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AUG 22 1991

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Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2 - CABLE ISSUES CORRECTIVE ACTION PROGRAM (CAP) PLAN - RESULTS OF THE LOW-RISK CABLE TESTS AND INSPECTIONS PERFORMED TO RESOLVE THE PULLBY ISSUE

References:
1. Letter from TVA to NRC dated December 20, 1989, "Watts Bar Nuclear Plant (WBN) Units 1 and 2 - Electrical Cable Damage - Assessment and Resolution Plan"
2. Letter from TVA to NRC dated June 15, 1990, "Watts Bar Nuclear Plant (WBN) Unit 1 - Electrical Cable Damage - Assessment and Resolution Plan"
3. Letter from TVA to NRC dated October 11, 1990, "Watts Bar Nuclear Plant (WBN) - TVA Responses to NRC Comments Resulting From August 1-3, 1990 Meeting"
4. Letter from NRC to TVA dated April 25, 1991, "Watts Bar Unit 1 - Corrective Action Program (CAP) Plan For Cable Issues (TAC 71917)"

This letter provides a summary of the results of the testing/inspection program utilized to support the basis for the resolution of the pullby issues as described in the references above.

As a result of a TVA evaluation conducted to resolve an employee concern at WBN, cable installation damage attributable to pullbys was identified. TVA has undertaken an extensive program to (1) identify those locations most susceptible to the damage mechanisms, (2) categorize conduits as high or low risk for pullby damage, and (3) validate the threshold between the low- and high-risk conduit categories. References 1 through 3 provide a detailed description of the methods employed to evaluate and resolve the pullby issue at WBN.

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As part of these corrective actions, cables which were defined as high risk, according to the above-referenced analyses, will be replaced. Cables in the low-risk category were considered acceptable "as-is" pending the successful completion of the high potential withstand tests on the defined sample of low-risk category cables. The results of this testing have validated the threshold between the high- and low-risk conduits, since pullby damage has not been identified as the cause of hi-pot test failures in the low-risk sample. TVA has completed approximately 50 percent of the cable replacement associated with the resolution of this issue. The remaining activities will be completed in accordance with the site integrated schedule following resumption of work activities in the field.

Enclosure 1 provides NRC with a summary of the low-risk hi-pot test results, the anomalies identified, and TVA's corrective actions required to resolve each issue. Additionally, this enclosure provides the results of ongoing inspections conducted during work activities where pullby damage has been identified.

TVA has completed its analyses regarding the insulation anomaly identified in the Brand Rex cables during the hi-pot testing. The successful completion of these analyses has confirmed that the Brand Rex cables in question will perform their intended long-term and accident functions. Therefore, additional corrective actions are not necessary.

In summary, the pullby damage identified in low-risk conduits would not have resulted in the cables' inability to perform their intended safety functions. The testing and inspections performed have validated the threshold between the high- and low-risk cables. Additionally, with the replacement of the remaining high-risk cables previously identified, TVA is taking the actions necessary to resolve the pullby issue, as approved by NRC (see Reference 4). TVA requests NRC review and closure of this issue based on the validation of the threshold between the high- and low-risk conduits.

Enclosure 2 provides a list of commitments resulting from this letter.

Please direct any questions regarding this letter or further discussion to P. L. Pace at 615-365-1824.

TENNESSEE VALLEY AUTHORITY

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ENCLOSURE 1

LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

As a result of an investigation conducted to resolve an employee concern at WBN, cable installation damage attributable to pullbys was identified. TVA has undertaken an extensive program to (1) identify those locations most susceptible to the damage mechanisms, (2) categorize conduits as high or low risk for pullby damage, and (3) validate the threshold between the low- and high-risk conduit categories.

Detailed descriptions of the methodologies employed to resolve (1), (2), and (3) above were provided to NRC in TVA submittals dated December 20, 1989, June 15, 1990, and October 11, 1990.

Part I of this enclosure discusses the results of the hi-pot testing of cables (active, spare, and abandoned) in low-risk conduits conducted to validate the threshold. The determinations of the failure mechanisms discussed in this enclosure were performed by TVA with the support of the University of Connecticut Electrical Insulation Research Center (EIRC). Part II of this enclosure discusses the results of an evaluation of pullby damage found in low-risk conduits and the results of a visual inspection of certain abandoned cables that were too short to test. Part III provides TVA's conclusions based on the results of the testing and inspections described previously.

