CATD 24102-BFN-01 (LEVEL IIa DEVIATION) - MISAPPLICATION OF PIDG TERMINAL LUGS ON SOLID CONDUCTORS

CATD 24102-BFN-01 documents the issue that BFN was instructed in Memo B43 850923 917 to determine if any misapplication of PIDG terminal lugs on solid conductors exists at BFN. The review has not been completed for units, 1, 2, and 3.

Previously Approved CAP

In response to a potential generic condition evaluation request on SCRWBNEEB8537, BFNP initiated an inspection to determine if the condition exists at its units. The process for evaluating potential use included interviews with personnel from Materials Administration, Power Stores, Electrical Maintenance, Procurement Division, Electrical Modifications on past use of PIDG terminals and the search of design documents; both efforts indicated Browns Ferry Nuclear Plant did not use PIDG terminals. It was determined that additional inspection in the following areas could provide the highest potential of application of these terminals:

a. SINGLE OR MULTIPLE SOLID CONDUCTOR CABLES: A search of purchase orders indicates that the only solid conductor cables purchased by BFN are coaxial cables. Coaxial cable does not lend itself to the PIDG lugs.
b. FOXBORO INSTRUMENTS: Watts Bar SCRWBNEEB8537 indicates misuse of PIDG terminals on Foxboro Instruments. An extensive search of Purchase Orders and Foxboro drawings indicate that control room panels 9-52 and 9-7 have Foxboro supplied discrete devices (resistors, diodes). A walkdown performed on these two panels, (Units 1, 2 & 3) indicates that the discrete devices in question were not terminated with PIDG terminals. Refer to QIR EQP87066 (B22 870331 052).
c. ARC SUPPRESSION NETWORKS: Watts Bar and Sequoyah Nuclear Plants indicate a misuse of PIDG terminals on modifications which incorporate arc suppression circuits. A walkdown inspection has been requested for 28 circuits. This represents 27% of solenoid valves suppression circuits found in Units 1, 2, & 3. Since the circuits were installed by the same process controls, these circuits are considered representative of the total modification. Results of walkdown are not expected until December, 1987. With completion of the walkdown inspection, a CAQR and corrective action will be initiated for those terminations which are a misuse of PIDG. If the walkdown reveals no misuse,

no further action will be required since the action to prevent recurrence has been implemented through issuance of modification/addition Instruction 45. With completion of the walkdown, and corrective action, if needed, PGCE response for SCRWBNEEB8537 will be issued. Schedule for completion of PGCE response is January 1988.

Revised CAP

In response to a potential generic condition evaluation request on SCRWBNEEB8537, BFNP initiated an inspection to determine if the condition exists at its units. The process for evaluating potential use included interviews with personnel from Materials Administration, Power Stores, Electrical Maintenance, Procurement Division, Electrical Modifications on past use of PIDG terminals and the search of design documents; both efforts indicated Browns Ferry Nuclear Plant did not use PIDG terminals. It was determined that additional inspection in the following areas could provide the highest potential of application of these terminals:

No change in Previously Approved CAP Items a and b.

c. ARC SUPPRESSION NETWORKS: Watts Bar and Sequoyah Nuclear Plants indicate a misuse of PIDG terminals on modifications which incorporate arc suppression circuits. Determine the population of Arc Suppression Networks (ASN) installed at BFNP Units 1, 2, and 3. Review documentation (Drawings, ECNs, DCNs, vendor documents) under which ASNs were installed to determine make and model number of lugs supplied for the installations to show that PIDG lugs were not used. Walkdown a sample to further support the results of the documentation review. With completion of the review and walkdowns, a CAQR and corrective action will be initiated for those terminations which are a misuse of PIDG lugs. If no misuse is revealed, no further action will be required since the action to prevent recurrence has been implemented through issuance of Modification and Addition Instruction 3.3. (Note: MAI 3.3 supersedes MAI 45.)

Technical Justification

c. ARC SUPPRESSION NETWORKS: The approved CAP stated that 28 circuits would be walked down representing 27% of solenoid valve suppression circuits in

Units 1, 2, and 3. When walkdowns (WD-2610 and QIREQP87080) were performed for Unit 2 restart, 14 circuits did not have ASNs and the other 10 did not have PIDG lugs. Unit 2 employee concern was closed based on the results of the walkdowns. During a later review in preparation for Unit 3 restart, it was determined that the Unit 2 corrective action was inadequate and the Unit 2 employee concern was reopened (See letter L25 920624 801). The purpose of this CAP Deviation is to provide an analysis for Units 1, 2 and 3 which assures that no PIDG lugs were used in any ASNs or that any identified PIDG lugs are replaced. The Proposed CAP provides a comprehensive review of BFN Units 1, 2 and 3 to provide reasonable assurance that all ASNs are identified. Once the population of ASNs is identified, further review will consist of documentation searches (including drawings, bills of material, letters, and walkdown data) and further walkdowns as required. The results will provide a high degree of confidence that no ASNs using PIDG lugs are installed at BFNP.

CATD 91000-BFN-02 (LEVEL IIb DEVIATION) - ADDITIONAL LIGHTING AND HANDRAILS NOT INSTALLED ON INTAKE GATE STRUCTURE NO. 3

CATD 91000-BFN-02 documents the issue that additional lighting and handrails have not been installed on the intake gate structure No. 3 to resolve an employee safety concern and complete DCR D3251. This work should not be delayed until the next outage, unit 3, cycle 5.

Previously Approved CAP

> The addition of hand rails and lighting will not be delayed until the U-3, C-5 outage. The work is not outage related and can be done during operation. A new design support group is being formed at BFN which will handle priority, plant-support type changes. Completion of this ECN will be assigned to this group and given priority. Installation may be completed prior to Unit 2 startup but its completion will not be a constraint to U-2 restart.

Revised CAP

> None required.

Technical Justification

In August of 1986, CATD 91000-BFN-02 was initiated to document an employee safety concern (industrial safety), alleging inadequate lighting and handrails on intake gate structure 3. As a result of this concern, Design Change Request (DCR) D3251 was initiated. On researching this CATD, it was found that Engineering Change Notice (ECN) number P5393 had been mortgaged to develop design for DCR D3251, but the actual design had never been completed.

To obtain a rough estimate of work required for purposes of both the design and implementation, BFN Site Industrial Safety was consulted. Industrial Safety Manager R. L. Barnes and Industrial Safety Specialist J. D. Cornelius, both recalled that in 1994, this area had been assessed for fall protection and lighting. Industrial Safety then produced a complete report of this assessment.

This report assessed all areas where a fall into the water is possible including the area of concern in this CATD. This report concluded that the intake area is adequately protected

by handrails and well lighted. It should be noted that since specific details regarding which handrails were inadequate and which areas were improperly lit, it could not be determined if corrective maintenance or another modification resolved this concern between 1986 and 1994.

Based on the above, CATD 91000-BFN-02 should be considered resolved and closed.

CATD I-84-33-BFN-01 (UNIT 2 ONLY; LEVEL IIa DEVIATION) -PROVIDE VERIFICATION DOCUMENTATION SUITABLE FOR AUDIT

CATD I-84-33-BFN-01 documents to prepare and check the isometric and support load drawings for EECW and Reactor Drain and Vent systems. Issue these drawings, perform an evaluation of problem N1-110-1R. Provide verification documentation suitable for audit.

Previously Approved CAP

a. The Unit-1 EECW system Isometric and support load table drawings have been issued for the NRC bulletin 79-14 program, via ECNs, on August 30, 1985. The Unit-2 reactor drains and vents isometric and support load table drawings were issued for ECN P0569 on June 9, 1987, and the Units 1 & 3 drawings will be issued before restart of the respective units. All future rigorous piping analysis and reanalyzes of safety related piping including the EECW and reactor drains and vent systems, will be documented on issued isometric and support load table drawings.

b. An evaluation of problem N1-110-1R determined that the spring load for support H21 was arrived at through an acceptable systematic interface between the piping analysis and the support designer, and was adequately documented by the piping analyst. The spring load inadvertently penciled in on the computer print out was not transmitted to support design section, and thus had no adverse effect on piping or support analysis. Discussion of the spring load derivation for support H21 is presented in the J. P. Stapleton to W. R. Brown memorandum dated September 12, 1986 (RIMS B22 860912 201).

Revised CAP

a. In lieu of issuing individual isometric and load table drawings for the EECW and the Reactor vent systems, the recent Unit-2, 79-14 program walkdown data will be utilized and the Unit-2 79-14 math model (isometric) and support and movements will be documented in the stress calculation(s). The support design calculation(s) references the pipe stress calculation(s).

b. No change in this portion of the approved CAP.

Technical Justification

Since the isometric and support load table drawings only provide data for engineering use, it would appear to be both sound engineering practice, and of significant cost benefit, to incorporate, and document this type of data in the appropriate pipe stress calculations.

