Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

MAY 10 1991

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - ACTION PLAN TO DISPOSITION CONCERNS RELATED TO UNITS 1 AND 3 CABLE INSTALLATION ISSUES INCLUDING CABLE SEPARATIONS

References:
1. TVA letter, dated January 9, 1991, Plans for the Return to Service of BFN Units 1 and 3
2. TVA letter dated February 15, 1991, Program for Resolving Cable Installation Issues prior to the Restart of Units 1 and 3
3. TVA letter dated April 26, 1991, Program for Resolving Units 1 and 3 Cable Installation Issues including Cable Separations - Action Plan Schedule

As part of Reference 1, TVA committed to provide the NRC Staff with the action plan for dispositioning concerns related to cable installation issues including cable separations at BFN Units 1 and 3. Issue of the action plan was postponed by References 2 and 3. Enclosure 1 to this letter provides a summary of these issues and a description of how the issues will be resolved on Units 1 and 3.

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U.S. Nuclear Regulatory Commission MAY 10 1991

This submittal is provided for informational purposes only. No NRC action is specifically requested. A summary list of commitments contained in this letter is provided as Enclosure 2. If you have any questions, please contact Joseph E. McCarthy, Manager of Unit 3 Licensing, at (205) 729-3604.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

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ENCLOSURE 1
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
CABLE INSTALLATION ISSUES CORRECTIVE ACTION PLAN

For the various cable installation issues including the cable separations issues, this enclosure provides 1) a summary of each of the BFN cable installation issues, 2) a review of the Unit 2 resolution of the issues, 3) a discussion of lessons learned from Unit 2 resolution of the issues, and 4) a description of how the issues will be resolved for Units 1 and 3.

Where appropriate, issues with similar resolutions are discussed together.

ELECTRICAL CABLE INSTALLATION ISSUES

Cable installation concerns at TVA initially resulted from the Employee Concerns Program for Watts Bar Nuclear Plant (WBN) and included a variety of issues concerning improper or inadequate installation practices. Since TVA's Sequoyah Nuclear Plant (SQN) and Browns Ferry Nuclear Plant (BFN) utilized installation practices and procedures similar to those used at WBN, TVA extended the review to SQN and BFN.

TVA's program for investigating and resolving these issues for BFN Unit 2 was originally described in Section III.13.1 of the Browns Ferry Nuclear Performance Plan (BFNPP). TVA submitted the cable installation concerns summary report by letter dated July 18, 1988 which contained corrective actions for the various cable installation issues. The summary report was revised and transmitted to NRC by letter dated June 19, 1989.

TVA's approach to resolve the issue of cable installation at BFN Unit 2 was based on: 1) evaluations to compare installation requirements and practices at BFN with those utilized in the industry during the period of BFN construction, 2) comparison of safety-related cable and conduit materials used between SQN and BFN, 3) plant walkdown inspections to assess the cable installation practices and overall quality of the resultant installation, and 4) a review of the extent to which the installed cables at BFN were enveloped by the resolution of the cable issue program at SQN. The BFN summary report addressed the following specific cable installation issues:

Sidewall Pressure
Pullbys
Jamming
Vertical Supports
Bend Radius
Pulling Cable Around 90 Degree Condulets and Through Mid-Run Flexible Conduit
Use of Condulets as Pull Points for Large 600V Cables

During the course of the investigations and testing performed to resolve these issues, two additional concerns were identified regarding 1) missing conduit bushings, and 2) Brand Rex cable.

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NRC inspection of cable installation issues resolution is documented in inspection report 90-13 dated August 10, 1990. TVA submitted to NRC the cable installation supplemental report by letter dated July 10, 1990, covering walkdown and testing results and completion of the program to resolve the issues at BFN except for the Cable Pullby issues and the Brand Rex Cable issue. The Cable Pullby program results were added and revisions to the supplemental report were transmitted by letters dated September 19, 1990 and October 4, 1990.