I. ANALYSIS OF LOW-RISK TESTING ANOMALIES

In order to validate the threshold established between the conduits that were categorized as high risk and low risk for potential pullby damage, 40 conduits were selected; 20 instrumentation conduits and 20 control and low voltage power conduits. Cables in the test conduit population were either tested or visually inspected for pullby damage. Table 1 provides a list of the cables which experienced anomalies during the performance of the testing of the approximately 400 cables (representing in excess of 1100 conductors).

TABLE 1
CABLE AND TEST ANOMALIES

Cable	Failure Location	Failed Conductor	Test Conditions
1PM2485B	MC880B	white	failed at 3.7kV dc
1PM2445B	MC880B	black	failed at 3.4kV dc
1PM2080B	MC880B	black	failed at 4.9kV dc
2V1011B	MC938B/MC904B	red	failed at 4.1kV dc
2PM3926B	MC914B/MC906B	white	failed 2.5kV dc megger
2PM3806B	2PM7410B	black, white	failed at 3.6kV dc
2PS207B	JB830B	black	failed 2.5kV dc megger
1PM2440B	JB5993B	black	failed at 3.8kV dc
2PM3765B	JB5989B	white	failed at 4.6kV dc
1PM1835K	JB4042K	black	failed at 3.4kV dc
1PM8J	1PM7254J	black	failed at 3.5kV dc
1ABN1739A	1RM508A**	white coax	failed continuity check
2PV142B	1VC3599B**	black	failed at 6.1kV dc
1PM1661J	1PM6256J**	white	failed at 1.5kV dc

**note: This identifies the target conduit; refer to text for further discussion of the failure location.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

During testing, other anomalies not associated with that portion of the cable in the low-risk conduit were identified. Temporary corrective actions were taken and the testing was continued.

The failed sections of cables shown in Table 1, except for 1ABN1739A (see Section B.4), were carefully removed and sent to EIRC for analysis. Those cables were first subjected to visual and tactile inspection. Tactile inspection was conducted by running a hand over the surface of the cable to detect any gross irregularities in the texture or overall dimensions. The jacket surfaces were visually inspected for deformation, pinholes, cuts, or other physical damage. Subsequent inspections and tests were performed, as necessary, to determine the damage mechanisms.

In summary, the anomalies can be categorized as A) random insulation anomalies in Brand Rex cables, B) mechanical damages, and C) those for which the cause of the apparent failure could not be determined.

A. Cable Test Anomalies Associated With Brand Rex Contract 80K6-825419 Where No Visible Damage Mechanism Was Evident

Cables: 1PM2485B, 1PM2445B, 1PM2080B, 2V1011B, and 2PM3926B

BACKGROUND

Five cables manufactured by Brand Rex on contract 80K6-825419 failed during in situ hi-pot testing. Breakdown of the cables occurred between 2500 and 4900 volts dc. The subject cables were previously hi-pot tested in the factory at 6000 volts dc for five minutes. The failed cables were removed from their conduits and visually inspected. No evidence of pullby damage was found. Laboratory testing by EIRC has indicated that atypically large inorganic particles were present in the insulation in the immediate vicinity of the dielectric failures for the first four cables. No fault site could be located on 2PM3926B. Elemental analysis performed by EIRC has determined the particles to be predominantly antimony, titanium, and silicon. According to the cable manufacturer, the antimony and titanium are components of the cables' fire-retardant and pigmentation systems, respectively. The specific source of the silicon was not determined.

ENCLOSURE 1

LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

RESOLUTION

To assess the long-term and accident performance capabilities of the cables, a sample was subjected to environmental qualification (EQ) tests. The specimens selected for analysis did not include sections of the cables that failed during the aforementioned high-potential testing. These latter cables were sent to EIRC and subjected to destructive testing. Specimens from "suspect" (Brand Rex cable also supplied under contract 80K6-825419) reels were chosen for the EQ test to ensure that the above-mentioned particles were present. Included in the EQ test population are sections of the following:

- WBN cable 1PM2081B - This cable is considered the same as cables 1PM2445B, 1PM2080B and 1PM2485B (which failed the high-potential test) since they were from the same conduit and same Brand Rex reel (1-99352).

- WBN cables 2V1131B, 2V1111B, 2PM3192B, 2PM3921B, and 2PM3334B - These five cables are considered the same as cable 2PM3926B (which failed the aforementioned high-potential test) since they were from the same conduit and the same Brand Rex reel (1-000795).

- Cables 1V5484A and 1V5487A from WBN conduit 1PM7186A - This conduit is classified as a "high risk" (i.e., the configuration of the conduit presents a high risk of pullby damage occurring during cable installation). Cables from a high-risk conduit were selected to be tested since the relatively high stresses experienced during installation may have separated the large inorganic particles from the polymer matrix (insulation).