Placing of the pipe stress and isometric load table data within the applicable stress calculation affords ready verification and retrievability from a Quality Assurance standpoint, and provides substantial cost savings. Hence, generation and issuance of the applicable pipe stress and isometric load tables as a separate Quality Assurance document would not be required.

Approval of this deviation would also provide consistency in the engineering approach and methodology utilized for the Unit 1 and Unit 3 portions of this CATD.

CATD SWEC-BFN-05-04 (LEVEL IIa DEVIATION) - FIRE RECOVERY PLAN TO SEPARATE ADS AUTOMATIC AND MANUAL RELIEF CABLES

CATD SWEC-BFN-05-04 documents the issue that a fire recovery plan commitment to separate ADS automatic and manual relief cables was never adequately met, subsequent modifications made the problem worse.

Previously Approved CAP

Administrative controls were established including the posting of firewatches. Interim modifications to ensure the operability of the relief valve on Unit 2 were completed May 24, 1984. Unit 1&3 met the divisional separation requirement of the FSAR. Engineering Change Notice (ECN) P0822 has been issued to install the modification which will separate the manual and automatic ADS cables as part of the modifications being proposed to meet the 10 CFR 50 Appendix R requirements.

Revised CAP

Provide the necessary modifications to assure the required number of SRVs will be available for 10CFR 50 Appendix R compliance.

Technical Justification

Engineering has evaluated the proposed corrective action and concluded that Browns Ferry is not committed to separating the manual and automatic ADS cables. This position has been stated in Browns Ferry's response to the NRC: Letter-September 13, 1984 to H. G. Parris transmitting Severity Level III Violation (No Civil Penalty) EA 84-82 Violation resulting from design review deficiencies (Inspection Report Nos. 50-259/84-20, -260/84-20, -296/84-20), RIMS L44 841015 811.

As previously stated, we at Browns Ferry are not required to separate the manual and automatic ADS cables. The modifications that are required to address the concern for safety relief valve availability, resulting in 10 CFR 50 Appendix R compliance are listed below:

Unit 2 was addressed by ECN P0889.

Unit 3 was addressed by way of DCN W21814.

These modifications assured the availability of the required number of SRVs for Appendix R compliance.

CATD SWEC-BFN-46-01 (LEVEL IIa DEVIATION) - INADEQUATE DESIGN CONTROLS FOR SAFETY-RELATED TRAY SUPPORTS

CATD SWEC-BFN-46-01 documents the issue of inadequate design controls for safety-related cable tray supports. The NRC inspector reviewed portions of design calculations for safety-related cable tray systems in the control bay area, diesel generator building and found them to be improperly designed. Cable tray support design calculations in the reactor building showed a lack of thoroughness, clarity, consistency and accuracy.

Previously Approved CAP

An interim seismic qualification of Unit 2 safety related cable trays was performed by United Engineers and Constructors. ECNs P5903 and P5385 were issued to correct identified deficiencies. Long term seismic qualification of Units 1, 2, and 3 safety-related cable trays was performed by EQE Inc. From these evaluations a set of Nuclear Engineering Procedures were issued in July, 1986.

Revised CAP

ECNs P5903 and P5385 were issued to correct identified deficiencies. For long-term qualification of Unit 1, 2, and 3 cable tray supports, BFN will use the Generic Implementation Procedure which has been developed by the Seismic Qualification Utility Group (SQUG) to resolve Unresolved Safety Issue A-46, "Seismic Qualification of Equipment in Nuclear Power Plants".

Technical Justification

The interim seismic qualification program for safety-related cable tray supports was completed for Unit 2 restart. These interim criteria were developed to allow restart and interim operation of Unit 2. This was a Nuclear Performance Plan restart commitment to the NRC and was tracked by NCO860326084. This commitment was closed prior to Unit 2, Cycle 6 startup. To resolve this issue for the long-term, TVA stated in Volume III of the Nuclear Performance Plan that it intended to utilize the methodology used to address Unresolved Safety Issue (USI) A-46, "Seismic Qualification of Equipment in Nuclear Power Plants." NRC guidance for the resolution of USI A-46 was published in Generic Letter 87-02 (and supplement), "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors." In a letter to the NRC on January 19, 1993 (R08930119958), TVA formally committed to a schedule for the use of the SQUG

methodology for implementing Generic Letter 87-02 for BFN Units 1, 2, and 3. These commitments are tracked by NCO930045002, NCO930045004, NCO930045005, NCO930045006, and NCO930045007.

This employee concern is identical to the issue identified in NRC Inspection Report 85-41 as Notice of Violation 85-41-01. This violation was closed by the NRC for Unit 2 Inspection Report 90-08.

CATD SWEC-BFN-46-02 (LEVEL IIa DEVIATION) - IMPROPER DESIGN VERIFICATION FOR CABLE TRAY SUPPORT SYSTEM

CATD SWEC-BFN-46-02 documents the issue that the NRC reviewed the calculations for the safety related cable tray supports systems. The inspector identified examples which indicated that calculations had either not been checked or in some cases not signed by the designer. Therefore, the report states that design verification had not been implemented in an acceptable manner.

Previously Approved CAP

An interim seismic qualification of Unit 2 safety related cable trays was performed by United Engineers and Constructors. Long term seismic qualifications of Units 1, 2, and 3 safety-related cable trays was performed by EQE Inc. New Nuclear Engineering procedures were issued and applicable training was conducted.

Revised CAP

ECNs P5903 and P5385 were issued to correct identified deficiencies. For long-term qualification of Unit 1, 2, and 3 cable tray supports, BFN will use the Generic Implementation Procedure which is being developed by the Seismic Qualification Utility Group (SQUG) to resolve Unresolved Safety Issue A-46, "Seismic Qualification of Equipment in Nuclear Power Plants". New Nuclear Engineering procedures were issued and applicable training was conducted.

Technical Justification

The interim seismic qualification program for safety-related cable tray supports was completed for Unit 2 restart. These interim criteria were developed to allow restart and interim operation of Unit 2. This was a Nuclear Performance Plan restart commitment to the NRC and was tracked by NCO860326084. This commitment was closed prior to Unit 2, Cycle 6 startup. To resolve this issue for the long-term, TVA stated in Volume III of the Nuclear Performance Plan that it intended to utilize the methodology used to address Unresolved Safety Issue (USI) A-46, "Seismic Qualification of Equipment in Nuclear Power Plants." NRC guidance for the resolution of USI A-46 was published in Generic Letter 87-02 (and supplement), "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors." Generic Letter 87-02, Supplement 1, contains guidance for the qualifications and training of the engineers responsible for

implementing the program. In a letter to the NRC on January 19, 1993 (R08930119958), TVA formally committed to a schedule for the use of the SQUG methodology for implementing Generic Letter 87-02 for BFN Units 1, 2, and 3. These commitments are tracked by NCO930045002, NCO930045004, NCO930045005, NCO930045006, and NCO930045007.

This employee concern is identical to the issue identified in NRC Inspection Report 85-41 as Notice of Violation 85-41-01. This violation was closed by the NRC for Unit 2 Inspection Report 90-08.

CATD SWEC-BFN-46-04 (LEVEL IIa DEVIATION) - CABLE TRAY/LOADING PROBLEMS

CATD SWEC-BFN-46-04 documents the issue that NRC Inspection Report 85-41 refers to a June 1985 in-depth study into cable tray/loading problems conducted by TVA which concluded that the inspected cable trays could not be seismically qualified for either interim or long term operation without additional inspection and evaluations.

Previously Approved CAP

Corrective action representative of this problem is discussed in detail in SWEC-BFN-46 Concern Number A02850926013-001.

Revised CAP

ECNs P5903 and P5385 were issued to correct identified deficiencies. For long-term qualification of Unit 1, 2, and 3 cable tray supports, BFN will use the Generic Implementation Procedure which is being developed by the Seismic Qualification Utility Group (SQUG) to resolve Unresolved Safety Issue A-46, "Seismic Qualification of Equipment in Nuclear Power Plants".

Technical Justification

The interim seismic qualification program for safety-related cable tray supports was completed for Unit 2 restart. These interim criteria were developed to allow restart and interim operation of Unit 2. This was a Nuclear Performance Plan restart commitment to the NRC and was tracked by NCO860326084. This commitment was closed prior to Unit 2, Cycle 6 startup. To resolve this issue for the long-term, TVA stated in Volume III of the Nuclear Performance Plan that it intended to utilize the methodology used to address Unresolved Safety Issue (USI) A-46, "Seismic Qualification of Equipment in Nuclear Power Plants." NRC guidance for the resolution of USI A-46 was published in Generic Letter 87-02 (and supplement), "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors." In a letter to the NRC on January 19, 1993 (R08930119958), TVA formally committed to a schedule for the use of the SQUG methodology for implementing Generic Letter 87-02 for BFN Units 1, 2, and 3. These commitments are tracked by NCO930045002, NCO930045004, NCO930045005, NCO930045006, and NCO930045007.