TVA's program for resolution of cable installation issues was evaluated by the NRC staff as documented in Section 3.11.5 of NUREG-1232, Volume 3, Supplement 2, dated January 23, 1991. The NRC staff concluded that TVA has adequately resolved the issues regarding cable installation practices for BFN Unit 2 restart pending completion of several remaining commitments.

Sidewall Pressure, Cable Pullbys, Cable Jamming and Pulling Around 90 Degree Conduletes and Through Mid-Run Flex Conduit

The issue of cable sidewall pressure is concerned with possible damage to cable shielding or insulation due to excessive radial force exerted on the insulation and jacket of a cable at a bend point during pulling operations. The pullby issue concerns cable insulation damage when one or more new cables are pulled over previously installed cable in a conduit. Cable jamming occurs when the ratio of the inside diameter of a conduit to cable diameter is close to 3.0 and three single conductor cables are pulled in a conduit (i.e., one of the cables slips between the two other cables and wedges in the conduit) causing a sudden, large increase in pull tension. The issue in pulling through mid-run flex conduit involves the tendency for a cable to have its surface caught by corrugations of the flex conduit during the pull, causing a substantial increase in sidewall pressure, and possibly leading to cable damage. The issue of pulling around 90 degree condulets involves potential damage to the cable due to the small bend radius of the condulet.

These issues were addressed at BFN through walkdowns to determine the extent or possibility of cable damage due to these concerns. Results of the walkdowns are documented in the Cable Issues Walkdown Report, dated June 1988. By letter dated July 18, 1988, TVA transmitted this walkdown report (revised by letter dated June 19, 1989) and concluded that no corrective actions were required for the sidewall pressure, cable jamming or pulling through 90 degree condulets and through mid-run flex conduit issues, due to the favorable results of the walkdowns and calculations.

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For the pullby issue, the July 18, 1988 letter concluded that cable pullby was not an issue at BFN as a result of good installation practices regarding pullby length, pull lubricant and use of non-abrasive pull lines. However, as a result of additional concerns subsequently identified at Watts Bar, by letter to NRC dated February 5, 1990, TVA submitted a plan for identification and testing of those cables at BFN judged to have the highest credible chance of having sustained pullby damage. As concluded in TVA's letter dated September 19, 1990, no evidence of pullby damage was identified at BFN after this extensive review and testing confirming TVA's earlier conclusions based on walkdown observations. No further corrective actions were identified for the cable pullby issue.

In summary, no cable damage due to excessive sidewall pressure, cable pullbys, cable jamming or pulling cable around 90 degree condulets or through mid-run flex conduits was identified during the Unit 2 evaluations. This is attributed to good installation practices observed on Unit 2. Additionally, as documented in the July 18, 1988 letter to NRC, reviews have established that the installation procedures and cable materials were the same for all three units at BFN.

Therefore, to resolve these cable installation issues for BFN Units 1 and 3, TVA will implement a confirmatory cable issues walkdown using the Unit 2 methodology, as documented in the revised walkdown report transmitted to NRC by TVA letter dated June 19, 1989, to confirm that the conclusions reached for these issues on Unit 2 are equally applicable to Units 1 and 3. This walkdown will look for evidence of adequate installation practices (including, but not limited to the use of adequate pulling lubricant at condulets and pullboxes, average length and degree of bends in conduit runs, presence of insulated pullwires and the absence of nylon pull cords) as was found in Unit 2. The confirmatory walkdowns will be completed prior to restart of the respective units.