- Cable from reel No. 1-74546 - High-potential tests were performed on this virgin reel cable and failures were identified. Specimens from this reel were selected in order to supplement the test population with "suspect" cable (i.e., cables with the potential for similar insulation anomalies).

- Where the lengths of cables identified above were not adequate to obtain the desired specimen footage, additional segments were taken from cables 2PM2435B and 2PM2440B, which were supplied on the same contract.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

RESOLUTION (continued)

The 40 samples (approximately 1200 conductor feet total) were maintained at their defined current and voltage during the 30-day accident simulation test following the 40-year aging process. Since all specimens passed the LOCA simulation, a post LOCA hi-pot test was performed to determine if the specimens contained any atypically large inorganic particles. The relationship between the presence of these particles and the reduction of dielectric strength was previously established during the in situ hi-pot testing. Four specimens (two from sections of reel No. 1-74546 and two sections from cable 2V1131B) broke down during the post LOCA hi-pot. The four specimens were sent to EIRC to confirm the presence of the particles. Large inorganic particles were found similar to those seen previously in other failed samples near the fault sites.

In order to determine if the presence of the large inorganic particles were confined to the suspect Brand Rex contract, preceding and succeeding Brand Rex contracts were inspected. This analysis showed that the dispersion of insulation ingredients in cables from the nonsuspect contracts was superior to those supplied on contract 80K6-825419. No evidence of the large inorganic particles was noted.

CONCLUSION

The successful completion of the EQ test demonstrates that the cables, as supplied and installed, will perform their intended long-term and accident functions. TVA has issued a directive to prevent future installation of cables from Brand Rex contract 80K6-825419 for Class 1E applications at TVA. Since the failures were not the result of pullby damage, this anomaly does not impact the validation of the high- and low-risk threshold.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

B. Cable Test Anomalies Associated With Miscellaneous Mechanical Damage

1. MISCELLANEOUS KINKS, GOUGES, ETC.

a. Cable 2PM3806B

Damage Mechanism:

2PM3806B is a 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield manufactured by Samuel Moore under TVA contract 79K5-825874. Upon removal from its conduit, this cable was noted to contain a significant kink in the area where the fault occurred. The jacket and insulation of both conductors was torn exposing the conductors.

EIRC noted that the black conductor's insulation was charred with significant evidence of surface tracking, conductor melting, a large eroded area in the overlying aluminum shield, and abrasion damage on the conductor. Abrasion damage on the white conductor's insulation was noted, exposing the conductor. The cable appears to have failed due to mechanical damage associated with the kink.

b. Cable 2PS207B

Damage Mechanism:

2PS207B is a 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield manufactured by Anaconda under TVA contract 76K5-87232. A 2.5-inch long section was evaluated due to the presence of surface damage.

This cable was found to contain a series of small cuts in its jacket over a length of approximately 0.45 inch. The jacket was found to be punctured with some damage to the underlying shield, assembly wrap, and black insulation. The punctures were characterized as having been inflicted by a sharp object/instrument.

2. SPLICE DAMAGE

a. Cable 1PM2440B

Damage Mechanism:

1PM2440B is a 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield manufactured by Eaton under TVA contract 77K5-821722. The failure was isolated to the vicinity of a splice in junction box 5993B. A 6-inch segment of the cable containing the failure was submitted to EIRC for evaluation.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

This cable was found to contain a shallow surface cut approximately 2 inches back from a crimp connector and another sharp cut approximately 4 inches back from the crimp connector. The shallow cut was inspected under a stereomicroscope and found to be limited to the outermost surface of the insulation. This shallow cut was previously located under a Raychem sleeve covering a splice. There was no evidence of electrical discharge at this location. The second cut was inspected under the stereomicroscope and found to penetrate through the insulation to the conductor. The insulation was pulled back to expose the conductor strands under the cut. Sharp circumferential scoremarks were noted in the outer surface of two of the conductor strands. The insulation and the conductor strands contained evidence of electrical discharge damage. The cut through the insulation was most likely inflicted when the jacket was stripped back to facilitate splicing.

b. Cable 2PM3765B

Damage Mechanism:

2PM3765B is a 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield manufactured by Brand-Rex under TVA contract 80K6-825419. A failure was isolated to the vicinity of a splice in junction box 5989B. An 8-inch long segment of the cable containing the failed portion was submitted to EIRC for evaluation. The black and white conductors were noted to contain sharp cuts, extending approximately halfway around the cable and through the insulation, near the end of the cut-back in the jacket. Electrical discharge damage was evident on the surface of the white insulation. Below these cuts, shallow corresponding nicks were found in the wire strands. Based on review of the EIRC report, TVA has concluded that the cuts in the insulation were most likely inflicted when the jacket was stripped back to facilitate splicing.