This employee concern is identical to the issue identified in NRC Inspection Report 85-41 as Notice of Violation 85-41-01. This violation was closed by the NRC for Unit 2 Inspection Report 90-08.

4.2.2 Level III CAP Deviations

There are 56 Level III CAP deviations identified for the following BFN CATDs:

CATD	Deviation
10400-BFN-02	1
10400-BFN-03	1
10400-BFN-05	1
10900-BFN-01	3
11300-BFN-05	1
17300-BFN-05	3
20101-BFN-02	2
21804-BFN-01	1
22301-BFN-01	3
22800-BFN-06	2
22901-BFN-01	1
22910-BFN-01	1
23208-BFN-01	1
23701-BFN-01	1
23701-BFN-02	1
23701-BFN-04	1
23702-BFN-02	1
23801-BFN-02	2
23900-BFN-06	4
23900-BFN-09	1
24000-BFN-02	1
24101-BFN-01	3
24105-BFN-01	1
24200-BFN-03	1
24200-BFN-04	3
30107-BFN-01	5
30801-BFN-01	1
31307-BFN-01	1
80106-BFN-01	1
80202-BFN-01	1
80202-BFN-02	1
90700-BFN-01	1

SWEC-BFN-05-03	1
SWEC-BFN-05-05	1
SWEC-BFN-05-06	1
SWEC-BFN-07-01	1

4.3 Watts Bar Nuclear Plant (WBN)

During this reporting period, there were 18 Level IIa CAP deviations, 26 Level IIb CAP deviations, and 125 Level III CAP deviations for WBN CATDs. This report documents 1 Level IIa, 1 Level IIb, and 125 Level III CAP deviations for WBN CATDs. The August 30, 1995, Supplemental Report documented the remaining CAP deviations.

4.3.1 Level IIa and IIb CAP Deviations

CATD 11200-WBN-09 (LEVEL IIb DEVIATION) - UNAUTHORIZED WORK PERFORMED ON UNIT 2

CATD 11200-WBN-09 documents the issue that SCR 6497 documents unauthorized work performed on Unit 2. SCR 6497 should be reviewed to determine if it is applicable to unit 1. Previous responses from ONP have not established a credible basis on which to assert that unauthorized work was not also performed on Unit 1.

THE NEED TO INITIATE THIS CAP DEVIATION WAS IDENTIFIED BY THE NRC.

Previously Approved CAP

Delete all previous corrective actions steps from previous CAP and replace with the following: Implementation of this CAP solely relies on implementation of the hardware review portion of the Additional Systematic Records Review. This review confirms the adequacy of plant hardware as it relates to the records. This review was performed in accordance with QAI-17.01.

Revised CAP

Corrective Action for this CATD relies on the implementation of the hardware portion of the Additional Systematic Records Review (ASRR) and the completion of the CAP/SPs. The ASRR review, performed in accordance with QAI-17.01, confirms the adequacy of the plant hardware as it relates to the records. Completion of the ASRR and the CAP/SPs will provide reasonable assurance that unacceptable hardware configurations, including unauthorized work performed after QA acceptance, has been properly dispositioned.

Technical Justification

Unacceptable hardware configurations may exist for several reasons. One, unauthorized work performed after QC acceptance. Two, items which were accepted which did not meet design/procedure requirements. Three, unclear design/procedure requirements. The last two form the basis of many CAPs/SPs at WBN. Therefore, it is very difficult to distinguish unauthorized work from authorized work. Furthermore, a component may be in accordance with design output requirements and the configuration may have resulted from unauthorized work.

As part of the implementation of the QA Records CAP, the ASRR was performed. Part of the ASRR included a hardware review. The objectives of the hardware review were as follows:

A review was performed to assure that the records adequately reflect the installed configuration of components and features. The objective was to demonstrate by physical reinspection that construction/installations match engineering design output and installation records (e.g., drawings, specifications, and inspection records).

Over 1350 components and features were reviewed under the hardware review. These reviews determined that, in some instances, the records did not match the as-installed configuration. These instances primarily involved dimensional variations from the as-designed conditions and tagging/identification items. The discipline Records Completion Teams (RCT's) reviewed each discrepancy to determine design significance, extent of condition and corrective action. During this review, the RCT's reviewed existing CAPs/SPs to determine if similar conditions were previously identified. No hardware discrepancies outside the scope of existing CAPs/SPs were determine to be design significant. Most hardware discrepancies were determined to be acceptable as is or enveloped by an existing CAP or SP.

Unauthorized work cannot be ruled out for the cause of some of the deficiencies identified during the ASRR. However, generally unauthorized work did not form the basis for any of the CAPs/SPs. The overall conclusion of the ASRR (including CAP/SP implementation) provides reasonable assurance that the QA records support the licensing of the plant.

CATD 30803-WBN-01 (LEVEL IIa DEVIATION) - CHRONIC DOOR MAINTENANCE PROBLEMS

CATD 30803-WBN-01 documents the issue that chronic door maintenance problems have been identified at SQN and BFN (ECSP Report Number 308.03 SQN, BFN). Doors were being continuously repaired to correct the damage, however, the actual cause of the problem (i.e., high differential pressure, door design limitations, etc.) was not corrected. The trending of door failures was not tracked. Since no program currently tracks door failures, a potential exists for the same situation to occur at WBN.

Previously Approved CAP

A. Seven of the most used fire doors have been found damaged from a combination of variable air pressure, heavy traffic and abuse. DCR 0694 has been written to replace these doors with a more durable type door before fuel load.
B. We presently have in effect a program for periodic inspection of all fire doors as described below.
   Preventive Maintenance procedure, PM 271.74, is performed once a month on the interim ABSCE doors. This inspection requires checking the weather stripping and the operation of each door.
C. Surveillance Instruction 7.31 requires inspecting the fire doors and all hardware every six (6) months and performing a functional test (the door shall close and latch when released from the fully open position) on each door.
D. Surveillance Instruction 7.53 requires verifying that each unlocked fire door is closed at least once per 24 hours and that each locked closed fire door is closed at least once per seven (7) days.
E. If any door or its hardware is found to be defective through these inspections, a Maintenance Request (MR) is written to correct the problem.
F. The information from MRs written for each individual door will be used to develop a maintenance history record for each fire door. A site Services Special Project Group will be developing a data base and trending program for non-NPRDS reportable items such as fire doors utilizing the EQIS data base. This trending program will help us identify continually recurring problems and locate the root cause.

Revised CAP

A. The subject damage to fire doors was corrected by SCAR WBP890561SCA.
B. PM 1-DOOR-271-0074 conducts periodic walkdowns of ABSCE doors. This PM implements the requirements set forth by the FPR.
C. O-FOR-410-2 implements a 12-month fire door operational test required by the FPR.
D. O-FOR-410-1 implements a 31-day fire door inspection required by the FPR.
E. Corrective Maintenance Program currently requires a Work Request (WR) to be written for corrective maintenance.
F. Fire doors have been added to the maintenance history tracking system described in SSP-6.04.

Technical Justification

A. The subject DCR was written to correct seven fire doors and the subject SCAR was expanded to evaluate/correct all fire door deficiencies.
B. PM 271.74 has been cancelled.
C. The operational fire protection testing program is detailed in the Fire Protection Report (FPR). The FPR is discussed in the FSAR for the Watts Bar Program. The fire door inspection and testing requirements are described in sections which require a 31-day inspection and a 12-month fire door operational test. The fire door testing program is consistent with industry and TVA's Standardization Program. The Fire Protection Report has been reviewed by the NRC and no open items exist in relation to WBN's fire door inspection and testing program, as stated in the FPR. The purpose of the FPR is to consolidate a sufficiently detailed summary of the WBN regulatory required fire protection program into a single document and to reflect the design as constructed at the time of fuel load. This document supersedes all previous commitments made relative to the WBN FPR. Therefore, the fire door testing criteria described in the FPR is the single source commitment and supersedes the previous commitment in CATD 30803-WBN-01. SIs 7.31 and 7.53 have been cancelled.
D. Same as C.
E. MR program has been superseded by the WR program.
F. To make the trending program complete, fire doors were added to the maintenance history tracking system.