ENCLOSURE 1
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
CABLE INSTALLATION ISSUES CORRECTIVE ACTION PLAN

Medium Voltage Cable Bend Radius

The bend radius issue concerns damage that may result when cables are bent beyond a minimum radius. As a part of the BFN Unit 2 Restart effort, class 1E medium voltage cables required for Unit 2 operation were inspected for cable bend radius using Construction Specification G-38 as acceptance criteria. All nonconformances were noted and ranked according to severity. The supplemental report, transmitted to NRC via letter dated July 10, 1990, and the subsequent revisions described TVA's program for resolution of the bend radius issue. This program excluded cables being replaced by other programs and diesel generator neutral ground circuits. The worst 15 case cables were Hi-Pot tested at the maintenance levels of IEEE Standard 400-1980, and all passed. The cables were then categorized according to severity levels into three groups. Group 1 cables (most severe) are scheduled for replacement during the next refueling outage. Group 2 cables are to be tested during the next BFN Unit 2 outage and subsequent outages to assess the need for continued trending. Group 3 cables (least severe) will be subject to only normal maintenance testing. Allowable bend radius criteria for the specific groups are explained below.

Safety-related medium voltage cables for Units 1 and 3 will be identified, walked down and evaluated against the bend radius criteria of G-38. These cables (excluding cables replaced by other programs and the diesel generator neutral ground circuits) will be dispositioned according to the same criteria as used for Unit 2. Corrective actions are as follows:

Group 1 cables, with bend radius of less than 6 times the cable outside diameter (OD) will be replaced prior to restart of Unit 1 or 3 as applicable.

Group 2 cables, with bend radius from 6 to less than 8 times the cable OD will be tested prior to Unit 1 or 3 restart and during subsequent outages to facilitate a trend analysis.

Group 3 cables, with bend radius 8 times or greater than the cable OD will remain in service and be subjected to only normal maintenance testing.

New installations must meet the requirements of G-38.

ENCLOSURE 1
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
CABLE INSTALLATION ISSUES CORRECTIVE ACTION PLAN

Vertical Cable Supports

The vertical cable supports issue concerns cable damage due to excessive strain resulting from improperly supported cables in a vertical section of conduit. Conduit fittings, boxes or termination devices at the top of this vertical section may worsen this condition by causing the cable to make a sharp change in direction at these points.

Class 1E medium voltage cables required for Unit 2 operation were walked down for conformance to G-38. Vertical sections of cable (except those cables being replaced by other programs) with unsupported lengths greater than that allowed by G-38 were Hi-Pot tested at the maintenance voltage levels in IEEE Standard 400-1980, and found to pass. Following this, static sidewall bearing pressure (SSBP) calculations were performed to determine if they were in the acceptable range. Cable supports were added for those cables not technically justified by this analysis.

With respect to low voltage power, control and instrumentation cables for Unit 2, TVA is to evaluate these cables prior to the restart of Unit 2 from the next refueling outage.

To resolve this issue for units 1 and 3, class 1E medium voltage cables will be identified, walked down and evaluated against the vertical cable support criteria of G-38. These cables (excluding those cables being replaced for other reasons) will be dispositioned in accordance with the following:

Cables not meeting the vertical cable support criteria will be evaluated for SSBP using the same acceptance criteria as Unit 2. Acceptable SSBP results indicate that insufficient force exists to cause insulation damage and since no Unit 2 cables with acceptable SSBP failed the Hi-Pot test, Units 1 and 3 cables with acceptable SSBP will be left as installed.

Cables with unacceptable SSBP will be Hi-Pot tested at the maintenance voltage levels in IEEE Standard 400-1980 and evaluated against the acceptance criteria in TVA Special Electrical Maintenance Instruction (SEMI-65) to assure that existing conditions have not damaged the cable insulation. Cables passing the Hi-Pot test will be left as installed and supported in accordance with G-38 to prevent cable insulation degradation with time. Cables failing the Hi-Pot test will be replaced.

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CABLE INSTALLATION ISSUES CORRECTIVE ACTION PLAN

For low voltage power, control and instrumentation cables, the program established for BFN Unit 2 will be implemented for Units 1 and 3 before the respective unit restarts. This program is described in the revised summary report transmitted from TVA to NRC by letter dated June 19, 1989, and is summarized below.

Class 1E low voltage cables which could fail the G-38 support criteria will be identified through a review of drawings, walked down and evaluated against the vertical cable support criteria of G-38. These cables (excluding those cables being replaced for other reasons) will be dispositioned in accordance with the following:

Cables not meeting the vertical cable support criteria and exhibiting jacket deformation or high strain, will be evaluated for static sidewall bearing pressure (SSBP) using the same acceptance criteria identified for medium voltage cables above.