3. BREACHING DAMAGE

a. Cable 1PM1835K

Damage Mechanism:

1PM1835K is a 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield manufactured by Samuel Moore under TVA contract 77K5-821722. A short section of the cable, approximately 8 inches long, adjacent to a conduit seal, was submitted to EIRC for examination of the punctures found in the jacket near one end.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

Two punctures were noted in the jacket. The larger of the two consisted of a V-shaped flap, approximately 0.35 inch long. Under the stereomicroscope, it could be seen that this puncture penetrated the jacket and that a cut was present through the insulation of the underlying black conductor. Electrical discharge damage was also noted at this site on the black insulation. A smaller puncture was found in the jacket at a location nearly opposite to that of the first puncture. This was limited to the jacket, with no damage to the underlying components.

Based on review of the EIRC report, TVA has concluded that the punctures appeared to be consistent with that which would be inflicted by a sharp, square-edged tool such as a screwdriver.

b. Cable 1PM8J

Damage Mechanism:

1PM8J is a 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield manufactured by Samuel Moore under TVA contract 77K5-821722. It was noted to be kinked in two locations with a small puncture at one kink at the location of a firestop seal. The failure appears to have been the result of a mechanical puncture which penetrated the jacket and damaged the insulation.

4. BROKEN CONDUCTOR

Cable 1ABN1739A

Abandoned cable 1ABN1739A, which was originally 1RM387A, is an eight conductor cable consisting of two coax, two number 20 AWG conductors, and four number 22 AWG conductors with an overall shield manufactured by Carolina Wire and Cable Incorporated, under TVA contract 80K8-826505. A continuity check prior to the hi-pot test indicated a broken conductor in the white coax. This was isolated outside the conduit of test (1RM508A) and the segment in the "target" conduit has successfully passed the hi-pot test. This abandoned cable remains in place in the plant. When the cable was active, the white coax was a spare conductor by design. Since a broken conductor is not indicative of pullby damage, analysis by EIRC was not necessary.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

C. Anomalies Where the Cause of the Apparent Failure Could Not be Determined

1. Cable 2PV142B

Damage Mechanism:

2PV142B is a 2 conductor #10 AWG unshielded cable of twin flat construction and manufactured by Anaconda under TVA contract 81K7-828633. A portion of this cable was routed through conduit 1VC3599B, a junction box, conduit 2PLC2324B and then to a tray. This cable (approximately 85 feet long) was removed from the two conduits and junction box in three segments approximately 16 feet, 34 feet, and 35 feet in length. The failure was isolated by a 2500V megger test and visual inspections to a section of conduit 1VC3599B, approximately eight inches beyond the junction box. Following removal, the approximately 16 foot section of cable containing the visible damage was hipot tested (wet) and continued to indicate breakdown. A borescope inspection of the two conduits indicated no presence of sharp objects which may have caused the damage. A 20-inch section of the cable, which contained only visible damage was subsequently evaluated by EIRC.

Two damaged sites were observed on the jacket. The first consisted of a series of four, parallel, equally spaced gouges, adjacent to the white conductor. Their orientation was transverse to the conductor. The jacket was sectioned to expose the conductor immediately below the damaged area. No damage was found. The shape of the surface gouges and their equal spacing suggests that these may have been inflicted by contact with a threaded surface.

The second damaged site consisted of a longitudinal gouge approximately 1-inch long. The gouge was very shallow at one end and then deepened steadily ending with a puncture through the jacket. The jacket was dissected to expose the underlying components. The insulation of the black conductor was found to contain surface damage only. The white conductor had no evidence of surface damage. The gouge and the area immediately surrounding the gouge were found to contain a cluster of glass fibers in a paste-like matrix. The damage appears to have been inflicted by the penetration of a tool or other sharp object which was possibly made of fiber glass or contained fiber glass residues. EIRC could not identify a cause or location for the apparent failure within this 20-inch segment. TVA is continuing its evaluation of the remaining sections of the cable as part of the broad evaluation of cable defects found during cable replacement. However, since no evidence of damage inflicted as a result of pullbys was observed, subsequent evaluations of this cable will not impact the threshold between high- and low-risk pullby categories.

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2. Cable 1PM1661J

Damage Mechanism:

1PM1661J is a 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield manufactured by Anaconda under TVA contract 76K5-87232. This cable failed an in situ hi-pot test and was carefully removed in five sections so as not to inflict further damage. Several hi-pot tests were performed on each segment following removal. No failures were observed during these tests conducted at 4.8kV dc, under both wet and dry conditions. The cable was subsequently sent to EIRC for further analysis.

