determine training requirements was not timely. Reference is made to a related evaluation and discussion concerning VIO 50-390, 391/87-18-01 in paragraph 7.a of this report.

The following corrective actions were verified:

- Engineering personnel requiring training were trained on EAI-3.07, Revision 0.

- Those who received training after their SPAE signoffs certified that the training received after the fact did not have an impact on the work done.

- Signed statements of understanding were obtained of the engineering training requirements by engineering personnel.

- Issuance of an NE desk top instruction, Conduct of Formal Training, September 9, 1992.

The inspector confirmed that the training notification process was being carried out in a timely manner.

The inspector had no further questions, and this item is closed.

c. (Closed) URI 50-390/92-27-04, 391/92-27-03, Installed Fuse Discrepancies

This item pertained to installed fuses which were different than that specified in the MFL. The MFL is a design output drawing which identifies Class 1E fuses and other selected types of fuses. This issue was identified during the NRC's review of the licensee's implementation of the MFL SP.

As documented in IR 50-390, 391/92-27, the NRC identified that fuses 1-FU-211-B16/3N-B and 1-FU-211-B16/3A-B did not agree with those specified in the MFL. These fuses were installed in 6.9 kV shutdown board 1B-B. The MFL required the installation of Gould Shawmut type OT10 fuses in both fuse holders. However, the actual fuses installed in the field were observed to be Bussmann type FRN-R-10. The licensee initiated PER WBPER920223 to evaluate the cause for this discrepancy and provide corrective actions. The cause was determined to be personnel error and corrective actions included replacing the incorrect fuses with those specified in the MFL and performing a 100 percent inspection of all four 6.9 kV shutdown boards to verify that installed fuses were in accordance with the MFL.

The subject fuses were replaced on September 8, 1992, by the plant operations department and documented in the Unit ASOS Daily Journal. These fuses are associated with the normal and auxiliary elevating circuits for the normal supply circuit breaker to shutdown board 1B-B. This elevating circuit is utilized only for removing and installing the breaker. The circuit breaker is racked in during normal plant operations. The elevating circuits are not required for the circuit breaker to perform its safety function. During this inspection period, the inspector independently inspected the following fuses to verify that the installed fuses matched the fuse specified in the MFL.

1-FU-211-A19/1N-A
1-FU-211-A19/2A-A
1-FU-211-A10/2N-A
1-FU-211-B14/1A-B
1-FU-211-B14/2N-B
1-FU-211-B14/2A-B
2-FU-211-B11/4-B
2-FU-211-B11/5-B

The above fuses were verified to be the same type and size as specified in the MFL. The inspector also reviewed SOI-211.01, 6.9 kV Shutdown BD 1A-A, that will be implemented as part of the SPOC process. The SPOC process will be implemented prior to system turnover to Operations and requires verification that the correct fuse type is installed in the correct fuse holder. The inspector concluded that this SOI provides assurance that the proper fuse is installed prior to system turnover. The corrective actions for

II-Report II-W-92-014, Placement of Fuses in a Tagged Out Control Circuit, also included coaching sessions by Operations and Startup and Test which re-emphasized the importance of system configuration and fuse control. The inspector reviewed the coaching session attendance rosters for the Operations and Startup and Test groups which implemented the corrective actions for II-W-92-014.

Based on the minimal safety significance of the pertinent fuses (i.e., failure of the fuses would not prevent the breaker from functioning), the licensee's 100 percent re-verification of the installed fuses in system 211, the inspector's independent sample inspection of installed fuses, the coaching sessions provided to site groups, and the verification of installed fuses though the SPOC process, this item is closed.

d. (Closed) URI 50-390/92-27-05, 391/92-27-04, Cracked Fuse Blocks and Receptacles

This item pertained to observed cracked fuse blocks and receptacles installed in the Class 1E 6.9 kV shutdown boards. The licensee previously developed accept and reject criteria for the cracked fuse blocks without contacting the fuse block manufacturer. Several cracked fuse blocks were dispositioned as acceptable-for-use. This item was identified during the NRC's review of the licensee's implementation of the MFL SP.

PER WBPER920239 was issued on October 8, 1992, to document that cracked fuse blocks were approved for use-as-is without a controlling engineering output document. The licensee contacted the fuse block vendor to determine if any accept and reject criteria were available to help determine the acceptability for cracked fuse block components. No criteria were available from the vendor. Corrective actions for this PER included review of commodities which have been dispositioned as "use-as-is". These commodities were determined to be components which contain bakelite or ceramic parts such as fuse blocks, terminal strips, circuit breakers and relays. Following the MFL SP inspection, the licensee developed minimum criteria for providing "use-as-is" dispositions. This criteria was documented in DCN Q-21562-A. This DCN specifies that damage to bakelite or ceramic parts may be accepted for continued use if they meet the following acceptance criteria:

- the damage does not pose a safety hazard to personnel.
- the damage does not impair the component's ability to function during a seismic event.
- the damage does not impair the component's ability to perform its electrical function.