Cables with acceptable SSBP will be left as installed.

Cables with unacceptable SSBP will be insulation resistance (IR) tested in accordance with IEEE Standard 690.

Cables passing the IR test will be supported in accordance with G-38.

Cables failing the IR test will be replaced.

Use of Condulets as Pull Points for Large 600V Cables

Investigation of cable jacket and insulation damage in November 1988 led to further investigation of large diameter cable installed in conduit with condulets. It was postulated that 300 MCM and larger 600V cable could have been damaged as a result of inserting large, stiff, single conductor cables in standard form condulets at the completion of the pull.

TVA described the program for resolution of this issue in the summary report, transmitted to NRC by TVA letter dated June 19, 1989. The BFN Unit 2 evaluation determined that the exposure for Unit 2 conduit configurations was limited to several cases of three single conductor 600V 400 MCM cables in three inch conduits with standard form condulets. These class 1E cable/conduit configurations were reworked to increase the conduit size. The damage found was confined to inside the condulets. Also, BFN site procedures were revised to prohibit the use of standard condulet bodies as pull points.

ENCLOSURE 1
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
CABLE INSTALLATION ISSUES CORRECTIVE ACTION PLAN

For Units 1 and 3, an evaluation, as was conducted for Unit 2, will be performed to identify susceptible 600V safety related cables. Conduits containing these cables will be walked down to determine the presence of standard form condulets within their length. The cables will be inspected for evidence of damage in any of these condulets. Corrective action including cable replacement will be taken, if necessary, prior to restart of BFN Units 1 and 3.

Missing Conduit Bushings

During the investigation of pullbys for Unit 2, six type PN (single conductor with polyethylene insulation and 4 mil nylon jacket) conductors exhibited high leakage currents under test. These six conductors were noted to have small tears in the jacket and insulation. This damage was determined to be the result of pulling the cables over a conduit end with a missing bushing and is clearly not indicative of pullby damage. As a result, a program was established for identifying additional conduits with missing bushings and which contained 10 CFR 50.49 circuits. TVA's resolution of the missing conduit bushings issue is described in the cable installation issues supplemental report corrective actions, which was submitted to NRC by letter dated September 19, 1990, and revised by letter dated October 4, 1990. The cables found in these conduits (excluding those being replaced by other programs or too short in length to have been subjected to pulling forces) were tested with no additional failures that can be attributed to damage from missing conduit bushings. The failures identified in Unit 2 occurred only in cable type PN, which is attributed to the significantly thinner jacket (4 mil, nylon) than the other cable types. The six damaged conductors were replaced. Additionally, the majority of remaining Unit 2 PN cables were replaced for EQ qualification reasons, even though they passed the Hi-Pot test.

To resolve the issue for Units 1 and 3, type PN Cables in 10 CFR 50.49 circuits will be replaced under the EQ program prior to restart of the respective units.

ENCLOSURE 1
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
CABLE INSTALLATION ISSUES CORRECTIVE ACTION PLAN

Brand Rex Cable

During the testing performed for the Unit 2 pullby program, an anomaly occurred that was not due to installation induced causes. No physical damage was observed and the cable was sent to the University of Connecticut's Electrical Insulation Research Center for analysis. The analysis determined that the failure resulted from the presence of a large number of atypically large inorganic particles concentrated in the region of the failure. This cable was manufactured by Brand Rex. TVA letter to NRC dated January 23, 1991, justified the continued use of Brand Rex cable for at least one operating cycle. Tests are being performed to verify the qualification of the Brand Rex cables for the life of the plant.

Corrective actions, if necessary, for Units 1 and 3 will be implemented prior to the restart of the respective unit in accordance with Unit 2 corrective actions.