4.3.2 Level III CAP Deviations

There are 125 Level III CAP deviations identified for the following WBN CATDs:

CATD	Deviation
10400-WBN-02	1
10400-WBN-03	4
10400-WBN-07	1
10400-WBN-09	1
10500-WBN-01	1
10900-WBN-06	2
10900-WBN-09	1
11102-WBN-01	1
11103-WBN-08	1
11200-WBN-02	2
11200-WBN-08	1
11300-WBN-01	3
17101-WBN-01	1
17300-WBN-15	2
20501-WBN-02	5
20601-WBN-02	1
20701-WBN-05	2
21202-WBN-01	4
21511-WBN-01	3
21511-WBN-02	1
21801-WBN-01	1
21801-WBN-02	2
21803-WBN-01	2
21806-WBN-01	1
21807-WBN-01	1
21809-WBN-01	1
21809-WBN-02	2
21811-WBN-01	2
22001-WBN-01	3
22003-WBN-01	1

22106-WBN-01	1
22207-WBN-01	1
22302-WBN-01	4
22403-WBN-01	2
22600-WBN-01	2
22800-WBN-05	1
23002-WBN-01	2
23511-WBN-03	1
23701-WBN-01	1
23701-WBN-03	1
23701-WBN-04	1
23702-WBN-01	1
23801-WBN-01	1
23801-WBN-10	3
24000-WBN-02	3
24101-WBN-02	1
24105-WBN-01	1
24300-WBN-01	5
30102-WBN-01	4
30202-WBN-07	5
30302-WBN-01	2
30704-WBN-04	1
30905-WBN-04	2
31003-WBN-02	1
31100-WBN-01	1
31105-WBN-03	1
31105-WBN-06	1
31309-WBN-06	1
40300-WBN-02	1
40300-WBN-06	1
40400-WBN-04	1
40500-WBN-01	1
50405-WBN-01	1
80109-WBN-04	1
80209-WBN-01	1
80209-WBN-03	3
80209-WBN-05	1
80214-WBN-02	3

80407-WBN-01	1
SWEC-WBN-65-001	1
SWEC-WBN-66-001	1
SWEC-WBN-73-004	1
SWEC-WBN-76-001	2

4.4 Bellefonte Nuclear Plant (BLN)

During this reporting period, there were no Level IIa CAP deviations, no Level IIb CAP deviations, and 2 Level III CAP deviations for BLN CATDs.

4.4.1 Level III CAP Deviations

There are 2 Level III CAP deviations identified for the following BLN CATDs:

CATD	Deviation
80104-BLN-02	2

4.5 Nonplant Specific (NPS)

During this reporting period, there were 15 Level IIa CAP deviations, 11 Level IIb CAP deviations, and 60 Level III CAP deviations for NPS CATDs. This report documents 6 Level IIa, 4 Level IIb, and 60 Level III CAP deviations for NPS CATDs. The August 30, 1995, Supplemental Report documented the remaining CAP deviations.

4.5.1 Level IIa and IIb CAP Deviations

CATD 10900-NPS-01 (WBN ONLY; LEVEL IIb DEVIATION) - ALLOWABLE LIMITS FOR CABLE SIDEWALL PRESSURE AND MINIMUM BEND RADIUS HAVE BEEN EXCEEDED

CATD 10900-NPS-01 documents the issue that allowable limits for cable sidewall pressure (SWP) maximum pull tension (MPT) and minimum bend radius (MBR) have been exceeded. The program inadequacies were identified in NSRS report I-85-06-WBN.

Previously Approved CAP

1. Cable Sidewall Bearing Pressure

   I. Develop design calculations to determine the magnitude of SWBPs exerted on Class 1E cables in existing conduit installations at WBN.

   II. Perform screening calculations to reduce the number of conduits to those containing Class 1E cables which have the greatest potential of having exceeded their allowable SWBP.

   III. Determine sample of conduits to be walked down - approximately 20 each from voltage levels V2, V3, V4, and V5.

   IV. Calculate maximum expected sidewall bearing pressures and compare to the allowable limits per General Construction Specification G-38.

V. Perform Testing at TVA Central Laboratories to demonstrate the acceptability of higher SWBP limits, based on actual cables used at TVA nuclear plants.

VI. Based on these new limits, one conduit from the 81 identified severe-case configurations contained cables which exceeded the limits when calculated in one direction. The cables in this conduit will be replaced.

VII. Perform independent review by third party to corroborate the results of TVA's SWBP tests.

VIII. Revise TVA engineering and construction procedures to address SWBP appropriately.

IX. Revise the design calculation and issued DCNs to address:

-Class 1E voltage level V1 conduits

-Utilization of verified cable weights

-Replacement of cables in the one outlying conduit

X. To provide further confidence, randomly select additional 40 conduits located in harsh environments which have not been previously analyzed. Perform SWBP calculations and compare to revised SWBP limits on Construction Specification G-38.

XI. If analysis of 40 conduits proves cables were not subjected to excessive SWBPs during installation then no further demonstration of adequacy is necessary.

XII. TVA will provide a response to the issues in the WBN TER relative to the applicability of TVA's cable SWBP testing program to actual plant installation conditions.

XIII. Additionally, TVA will further enhance G-38 to require additional engineering participation when the expected SWBP for new cable installations approach the maximum allowable limits.

2. Distribution of Cable Pulling Forces

TVA practice of monitoring total tension rather than individual tension does assure individual conductor strength limits are not exceeded and is consistent with IEEE 690-1984, "Standard for the Design and Installation of Cable Systems for Class 1E Circuits in Nuclear Power Generating Stations." In fact, TVA practice is more conservative since August of 1978 we take 80% rather than 100% of individual conductor strength on multi-cable pulls. Besides industry experience, acceptability of this practice was demonstrated in a recent cable pull in which the total pulling tension in a multi-cable pulls was 3750 lbs. Several cables in the pull had a conductor-strength limit of 65 lbs. If the tension HAD NOT been distributed proportionally, the smaller cables would have snapped. These cables did not break or elongate. The above demonstrates that TVA's practices with respect to the distribution of cable pulling forces had maintained the adequacy and integrity of Class 1E cable. Therefore, TVA considers this issue closed.

3. Cable Bending Radius

I. Review previous design output and construction implementation procedures to determine acceptability of previous cable bend radius attribute inspections. This action is complete (See NE Calculation WBPEVAR8904018). In general, implementing procedures were not consistent with design output requirements.

II. Perform walkdown to assess present installations in regards to cable bend radius. This action is complete (see NE Calculation WBPEVAR8904064 'Selection of Equipment and Raceway Sections for Walkdown' and CAQ WBP900019, which documents violations of ICEA recommended cable bend radius limits as result of the walkdown).

III. In accordance to the dispositioning of WBP900019SCA, a generic program consisting of testing and analysis will be initiated to develop new cable bend radius limits (inspection/acceptance criteria) and resolve deficiencies. Cases found unacceptable will be reworked.

(A) Perform bending test using single conductor cable to determine the mechanical damage threshold and lower bound bend radius for each cable size. This action is complete. (See test report 90-1014, E13 900605 302).

(B) For cable used at WBN, evaluate percent retention of elongation an evaluate small bend radius impacts on cable life. This action is complete. (See NE Calculation WBPEVAR9006007).

(C) Using test results, the percent retention of elongation analysis and the applicable failure mechanisms develop an inspection/acceptance criteria. This action is complete. (See NE Calculation WBPEVAR9004013).

(D) Inspect cables, accept-as-is, rework, or replace. This action is in progress. (See DCN M-09484, M-10189, M-10464, M-10823, M-10950, and M-10951).

IV. Perform Corona and load cycle test on bent and retrained medium voltage cable. This action is complete. (See NE Calculation WBPEVAR9004013).

V. Perform bending test on multi-conductor cable. This action is complete. (See NE Calculation WBPEVAR9004013).

VI. Revise TVA's final report on bend radius for WBN. This action is complete. (See TVA letter to NRC dated 6/29/90, L44 900629 801).

VII. Develop a long term test/analysis and cable monitoring program to provide long term support of reduced bend radii.

VIII. Close WBP900019SCA and cable issues CAP Section 4.1.7

4. Schedule

WBN's schedule for items 1 and 3 above is before fuel load. Item 2 is not applicable.

Revised CAP

1. Cable Sidewall Bearing Pressure

No change from approved CAP.

2. Distribution of Cable Pulling Forces

No change from approved CAP.

3. Cable Bending Radius

No change from approved CAP except for Item No. III.D, VIII and added CAP Item No. IX.

> III. D Inspect cables, accept-as-is, rework, or replace. This action is complete. (See DCN M-09484, M-10189, M-10464, M-10823, M-10950, and M-10951).
>
> VIII. Close WBP900019SCA.
>
> The below action IX is not currently in the approved CAP.
>
> IX. Prior to fuel load TVA will also solicit cable manufacture's review of the technical adequacy of the approach to establishment of the bend radius lower bound limit. This action is complete. (See Memo to M. C. Brickey dated July 28, 1995 from R. C. Williams Rims B43 950728 005).

4. Schedule

No change from approved CAP.

Technical Justification

Section 4.1.6 is the current section instead of 4.1.7 that deals with the cable issues bend radius. This CAP issue cannot be closed until all related cable issues are closed which includes 10900-NPS-01.

Item IX is a commitment in the cable issue CAP Section 4.1.6, and therefore, added to the revised CAP.