- the damage does not impair the component's ability to function mechanically.

These criteria were developed based on the fact that the fuse block manufacturer did not have any specific guidance. In the absence of any criteria from the vendor, the licensee's position is that engineering personnel were qualified to make technical judgments regarding the acceptability of electrical components. This practice was in accordance with the requirements specified in SSP-3.04, Corrective Action Program, Revision 6, which defines "accept-as-is" to be "A hardware disposition which may be imposed for an ADVERSE CONDITION when it can be established that the discrepancy will continue to meet all engineering functional requirements including performance, maintainability, fit and safety even though the item does not conform to design requirements."

The licensee has reviewed the fuse blocks and receptacles which were originally dispositioned as "use-as-is" against the criteria specified in DCN Q-21562-A. The original disposition was determined to be adequate. The inspector reviewed the licensee's evaluation of the cracked fuse blocks and concluded that the disposition was adequate. No deficiencies were identified.

Based on review of the developed acceptance criteria specified in DCN Q-21562-A and the adequacy of the original "use-as-is" disposition for the inspected fuse blocks and receptacles using the criteria in the DCN, this item is closed.

8. Exit Interview

The inspection scope and findings were summarized on December 18, 1992, with those persons indicated in Paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. The discussions included the two non-cited violations which are documented in this inspection report. Dissenting comments were not received from the licensee. Proprietary information is not contained in this report.

Item Number	Status	Description and Reference
390/87-18-01 391/87-18-01	Closed	VIO - DNE Training (Paragraph 7.a)
390/92-18-02	Closed	VIO - Failure to Conduct Training Prior to Performing Safety Related Activities (Paragraph 7.b)
390/92-27-04 391/92-27-03	Closed	URI - Installed Fuse Discrepancies (Paragraph 7.c)

390/92-27-05 391/92-27-04	Closed	URI - Cracked Fuse Blocks and Receptacles (Paragraph 7.d)
390/92-40-01 391/92-40-01	Open	NCV - Failure to Revise Cable Pull Calculations (Paragraph 2.b)
390/92-40-01 391/92-40-01	Closed	NCV - Failure to Revise Cable Pull Calculations (Paragraph 2.b)
390/92-40-02	Open	Apparent VIO - Potential Falsification of Engineering Calculations (Paragraph 3)
390/92-40-03 391/92-40-03	Open	NCV - Failure to Maintain Controlled Drawings (Paragraph 6)
390/92-40-03 391/92-40-03	Closed	NCV - Failure to Maintain Controlled Drawings (Paragraph 6)

8. List of Acronyms and Initialisms

ASOS	Assistant Shift Operations Supervisor
ATI	Acceptance Test Instruction
CAP	Corrective Action Program
DCN	Design Change Notice
DNE	Division of Nuclear Engineering
EAI	Engineering Administrative Instruction
HVAC	Heating, Ventilation, and Air Conditioning
IFI	Inspector Follow-up Item
II	Incident Investigation
IR	Inspection Report
JTG	Joint Test Group
kV	kiloVolts
MAI	Modification and Addition Instruction
MCM	Thousand Circular Mils
MFL	Master Fuse List
MOV	Motor Operated Valve
NCV	Non-cited Violation
NE	Nuclear Engineering
NEP	Nuclear Engineering Procedure
NETS	Nuclear Engineering Training System
NRC	Nuclear Regulatory Commission
PER	Problem Evaluation Report
PTI	Pre-operational Test Instruction
QC	Quality Control
QE	Quality Engineer
RIMS	Records Information Management System

RIP	Replacement Items Program
SMP	Startup Manual Procedure
SOI	System Operating Instruction
SP	Special Program
SPAE	System Plant Acceptance Evaluation
SPOC	System Pre-operation Checklist
SSP	Site Standard Practice
SWP	Sidewall Pressure
Tc	Maximum Conductor Pulling Tension
TI	Technical Instruction
Tmax	Maximum Allowable Pulling Tension
Tswp	Maximum Sidewall Pressure Pulling Tension
TVA	Tennessee Valley Authority
URI	Unresolved Item
Vac	Volts Alternating Current
VIO	Violation
WO	Work Order
WP	Workplan