ELECTRICAL CABLE SEPARATIONS ISSUES

TVA has identified instances where the electrical separation requirements have not been met at Browns Ferry Nuclear Plant (BFN). These discrepancies were discovered while implementing design changes and conducting reviews as part of the BFN Unit 2 restart effort and have been documented by the issuance of Licensee Event Report (LER) No. 88-032, dated October 21, 1988, and subsequent condition adverse to quality reports (CAQRs).

TVA submitted the cable separation report to NRC by letter dated January 6, 1989, to describe TVA's plan for evaluating the problem of cable separation and correcting the discrepancies for Unit 2 restart. This letter was supplemented by letters dated on June 9, 1989, October 23, 1989, and December 14, 1989. Implementation of BFN's separations program was reviewed by the NRC in inspection reports 89-59 dated February 23, 1990, and 90-13 dated August 10, 1990.

ENCLOSURE 1
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CABLE INSTALLATION ISSUES CORRECTIVE ACTION PLAN

TVA's program for resolving the discrepancies on BFN Unit 2 consisted of a categorization of discrepancies and identification of populations of cable susceptible to these discrepancies followed by an evaluation using one of three methods; 1) a review of 100 percent of the cable population, 2) a generic analysis to demonstrate the absence of safety concerns, or 3) a random sample of the cable population. This program resulted in the following twelve evaluations:

A review of field verified cable routing data from TVA's cable ampacity program and Appendix R program.

A 100-percent review of V4/V5 cables which originate from safety related power supplies.

A random sample of nondivisional V4/V5 cables which originate from nonsafety-related power supplies.

A 100-percent review of V3 nondivisional cables which originate from safety-related power supplies.

A random sample of nondivisional V3 cables which originate from nonsafety-related power supplies.

A generic analysis of typical nondivisional V1/V2 circuits which originate from both safety-related and nonsafety-related power supplies.

A 100-percent review of cables designated with and "IE" or "IES" suffix.

A 100-percent review of nondivisional V4/V5 cables contained in the project Q-list.

A random sample of nondivisional V3 cables contained in the project Q-list.

A random sample of nondivisional V1/V2 cables contained in the project Q-list.

A generic analysis of typical divisional V1/V2 circuits.

A review of divisional and nondivisional cable trays that physically connect.

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In a series of meetings between February 1 and May 11, 1989, TVA met with NRC staff to discuss the sampling methodology. The results of these discussions are incorporated in Revision 1 of the cable separation report as submitted by letter dated June 9, 1989, enabled agreement with the staff's position regarding acceptance criteria for the sampling methodology. Additional staff concerns resulting from their review of Revision 1 of the cable separation report were addressed and clarified in Revisions 2 and 3 of the cable separation report transmitted to NRC by letters dated October 23, 1989 and December 14, 1989. NRC concluded that Revision 3 adequately resolved the issue of the accuracy of design output documents.

As a result of these evaluations and implementation of the corrective actions, TVA has provided reasonable assurance with a high level of confidence that the cables required for Unit 2 operation are routed in accordance with the existing separation criteria. Based on the NRC staff's evaluation and inspections of TVA's cable separation program, the staff concluded in NUREG-1232, Volume 3, supplement 2 dated January 23, 1991, that TVA's program to identify cable separation discrepancies against design requirements and the associated corrective actions to resolve those discrepancies was acceptable.

Unit 1 and 3 Separations Discrepancies to be Resolved in Accordance with the Unit 2 Implementation Precedent

For Units 1 and 3, the following categories of separations discrepancies will be resolved in accordance with the Unit 2 implementation precedent, prior to fuel load of the respective units.

A 100-percent review of V4/V5 cables which originate from safety-related power supplies.

A random sample of nondivisional V4/V5 cables which originate from nonsafety-related power supplies.

A 100-percent review of V3 nondivisional cables which originate from safety-related power supplies.

A random sample on nondivisional V3 cables which originate from nonsafety-related power supplies.

ENCLOSURE 1
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
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A generic analysis of typical nondivisional V1/V2 circuits which originate from both safety-related and nonsafety-related power supplies.