CATD 10900-NPS-01 (SEQUOYAH ONLY; LEVEL IIa DEVIATION) - ALLOWABLE LIMITS FOR CABLE SIDEWALL PRESSURE AND MINIMUM BEND RADIUS HAVE BEEN EXCEEDED

CATD 10900-NPS-01 documents the issue that the allowable limits for cable sidewall pressure (SWP), maximum pull tension (MPT) and minimum bend radius (MBR) have been exceeded. The program inadequacies were identified in NSRS report I-85-06-WBN.

Previously Approved CAP

1. TVA's central laboratory test results on cable sidewall bearing pressure concluded that the allowable pressures were four (4) to five (5) times higher than previous manufacturer's limits. Initial calculations for WBN have been performed and are under review. Final calculations for SQN have been completed and test results concluded that the cable pulling practices in the worst case conduit configuration for SQN would not result in sidewall pressures that cause damage to the cable insulation. These test results were consistent with the EPRI Report No. EL-3333. An independent third party, David A. Silvers and Associates, Inc., has concluded that the TVA testing is a reasonable basis for increased sidewall pressure values.

   The testing and analysis results have been submitted to the NRC. TVA is continuing resolution with NRC on this issue, if any additional corrective action, either short-term or long-term, is required as a result, then the CAP will be revised accordingly.

   In addition General Construction Specifications G-38 and G-40 have also been revised to limit the total sum of all bends in a conduit run to 360° between pull points.

NOTE: Calculations for BLN and BFN will be completed prior to restart for BFN and prior to fuel load for BLN.

2. DISTRIBUTION OF CABLE PULLING FORCES

TVA practice of monitoring total tension rather than individual tension does assure individual conductor strength limits are not exceeded, and is consistent with IEEE 690-1984, "Standard for the Design and Installation of Cable Systems for Class 1E Circuits In Nuclear Power Generating Stations". In fact, TVA practice is more conservative since August of 1978 we take 80% rather than 100% of the individual conductor strength on multi-cable pulls. Besides industry experience, acceptability of this practice was demonstrated in a recent cable pull in which the total pulling tension in a multi-cable pull was 3750 lbs. Several cables in the pull had a conductor-strength limit of 65 lbs. If the tension HAD NOT been distributed proportionally, the smaller cables would have snapped. These cables did not break or elongate. The above demonstrates that TVA practices with respect to the distribution of cable pulling forces has maintained the adequacy and integrity of Class 1E cable. Therefore, TVA considers this issue closed.

3. CABLE BENDING RADIUS

TVA's Electrical Engineering Branch (EEB) has used the NSRS report in addition to the manufacturer's requirements, to form the basis for its evaluation. Each of the areas of potential concern is being resolved into elements for further analysis. In each case the actual bend radius to which a cable has or could have been subjected is determined. This is accomplished for each Class 1E safety-related cable to which the concern applies. Subsequently, a determination is made of the effects, both short and long term, on the integrity of the cable and its ability to perform its safety-related function as a result of being subjected to the reduced bend radius. This determination is based on the consultations with and recommendations from the cable manufacturers, a review of the cable materials and constructions involved, the particular application of the cable at TVA, and a review of TVA and industry environmental qualification testing as it related to cable bend radius. In particular, EEB has identified the elongation stress, to which a cable is subjected as the result of a bend, as the critical parameter in determining acceptability. The evaluation of the concerns indicates that the minimum bend radius to which cables could have been subjected is that of one times its overall diameter. The resulting elongation stress has been calculated and compared with the cable's corresponding capability following its postulated accident scenario. This information is compiled from the

environmental qualification tests reports. Preliminary conclusions of the study indicate that this worst case bend at SQN does not reduce the cable's available elongation properties below that required for it to perform its safety-related function.

A final report, including EEB's comprehensive detailed analysis of the concern, including evaluation results, conclusions, and recommendations will be provided.

The effects of a reduced bend on shielded medium voltage power cable and coaxial, triaxial, and twinaxial cables will be evaluated separately. EEB has issued project specific actions for the evaluation of these cables. These actions will include field inspections for the existence of pull boxes or condulets of any type in which the cable is bent as well as individual inspections of a cable's bend radius. The actual bend radius will be determined and the resulting effects on the integrity of the cable will be established.

The testing and analysis results have been submitted to the NRC. TVA is continuing resolution with the NRC on this issue, if any additional corrective action, either short-term or long-term , is required as a result, then the CAP will be revised accordingly.

Revised CAP

The original CAP program outline to reconcile this CATD was written in general terms and did not reference specific actions to address the resolution of concerns for exceeding allowable limits for sidewall pressure and minimum bend radius. Maximum pull tension and the distribution of pulling forces was addressed in the CATD and is considered closed.

This proposed CAP Deviation Request will focus on the actions that SQN believes will resolve the remaining concerns about the adequacy of the cable pulling practices, and therefore, the ability of the installed SQN Class 1E cables to perform their intended safety-related functions.

SQN proposes the following actions to resolve this concern:

1. Complete testing of representative samples of power, control, signal, instrument, and coaxial cables from TVA's nuclear power plants to determine the maximum sidewall bearing pressure (SWBP) possible on cable pulls without cable degradation.

2. Establish a cable testing program that addresses the NRC's concerns about Sequoyah Unit 1 and Unit 2 cable pulling practices and cable bend radii configurations.

3. Obtain concurrence from NRC that Sequoyah has successfully completed their electrical cable testing program for both Unit 1 and Unit 2, and that TVA has adequately resolved their cable installation issues.

4. Establish a cable monitoring and test maintenance program to ensure that the safety-related cables will continue to be capable of performing their intended safety functions when subjected to accident or post accident environments.

Technical Justification

The original CATD was written during the time when the cable installation issues were still under discussion with the NRC, and the complexities of the available methods of resolution were not fully understood. That CATD alluded to continuing resolution with the NRC and the generation of additional actions, if necessary. Since that time, TVA has been successful in establishing a cable testing and monitoring approach that is acceptable to the NRC. Therefore, this CAP Deviation represents the results of those issue resolutions and the promised revised CAP containing the necessary additional, specific actions.

CATD 10900-NPS-05 (BFN UNIT 1 ONLY; LEVEL IIa DEVIATION) - CONDUIT FILL PROGRAM

CATD 10900-NPS-05 documents the issue that cable diameters used in the conduit fill program were not auditable. Cable diameters measured at TVA's Singleton Labs established new average cable diameter values for use in the cable conduit and tray fill program. For this reason each project must incorporate the new values into their fill program, and determine if overfill has occurred.

Previously Approved CAP

QA values for Class 1E and NC cable weights and outside diameters which are used in Category 1 structures, have been established and documented. These values have been incorporated into Engineering Design Standards DS-E12.1.13 and DS-E12.1.14 for use in performing calculations for cable minimum bend and training radius and sidewall pressure. In addition, these QA values will be used for calculation of conduit and cable tray cross-sectional area fill and seismic loading. QA values for new cable mark numbers will be established and documented.

As a result, evaluations will be performed on any existing overfilled condition to determine the impact on cable ampacity, cable sidewall bearing pressure as a result of cable pulling and raceway structural support systems. Conditions that are determined to be technically acceptable will be documented and accepted for use as is, for conditions that are determined to be unacceptable, corrective actions which may include cable removal and rerouting will be taken.

Revised CAP

Cable ampacity is not impacted by the percent of conduit fill because TVA's present method (DS-E12.6.3) is based on the number of conductors in the conduit and not the percent of fill. BFN's program for maintaining conduit fill prior to 1986 consisted of design employees following the existing design standards. The actions defined below will confirm that this method of control was effective. Further, the use of non-auditable diameter values did not allow detrimental overfill conditions to exist.

QA values for Class 1E and NC cable weights and outside diameters which are used in Category 1 structures, have been established and documented. These values have been incorporated into the TVA On-Line Mark Number Data base computer program ("On-Mark", Computer Software System ID 262486), for use in performing calculations for cable minimum bend and training radius and sidewall pressure. In addition, these QA values will be used in accordance with BFN-50-758 for the calculation of conduit and cable tray cross-sectional area fill and seismic loading for existing and future cables. QA values for new cable mark numbers and/or outstanding cable mark numbers will be established and documented. The seismic qualification of Unit 1 and common essential trays will be documented in Civil calculation. The Civil calculation will be similar to the Unit 3 analysis done in CD-Q0000-931227. Ampacity calculations for Unit 1 and common essential trays will be documented in Electrical calculation ED-Q0999-870135.

The values incorporated as part of the "On-Mark" computer program will be used for any conduit fill, expected pull tension and expected sidewall bearing pressure calculations which are performed for justification of past cable installation practices at BFN. Successful completion of the cable issues program which is documented in the evaluation of Browns Ferry Nuclear Plant Cable Installation Concerns Summary Report will justify that cable damage did not occur during installation, including concerns relative to conduit fill. Conduit fill is a specific screening parameter in the largest of the cable installations program (Cable pullbys) and will permit evaluation of cable damage due to conduit overfill.

Technical Justification

The objective of the Corrective Action Plan is to establish representative values for past cable weights and outside diameters (ODs) and use them in applicable evaluation programs (which have been approved by the NRC) to confirm that adverse conditions do not exist as a result of not having auditable weights and ODs. Evaluation of past pulling tension calculations were performed and established diameters and weights. The use of these values in a sample of cable installations, coupled with a program of plant inspections and evaluation of past procedures, confirms that conduit overfill conditions would not have caused cable damage to occur.

Corrective actions which are required as a result of these evaluations will be documented in the BFN Cable Issues Supplemental Report Corrective Actions. This program involves

inspection, evaluation, and testing to resolve the eight major cable installation issues for the restart of BFN Unit 1. Conduit fill was not one of these issues. However, conduit fill was indirectly evaluated as a part of the resolution of the issue of pullbys. This was due to industry recognition of the fact that the severity of a given pullby increases with increasing fill. As a result, one of the key screening factors was conduit fill. A summary of the cable pullby analysis can be found in Section 6 of the BFN Cable Issues Supplemental Report Corrective Actions. The results of this analysis are documented in calculation ED-02999-900072. Attachment F of the calculation lists all conduits included in the analysis, and the conduit fill was calculated for all of them (110). This calculation illustrates that of the 110 conduits, only three were over the allowed 40 percent value (41.73%, 54.44%, and 44.73%).

The two highest of the three are only 25 feet long and, therefore, can be justified as acceptable due to the benign conduit configuration. The remaining conduit which is at 41.73% has only a slight overfill. This conduit was inspected and expected pull tensions and sidewall bearing pressures were calculated for each of the pull groups in the conduit. These values are acceptable and are also documented in the calculation.

Based on this extensive program involving a representative worst case sample of conduits, the completed program confirms that detrimental conduit overfill conditions did not occur due to the use of non-QA weights and ODs during the design of raceway systems of BFN following the design standards on conduit fill were followed.

CATD 19200-NPS-02 (BFN UNITS 1 AND 3 ONLY; LEVEL IIb DEVIATION) - REVISE INSTALLATION GUIDELINES TO ADDRESS FLEXIBLE CONDUIT CONNECTORS

CATD 19200-NPS-02 documents the issue to revise NCR BFN EEB 8632 installation guidelines to fully address the flexible conduit connected to 10CFR50.49 equipment below six feet above the floor for minimum length criteria.

Previously Approved CAP

General Construction Specification G-40 issued in 1975 established requirements for installing electrical conduit systems and conduit boxes for the Sequoyah Nuclear Plant and all future nuclear plants.

Revision 9 of G-40 imposed the requirements within the specification on future modifications at Browns Ferry Nuclear Plant. Specification Revision Notice SRN-G-40-12 was issued to impose the requirements of G-40 on all work at Browns Ferry Nuclear Plant effective June 20, 1986.

A memorandum to Those listed from W. S. Raughley, dated May 14, 1986, provided guidance to each electrical lead engineer to determine the adequacy of flexible conduit lengths for thermal and seismic movements for installed Class 1E equipment and devices on the 10CFR50.49 lists. As a minimum each nuclear plant will be evaluated using this guidance and CAQs will be dispositioned accordingly.

In addition for BFN, since minimum lengths of flexible conduit were not specified by General Construction Specification G-3, calculations will be performed to determine acceptable lengths of flexible conduit for floor mounted equipment below six feet above the floor level. Using this data a random sample of 10CFR50.49 devices will be inspected to determine acceptability. NCR BFNEEB8632 will be revised to incorporated these required actions and will be tracked in TROI until completion.

Specification Revision Notice SRN-G-40-11, which was effective on July 1, 1986, specifies flexible conduit length in respect to thermal and seismic movement for

installation on all classes of equipment and components. Reference: SRN-G-40-11 (B43 860522902)

Revised CAP

General Construction Specification G-40 issued in 1975 established requirements for installing electrical conduit systems and conduit boxes for the Sequoyah Nuclear Plant and all future nuclear plants.

Revision 9 of G-40 imposed the requirements within the specification on future modifications at Browns Ferry Nuclear Plant. Specification Revision Notice SRN-G-40-12 was issued to impose the requirements of G-40 on all work at Browns Ferry Nuclear Plant effective June 20, 1986.

A memorandum to Those listed from W. S. Raughley, dated May 14, 1986, provided guidance to each electrical lead engineer to determine the adequacy of flexible conduit lengths for thermal and seismic movements for installed Class 1E equipment and devices on the 10CFR50.49 lists. As a minimum each nuclear plant will be evaluated using this guidance and CAQs will be dispositioned accordingly.

In addition for BFN, since minimum lengths of flexible conduit were not specified by General Construction Specification G-3, calculations will be performed to determine acceptable lengths of flexible conduit for floor mounted equipment below six feet above the floor level. 100% of the flex conduits for 10 CFR 50.49 equipment will be analyzed in electrical calculations for acceptability. SCR BFN EEB8632 is revised and closed for BFN Unit 2. These required actions will be part of the resolution for CAQRs BFP900220 and BFP900221 (for BFN Units 1 and 3 respectively) and tracked by TROI until completion.

Specification Revision Notice SRN-G-40-11, which was effective on July 1, 1986, specifies flexible conduit length in respect to thermal and seismic movement for installation on all classes of equipment and components. Reference: SRN-G-40-11 (B43 860522902)

Technical Justification

Due to the difficulty in determining a representative random sample of flex conduits to analyze, 100% of the flex conduits for 10CFR50.49 equipment will be analyzed in electrical calculations for acceptability. This is the same approach used to close the BFN Unit 2 portion of SCRBFNEEB8632. This 100% evaluation will encompass the flexible conduit verification program commitment for BFN Units 1 and 3 and is considered an enhancement to the program.

CATD 19201-NPS-01 (BFN ONLY; LEVEL IIb DEVIATION) - ACCEPTABILITY OF INSTRUCTIONS FOR ALL NUCLEAR SITES TO FOLLOW ON PAST FLEXIBLE CONDUIT INSTALLATIONS

CATD 19201-NPS-01 documents the issue that the W. S. Raughley memo, dated 5/14/86 does not fully address the acceptability or prescribe the necessary instructions for all active TVA nuclear sites to follow which would ensure past flexible conduit installations are in compliance with or meet the intent of General Construction Specification G-40, Rev. 9, SRN 11. Implementation of the policy memo at each site would only partially address the generic implication of WBN NCR-6529.

Previously Approved CAP

DNE will reevaluate the instructions given in the W. S. Raughley memo to determine acceptability of all Class 1E flexible conduit installations. This evaluation will include all generic implications of WBN NCR 6529. From this evaluation a total plan will be developed to resolve this issue.

TVA will initiate CAQR's if unacceptable conditions are determined to exist.

Revised CAP

DNE will reevaluate the instructions given in the W. S. Raughley memo to determine acceptability of all Class 1E flexible conduit installations. This evaluation will include all generic implications of WBN NCR 6529. From this evaluation a total plan will be developed to resolve this issue.

TVA will initiate CAQR's if unacceptable conditions are determined to exist.

For BFN Units 1, 2, and 3, 100% of the flex conduits for 10CFR50.49 equipment will be analyzed in electrical calculations for acceptability. The analysis is grouped as follows: Class 1E pipe mounted devices with expected motion greater than 1 inch (Group 1), pipe mounted devices with expected motion of 1 inch or less (Group 2), floor mounted cast or forged equipment at a point equal to 6 feet or greater above floor level (Group 3), and floor mounted equipment at a point less than 6 feet above the floor level (Group 4). 100% of the flex conduits, in each of

the four groups above, will be analyzed for 10CFR50.49 equipment prior to Unit 1, 2, and 3 restart. Analysis for Groups 1 thru 3 are contained within the scope of CATD 19201-NPS-01 and Group 4 is contained within the scope of 19200-NPS-02. Any identified unacceptable conditions will be replaced.

Technical Justification

Due to the difficulty in determining a representative random sample of flex conduits to analyze, 100% of the flex conduits for 10CFR50.49 equipment will be analyzed in electrical calculations for acceptability. This is the same approach used to close the BFN Unit 2 portion of SCRBFNEEB8632. This 100% evaluation of 10CFR50.49 equipment will encompass the flexible conduit verification program commitment for BFN Units 1, 2, and 3, and is considered an enhancement to the program.

CATD 24000-NPS-01 (BFN UNITS 1 AND 3 ONLY; LEVEL IIa DEVIATION) - OVERFILLED CABLE TRAYS IN FIRE STOPS WERE NOT EVALUATED

CATD 24000-NPS-01 documents the issue that no evaluation/test conducted on overfilled cable trays in fire stops was identified (also addressed in CATD 24000-SQN-01). The effect on ampacity of abandoned cables in raceways is not addressed in WBN design documents (also addressed in CATD 23803-SQN-1).