A 100-percent review of cables designated with and "1E" or "1ES" suffix.

A generic analysis of typical divisional V1/V2 circuits.

Categories of Separations Discrepancies which will Deviate from the Unit 2 Implementation Precedent

For Units 1 and 3 the resolution of the following separations categories discrepancies will deviate from the Unit 2 implementation precedent:

Review of Field Verified Cable Routing Data from TVA's Cable Ampacity and Appendix R Program

The Unit 2 resolution consisted of a review of field verified cable routing data from the ampacity and Appendix R programs to provide a 95/95 confidence level that the Unit 2 cable schedule drawings were adequate for use as design input for the other separation evaluations. For Units 1 and 3, the Cable and Conduit Database is the Consolidated Cable Routing System (CCRS). Information from CCRS will be utilized to establish a working database for use during the evaluation process. This database information will be validated for divisional separation by analyzing two random samples, which will be confirmed by walkdown and/or signal tracing, for conformance to the relevant design criteria. The two random samples to be analyzed are safety related and associated cables and non-safety cables. The acceptance criteria for this validation will be the same 95/95 confidence level that the cables are routed consistent with the functional design criteria as was used for Unit 2. Following this validation the CCRS will be used as input for the remaining evaluations. Corrective actions for Units 1 and 3 will be implemented prior to restart of the respective unit.

Nondivisional V4 and V5, Nondivisional V3, and Nondivisional V1 and V2 Cables Contained in the Project Q-LIST.

The Unit 2 Q-List was issued prior to the separation evaluation and identified a number of nondivisional cables as safety related. Evaluations were performed to determine if the cables were safety related and, if so, the cables were routed correctly.

ENCLOSURE 1
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For Units 1 and 3, the Q-List will establish a list of equipment and device IDs for safety related and quality related systems. Subsequently, circuit block diagrams will be analyzed to identify each cable required in support of the "Q" device functions. The resultant cable list will be compared against the cable data base to determine if it is correctly identified as divisional. If it is determined that a change in divisional status is required, the respective cables will be evaluated against the separation criteria. Corrective actions for Units 1 and 3 will be implemented prior to restart of the respective unit.

Evaluation of Cables Contained in Divisional and Nondivisional Cable Trays that Physically Connect.

While performing evaluations associated with the adequacy of the cable and conduit database, certain Unit 3 divisional cables routed in nondivisional cable trays were identified. The problem was determined to be associated with the Unit 3 automatic cable routing program in cases where a node assignment was made at an intersection of a safety and nonsafety tray.

A review applicable to Units 1, 2, and 3 was performed to identify all of these unique situations and evaluations were performed for all affected cables. The evaluations found certain discrepancies to the separation criteria, and either design modifications were initiated to correct the discrepancies or circuit breakers were opened to isolate cables not required for Unit 2 restart.

Corrective actions for Units 1 and 3 involving the cable separation discrepancies resolved by opening breakers for Unit 2 restart will be implemented prior to restart of the respective unit.

ENCLOSURE 2
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
SUMMARY OF COMMITMENTS

1) For the sidewall pressure, cable pullbys, cable jamming, pulling around 90 degree condulets and thru mid-run flex conduit issues, TVA will implement a confirmatory cable issues walkdown using the Unit 2 methodology as documented in the revised walkdown report transmitted to NRC by TVA letter dated June 19, 1989. The confirmatory walkdowns are to be completed for Unit 1 prior to Unit 1 restart.

2) For the sidewall pressure, cable pullbys, cable jamming, pulling around 90 degree condulets and thru mid-run flex conduit issues, TVA will implement a confirmatory cable issues walkdown using the Unit 2 methodology as documented in the revised walkdown report transmitted to NRC by TVA letter dated June 19, 1989. The confirmatory walkdowns are to be completed for Unit 3 prior to Unit 3 restart.