Previously Approved CAP

TVA will review the fire stop configuration and available calculations of fire stop temperature rise to determine if the effects of overfills can be calculated or if additional fire stop testing is required to establish ampacity derating. An appropriate derating factor will be determined to ensure that cables in an overfilled fire stop do not exceed their qualified insulation temperature rating. All power cable trays which pass through a fire stop and exceed the maximum established fill will be determined. The ampacity of all cables, safety related and nonsafety related routed with safety related (associated), in these trays will be verified using the established derating and DS-E12.6.3. All other power cable trays which pass through fire stops will have their tray fill frozen at or below the maximum established value.

Abandoned cables will be addressed when the ampacity study for installed cables is performed per corrective action for PIR GENEEB8605. Since these abandoned cables will contribute no heat to the mass, they will add conservatism to our study. If TVA chooses to remove this conservatism by removing the abandoned cables from the tray fill data, a study will be performed on the affect of the insulating properties of the abandoned cables on other cables in the raceway and DS-E12.6.3 will be revised if abandoned cables are found to have a significant adverse affect on cable ampacity.

Revised CAP

TVA will review the fire stop configuration and available calculations of fire stop temperature rise to determine if the effects of overfills can be calculated or if additional fire stop testing is required to establish ampacity derating. An appropriate derating factor will be determined to ensure that cables in an overfilled

fire stop do not exceed their qualified insulation temperature rating. Safety-related power cable trays which pass through a fire stop will be determined. The ampacity of all cables, safety related and nonsafety related routed with safety related (associated), in these trays will be verified using the established derating and DS-E12.6.3 which are sensitive to fill. Safety-related power trays which pass through fire stops will be maintained such that allowable cable ampacities are not exceeded.

Abandoned cables will be addressed when the ampacity study for installed cables is performed per corrective action for CAQR BFP880285 and SCAR BFP880287SCA for BFN Unit 1 and Unit 3 respectively. Since these abandoned cables will contribute no heat to the mass, they will add conservatism to our study. If TVA chooses to remove this conservatism by removing the abandoned cables from the tray fill data, a study will be performed on the affect of the insulating properties of the abandoned cables on other cables in the raceway and DS-E12.6.3 will be revised if abandoned cables are found to have a significant adverse affect on cable ampacity.

Technical Justification

Changing the text of the CATD from analyzing all power cable trays to only analyzing the safety-related trays required for BFN Unit 1 and 3 restart is in accordance with the Browns Ferry Nuclear Performance Plan which was used for BFN Unit 2 restart, is being used for Unit 3 restart, and is expected to be the same plan for Unit 1 restart.

If a new cable is required to be routed through a fire stop, then its ampacity through the fire stop will be calculated (including the effects of fill, abandoned cables, spare cables, etc.) to determine if that section of the tray is the most limiting raceway configuration.

CAQR BFP880285 and SCAR BFP880287SCA for Units 1 and 3 respectively, currently track the resolution of ampacity concerns for power cables in tray. This is the same approach used to close the Unit 2 portion of CATD 24000-BFN-01.

CATD 30403-NPS-01 (BFN ONLY; LEVEL IIa DEVIATION) - STANDING WATER IN ELECTRICAL MANHOLES

CATD 30403-NPS-01 documents the issue that problems were identified with standing water in electrical manholes at all sites. Although this is not considered safety-related, a potential safety issue may exist with "water-treeing" of insulation on Level V voltage cables. CATD 30403-SQN-01 was written for DNE to address this issue at SQN; however, because this issue is generic, a response should be made applicable for all sites.

THE NEED TO INITIATE THIS CAP DEVIATION WAS IDENTIFIED BY THE NRC.

Previously Approved CAP

TVA will take corrective action for this CATD in two phases.

For the first phase the following actions will occur:

1. Sump pump deficiencies will be corrected in all Class 1E/CSSC manholes and handholes except those used for cabling to the additional diesel generator buildings. This will include sump pump power supplies, controls, and piping, and will be accomplished using applicable maintenance instructions (if the above cannot be accomplished prior to restart of SQN Unit 2 it shall be acceptable to use temporary means to ensure the water level is maintained below the cables within the manhole/handhole).

2. Existing high potential and/or megger test results for all Class 1E/CSSC medium and low voltage power cables routed through the manholes and handholes will be obtained. If test results are not available tests will be performed in accordance to applicable site procedures or instructions. These test results will be evaluated to determine if the cables are adequate for their application. Any found to be inadequate will be replaced.

The second phase of the evaluation will include the following:

1. TVA will evaluate all Class 1E/CSSC cables and splices in all manholes/handholes of fitness of duty relative to past and future submergence with respect to manufacturer's test data.

2. TVA will investigate and determine the root cause of known MH/HH flooding. This investigation will include as a minimum identification of and deficiencies in the following:

   a. Sump, sump pump, and piping design and installation.

   b. Reliable, automatic operation of sump pumps with controls and power connection protected from flooding.

   c. Water-tightness of covers and gaskets.

   d. Location of covers above grade.

   e. Internal sealing to prevent excessive leakage.

3. TVA will determine corrective action to prevent recurrence which may include the addition of water level alarms and the incorporation of an upgraded preventive maintenance program.

Revised CAP

Browns Ferry Units 1, 2, and 3 will implement the following corrective actions:

1. A method will be developed and maintained to ensure manholes and handholes are inspected on a regular bases. This will ensure that standing water does not accumulate in the manholes and handholes.

2. Megger testing will be performed on all Class 1E/CSSC voltage level V5 cables in manholes and handholes to ensure acceptability.

3. The acceptability to Class 1E/CSSC cable splices in manholes and handholes will be demonstrated. (Reference QIR BFPBFN88026)

Reference CATD 30403-BFN-01 for additional corrective actions taken to resolve standing water in manholes and handholes.

Technical Justification

CATD 30403-BFN-01 was issued to resolve similar concerns for BFN. The corrective actions of CATD 30403-BFN-01 and this CATD ensure continued observance of manholes, including satisfactory operation of manhole sump pumps and early detection of any flooding that may occur. This precludes the possibility of extended periods of submerged cables and subsequent "water-treeing" of insulation. In addition, the corrective actions of this CATD ensure that any previous flooding of manholes and handholes has not had any detrimental impact on the cables and splices involved.

CATD 30403-NPS-01 (BLN ONLY; LEVEL IIb DEVIATION) - STANDING WATER IN ELECTRICAL MANHOLES

CATD 30403-NPS-01 documents the issue that problems were identified with standing water in electrical manholes at all sites. Although this is not considered safety-related, a potential safety issue may exist with "water-treeing" of insulation on Level V voltage cables. CATD 30403-SQN-01 was written for DNE to address this issue at SQN; however, because this is generic, a response should be made applicable for all sites.

Previously Approved CAP

TVA will take corrective action for this CATD in two phases.

For the first phase the following actions will occur:

1. Sump pump deficiencies will be corrected in all Class 1E/CSSC manholes and handholes except those used for cabling to the additional diesel generator buildings This will include sump pump power supplies, controls, and piping, and will be accomplished using applicable maintenance instructions. (If the above cannot be accomplished prior to restart of SQN Unit 2 it shall be acceptable to use temporary means to ensure the water level is maintained below the cables within the manhole/handhole).

2. Existing high potential and/or megger test results for all Class 1E/CSSC medium and low voltage power cables routed through the manholes and handholes will be obtained. If test results are not available tests will be performed in accordance to applicable site procedures or instructions. These test results will be evaluated to determine if the cables are adequate for their applications. Any found to be inadequate will be replaced.

The second phase of the evaluation will include the following:

1. TVA will evaluate all Class 1E/CSSC cables and splices in all manholes/handholes for fitness of duty relative to past and future submergence with respect to manufacturer's test data.

2. TVA will investigate and determine the root cause of known MH/HH flooding. This investigation will include as a minimum identification of and deficiencies in the following:

   a. Sump, sump pump, and piping design and installation.

   b. Reliable, automatic operation of sump pumps with controls and power connection protected from flooding.

   c. Water-tightness of covers and gaskets.

   d. Location of covers above grade.

   e. Internal sealing to prevent excessive leakage.

3. TVA will determine corrective action to prevent recurrence which may include the addition of water level alarms and the incorporation of an upgraded Preventive Maintenance Program.

Revised CAP

Bellefonte units 1 and 2 will implement the following corrective actions:

1. Evaluate the adequacy of present manhole/handhole design and correct deficiencies which allow the accumulation of water.

2. Evaluate the adequacy of presently installed Class 1E cables, by partial discharge locator testing (reference memorandum to Those Listed from R. C. Williams, "Water Treeing in Medium Voltage Cables, " B43 950207 002), and splices to perform their function. Repair or replace deficient cables or splices.

3. Revise preventative maintenance program to include periodic inspections of manholes and handholes regarding the accumulation of water.

Technical Justification

CATD 30403-BLN-01 and resulting PERBLN5154 (both presently being tracked by NCO930161001) were written to resolve similar concerns for BLN. These existing documents fully address all required corrective actions to ensure that manhole and handhole design deficiencies are identified and corrected; that presently installed Class 1E cables and splices are adequate for their function; and that preventative maintenance procedures are revised to include periodic inspections of manholes and handholes regarding the accumulation of water. These actions will assure that the problem relating to water-treeing of insulation on level V voltage cables, as documented in this CATD, is fully addressed.

NOTE: The primary difference between the original corrective action plan and the proposed CAP concerns the evaluation for adequacy of presently installed Class 1E cables. The original CAP proposed megger and/or high potential testing. The proposed CAP replaces these potentially destructive tests with a newly developed non-destructive test (Partial Discharge Locator Test), which has been effective in detecting and locating water trees in power cables. This test methodology provides superior results when compared to the previously proposed megger and high potential testing. The test methodology is described in detail in the memorandum referenced in the "Proposed CAP" section of the CAP deviation.

CATD 31212-NPS-01 (BLN ONLY; LEVEL IIa DEVIATION) - NON-ADHERENCE TO ACCEPTANCE CRITERIA FOR "PAT-DOWN SEARCH"

CATD 31212-NPS-01 documents the issue that during periods of inoperative electronic search equipment, Acceptance Criteria for the "pat-down search" function has not been adequately adhered to by PSS officers.

Previously Approved CAP

A. Action to be taken to identify similar instances of inadequate pat-downs will be through an established ongoing audit/evaluation program. The Nuclear Regulatory Commission (NRC) and the Division of Nuclear Quality Assurance (DNQA) will perform annual audits and/or unannounced inspections. Site Security Managers and the Nuclear Security Branch (NSB) will perform ongoing evaluations of the program and officers. Shift supervisors will perform onshift officer performance evaluations. All will be documented.

   At Watts Bar Nuclear Plant (WBN), the action to be taken will start when the security program reenters a schedule that completes training of individual officers and places the security program in an operational state for a fuel load license. The target date to complete the actions necessary to have the program in place is 30 days prior to a future established fuel load data for unit 1.

   At Sequoyah Nuclear Plant (SQN), the target date to complete the action necessary to have the program in place is prior to a future established restart date of unit 2. This plan is already being performed at SQN preparatory to restart. The Site Security Manager has already performed an operational readiness test. NRC is completing its second preparatory inspection in four months (March 6, 1987). DNQA completed its annual audit on February 6, 1987.

B. Action to be taken or planned that corrects identified instances of inadequate pat-downs will be thorugh remedial training and/or disciplinary action. Each case will be judged on its own merits. Additionally, action completion dates will be assigned according to each case need.

C. Actions to be taken or planned and dates of completion that will preclude recurrence of inadequate pat-downs will be as provided in the above paragraphs. It is noted that individual inaction or willful poor performance are not factors that can always be controlled. However, experience has shown that the plan will provide management wiht the best tool available.

D. For actions completed to date, see the above paragraphs. The results of the plan will be evidenced when a fuel load license is received at WBN and restart of SQN has occurred.

Revised CAP

No corrective actions required.

Technical Justification

The program described in this CATD does not exist at Bellefonte.

Bellefonte does not utilize electronic search equipment, nor do we require pat-down searches. However, at such time that construction progresses to completion and the Regulatory Requirements of 10 CFR 73.55 become applicable, Bellefonte will implement a security plan that fully complies with the regulation, including appropriate control measures for the "pat-down search" function.

This CATD can be closed for Bellefonte.

CATD R-81-04-YCN/NPS-01 (BFN, SQN, AND BLN ONLY; LEVEL IIa DEVIATION) - NO MINIMUM SAFETY REVIEW REQUIREMENTS ESTABLISHED

CATD R-81-04-YCN/NPS-01 documents the issue that no minimum safety review requirements had been established by NEB. Safety reviews had been curtailed when manpower was in short supply or more pressing needs existed. SQN is not receiving an adequate level of safety review. No minimum safety review requirements have been established by NEB.

Previously Approved CAP

BFN Approved CAP

NEB has previously addressed the subject concern and our responsibilities have been carried out per applicable criteria, procedures, and established guidelines (refer to EDC 820316 023 and B45 850502 268). There are no implications for past or present reviews of BFN.

After our initial response, there was a remaining concern dealing with the absence of a procedure on "safety reviews" and, as a result of this, NEB issued NEB-EP-25.4.6, "Guideline for Discretionary Safety Reviews", May 14, 1984 (ESB 840507 201), and revision 1 to this document was subsequently issued November 6, 1985 (B42 851112 503). This procedure states methodology for the performance of discretionary safety reviews. In addition, the issuance of upper-tier documents such as OEP-10 and its successor, NEP-5.2 further clarified the "Review" area and stated the responsibilities of other disciplines in this area. Therefore, it is NEB's opinion that NEP-5.2 and NEB-EP-25.4.6 sufficiently specify the responsibilities for safety review in DNE. All CAP work is complete.

SQN Approved CAP

Safety reviews (unreviewed safety question determinations) have been performed for all engineered changes to the Sequoyah Nuclear Plant initiated since receipt of the operating license. This is in compliance with the requirements of 10 CFR 50.59 and is controlled procedurally via Engineering procedures (reference:

Division of Engineering Design - EP 2.03; Office of Engineering - OEP 14; Division of Nuclear Engineering - NEP 2.1).

At present, NEB is utilizing PMP 0604.04, Evaluation of Changes, Tests and Experiments, and NEP 2.1, Licensing Support, to perform Safety Evaluations. Training of SQN-NEB personnel has been conducted for both procedures. However, the training associated with PMP 0604.04 was much more detailed and covered the process for determining if any physical or procedural changes, tests or experiments to the facility could involve an unreviewed safety question. It also included a workshop for development and demonstration of the skills required to perform safety evaluations. Successful completion of the course resulted in employee certification as a qualified safety evaluator.

In addition, DNE is writing a procedure NEP 6.6, Safety Evaluations, which will provide more detailed guidelines concerning the process of performing a safety evaluation. This procedure is scheduled to be issued by September 30, 1987 but is not required to satisfy the concern.

Revised CAP

BFN, SQN Proposed CAP

Subsequent to the corrective action plan in R-81-YCN/NPS-01, Rev 0, Design Basis Verification Plan Corrective Action Plans (DBVP CAP) were performed for BFN and SQN. The DBVP CAP for BFN and SQN and the listed procedures ensure future design changes will be properly reviewed.

1) SEP-9.5.6, Design Verification (SQN, BFN)

2) SSP-2.03, Administration of Site Procedures (BFN, SQN)

3) SSP-12.54, Plant Operations Review Committee (SQN, BFN)

4) SSP 12.13, Safety Evaluations 10 CFR 50.59 (SQN, BFN)

5) SSP 8.04, Special Tests (BFN, SQN)

The above procedures and programmatic approach ensure safety review is adequately addressed.

BLN Proposed CAP

BLN is in the design phase. Design is being conducted in accordance with Nuclear Power Standards, Section 9, Nuclear Engineering, Section 12, Plant Operations, and Section 8.0, Testing.

No further action is required for BLN.

Technical Justification

BFN, SQN Justification

The DBVP was performed subsequent to the original CAP as a result of omissions and deficiencies revealed in the design review process. The new CAP addresses the DBVP and procedures which ensure an adequate design review.

WBN ONLY

The WBN CAP deviation was approved separately, and is documented in the August 30, 1995, ECSP Special Supplemental Report to the NRC (L44950830806).

BLN Justification

The BLN program is being conducted in accordance with TVA Nuclear Power Standards.

4.5.2 Level III CAP Deviations

There are 60 Level III CAP deviations identified for the following NPS CATDs:

CATD	Deviation
705-NPS-01	1
10500-NPS-01	4
10500-NPS-02	1

10900-NPS-01	1
10900-NPS-05	2
10900-NPS-03	1
19200-NPS-01	1
19200-NPS-02	4
19200-NPS-06	1
19201-NPS-01	1
20104-NPS-01	1
21804-NPS-01	2
22003-NPS-01	7
24000-NPS-01	1
30115-NPS-01	13
30708-NPS-02	2
30710-NPS-01	2
80109-NPS-01	1
80109-NPS-02	1
80204-NPS-01	1
80312-NPS-01	1
80454-NPS-01	1
I-85-373-NPS-01-009	1
I-85-373-NPS-04-012	1
R-81-04-YCN/NPS-01	2
R-83-27-NPS-01	6