3) Safety-related medium voltage cables for Unit 1 will be identified, walked down and evaluated against the bend radius criteria of G-38. These cables (excluding cables replaced by other programs and the diesel generator neutral ground circuits) will be dispositioned according to the same criteria as used for Unit 2. The following corrective actions will be completed prior to Unit 1 restart:

   Group 1 cables, with bend radius of less than 6 times the cable outside diameter (OD) will be replaced.

   Group 2 cables, with bend radius from 6 to less than 8 times the cable OD will be tested prior to restart and during subsequent outages to facilitate a trend analysis.

   Group 3 cables, with bend radius 8 times or greater than the cable OD will be allowed to remain in service and be subjected to only normal maintenance testing.

4) Safety-related medium voltage cables for Unit 3 will be identified, walked down and evaluated against the bend radius criteria of G-38 These cables (excluding cables replaced by other programs and the diesel generator neutral ground circuits) will be dispositioned according to the same criteria as used for Unit 2. The following corrective actions will be completed prior to Unit 3 restart:

ENCLOSURE 2
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
SUMMARY OF COMMITMENTS

Group 1 cables, with bend radius of less than 6 times the cable outside diameter (OD) will be replaced.

Group 2 cables, with bend radius from 6 to less than 8 times the cable OD will be tested prior to restart and during subsequent outages to facilitate a trend analysis.

Group 3 cables, with bend radius 8 times or greater than the cable OD will be allowed to remain in service and be subjected to only normal maintenance testing.

5) TVA will resolve the BFN medium voltage vertical cable supports issue for Unit 1 by evaluating cables not meeting the vertical cable support criteria for static sidewall bearing pressure (SSBP). Cables with acceptable SSBP will be left as installed. Cables with unacceptable SSBP will be Hi-Pot tested. Cables passing the Hi-Pot test will be supported in accordance with construction specification G-38, and cables failing the Hi-Pot test will be replaced. Corrective actions will be completed for Unit 1 prior to Unit 1 restart.

6) TVA will resolve the BFN medium voltage vertical cable supports issue for Unit 3 by evaluating cables not meeting the vertical cable support criteria for static sidewall bearing pressure (SSBP). Cables with acceptable SSBP will be left as installed. Cables with unacceptable SSBP will be Hi-Pot tested. Cables passing the Hi-Pot test will be supported in accordance with construction specification G-38, and cables failing the Hi-Pot test will be replaced. Corrective actions will be completed for Unit 3 prior to Unit 3 restart.

7) TVA will resolve the BFN low voltage vertical cable supports issue for Unit 1 by implementing the program established for BFN Unit 2 in the revised cable installation concerns summary report transmitted to NRC by letter dated June 19, 1989. Corrective actions will be completed for Unit 1 prior to Unit 1 restart.

8) TVA will resolve the BFN low voltage vertical cable supports issue for Unit 3 by implementing the program established for BFN Unit 2 in the revised cable installation concerns summary report transmitted to NRC by letter dated June 19, 1989. Corrective actions will be completed for Unit 3 prior to Unit 3 restart.

ENCLOSURE 2
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
SUMMARY OF COMMITMENTS

9) Prior to Unit 1 restart, an evaluation, as was conducted on Unit 2 will be performed to identify 600V safety related cables susceptible to damage from the use of condulets as pull points for large 600V cables. Conduits containing these cables will be walked down to determine the presence of standard form condulets within their length. The cables will be inspected for evidence of damage in any of these condulets. Corrective actions will be completed for Unit 1 prior to Unit 1 restart.

10) Prior to Unit 3 restart, an evaluation, as was conducted on Unit 2 will be performed to identify 600V safety related cables, susceptible to damage from the use of condulets as pull points for large 600V cables. Conduits containing these cables will be walked down to determine the presence of standard form condulets within their length. The cables will be inspected for evidence of damage in any of these condulets. Corrective actions will be completed for Unit 3 prior to Unit 3 restart.

11) To resolve the missing conduit bushings issue for Unit 1, type PN cables in 10 CFR 50.49 circuits will be replaced under the EQ program prior to restart of Unit 1.

12) To resolve the missing conduit bushings issue for Unit 3, type PN cables in 10 CFR 50.49 circuits will be replaced under the EQ program prior to restart of Unit 3.

13) To resolve the Brand Rex cable issue for Unit 1, corrective actions will be implemented prior to the restart of Unit 1 and in accordance with Unit 2 corrective actions.

14) To resolve the Brand Rex cable issue for Unit 3, corrective actions will be implemented prior to the restart of Unit 3 and in accordance with Unit 2 corrective actions.

ENCLOSURE 2
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
SUMMARY OF COMMITMENTS

15) Prior to fuel load of Unit 1, TVA will implement all corrective actions in accordance with the Unit 2 criteria and implementation precedent for the following cable separations issues: V4 and V5 cable which originate from safety-related power supplies, nondivisional V4 and V5 cables which originate from nonsafety-related power supplies, nondivisional V3 cables which originate from safety-related and from nonsafety-related power supplies, nondivisional V1 and V2 cables which originate from both safety-related and nonsafety-related power supplies, divisional and nondivisional cable designated with an IE and IES suffix, and divisional V1 and V2 cables.

16) Prior to fuel load of Unit 3, TVA will implement all corrective actions in accordance with the Unit 2 criteria and implementation precedent for the following cable separations issues: V4 and V5 cable which originate from safety-related power supplies, nondivisional V4 and V5 cables which originate from nonsafety-related power supplies, nondivisional V3 cables which originate from safety-related and from nonsafety-related power supplies, nondivisional V1 and V2 cables which originate from both safety-related and nonsafety-related power supplies, divisional and nondivisional cables designated with an IE or IES suffix, and divisional V1 and V2 cables.

17) For the Unit 1 review of field verified cable routing data from TVA's cable ampacity and Appendix R program, the cable and conduit database will be validated for divisional separation by random sample analysis and confirmation by walkdown and/or signal tracing to the relevant design criteria and meet the 95/95 confidence level criteria.

18) For the Unit 3 review of field verified cable routing data from TVA's cable ampacity and Appendix R program, the cable and conduit database will be validated for divisional separation by random sample analysis and confirmation by walkdown and/or signal tracing to the relevant design criteria and meet the 95/95 confidence level criteria.

ENCLOSURE 2
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3
SUMMARY OF COMMITMENTS

19) For nondivisional V4 and V5, nondivisional V3 and nondivisional V1 and V2 cables contained in the project Q-List, cables separations issues for Unit 1 will be resolved as follows. The Unit 1 Q-List will establish a list of equipment and device IDs for safety-related and quality-related systems. Circuit block diagrams will be analyzed to identify cables required in support of these equipment and device functions. This resulting list will be compared against the cable data base to determine if cables are correctly identified as divisional. If it is determined that a change in divisional status is required, the respective cables will be evaluated against separations criteria. Corrective actions will be completed for Unit 1 prior to Unit 1 fuel load.

20) For nondivisional V4 and V5, nondivisional V3 and nondivisional V1 and V2 cables contained in the project Q-List, cables separations issues for Unit 3 will be resolved as follows. The Unit 3 Q-List will establish a list of equipment and device IDs for safety-related and quality-related systems. Circuit block diagrams will be analyzed to identify cables required in support of these equipment and device functions. This resulting list will be compared against the cable database to determine if cables are correctly identified as divisional. If it is determined that a change in divisional status is required, the respective cables will be evaluated against separations criteria. Corrective actions will be completed for Unit 3 prior to Unit 3 fuel load.

21) For the cables contained in divisional and nondivisional cable trays that physically connect issue on Unit 1, corrective actions involving cable separations discrepancies resolved for Unit 2 restart by opening breakers will be implemented prior to Unit 1 fuel load.

22) For the cables contained in divisional and nondivisional cable trays that physically connect issue on Unit 3, corrective actions involving cable separations discrepancies resolved for Unit 2 restart by opening breakers will be implemented prior to Unit 3 fuel load.