Four sections of the cable contained minor surface nicks and scrapes. In addition, approximately halfway between footage markers 17366 and 17368, a 1-inch long diagonal gouge was noted which penetrated through the jacket, aluminum mylar shield and the assembly wrap tape. The fifth section of cable contained a series of small sharp nicks and scrapes at the location of an RTV foam fire seal.

The entire length of the cable was manually stripped of its jacket to determine, by visual inspection, where the reported test failure had occurred. No fault sites and no significant damage sites could be found. Electrical tests were performed (i.e., Telsa coil and insulation resistance tests) and no failure locations could be found.

The damage between footage markers 17366 and 17368 was inspected under the stereomicroscope. No damage was found to any components other than to the jacket, aluminum mylar shield, and assembly wrap. Based on previous experiments conducted at EIRC, the jacket damage present between footage markers 17366 and 17368 was most likely caused by sliding contact with a parachute cord.

EIRC could not identify a cause or location for the apparent failure encountered during in situ testing. Since it was necessary to cut the cable and conduit for ease of removal, it is possible that the damaged area was cut out at that time.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

SUMMARY

The cable test anomalies were analyzed to determine if pullby damage contributed to the failure during the hi-pot testing. In most cases, the failure mechanisms identified are considered isolated occurrences. In two instances, the damage was near splice locations. TVA has initiated corrective action documents Significant Corrective Action Report (SCAR) WBP900450 SCA and Condition Adverse to Quality Report (CAQR) WBP900548 and determined that these were not isolated instances. Corrective actions required to resolve this concern have been previously reported to NRC in accordance with the requirements of 10 CFR 50.55(e) as Construction Deficiency Report (CDR) 90-04.

Additionally, since the above described anomalies were not caused by pullbys, they will not affect the validation of the threshold for low-risk conduits. Before fuel load, TVA will repair, replace, or rework the removed active cables as documented on the associated corrective action reports.

II. INSPECTION OF CABLES ROUTED IN LOW RISK CONDUITS EVALUATED FOR PULLBY DAMAGE

A. Inspection Of Cables Removed During Replacement

During replacement of cables 1PM1381G, 1PM1800G, 1PM1026G, and 1PM1232G in high-risk conduit 1PM6352G, the same cables in the adjacent low-risk conduit 1PM6219G were pulled back to facilitate splicing. TVA inspected these cables and identified pullby damage at a 90 degree bend in the low-risk conduit segment.

Cable 1PM1381G is a 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield manufactured by Samuel Moore under TVA contract 77K5-821722. Cable 1PM1232G, 1PM1800G, and 1PM1026G were manufactured by Anaconda under TVA contract 76K5-87232. Cables 1PM1232G and 1PM1026G are 2 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield. 1PM1800G is a 4 conductor #16 AWG twisted instrumentation cable with an overall aluminum mylar shield.

Cable 1PM1381G was found to contain a shallow groove in the outer surface of the jacket. The jacket, which was not penetrated, was noted to be worn at this location, with a resulting roughened surface in the bottom of this groove. The groove extended approximately 2 inches along the length of the cable. Cable 1PM1232G contained a shallow groove in its jacket. The groove had a flat, or nearly flat, bottom with a smooth surface. There was no evidence of penetration through the jacket. This damage may have resulted from localized high sliding force with another cable or pulling rope.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

A. Inspection Of Cables Removed During Replacement (continued)

A groove in the jacket of 1PM1800G was observed to lie at an oblique angle to the length of the cable. The groove had a radius of approximately 0.12 inch. At no point was any penetration of the jacket observed.

The jacket of 1PM1026G contained a groove with characteristics similar to those observed on 1PM1800G. In this case, however, the jacket was penetrated and the underlying aluminum mylar shield and assembly wrap tapes were damaged. The black insulation was exposed, but no damage was evident. The damage noted on these cables contained grooves with characteristics similar to those observed when pullby damage between similar cables and a "parachute cord" were simulated in the EIRC laboratory.

Following removal, the damaged sections of 1PM1381G, 1PM1800G, 1PM1026G, and 1PM1232G were successfully hi-potential tested, both wet and dry.

TVA's analysis concluded that the potential for damage in the subject conduit had not been realized due to the practice of changing conduit numbers at building interfaces even when the run is continuous. As a result, a review of all such "conduit-pairs" was conducted, with the subject pair evaluated as a single run and dispositioned accordingly. The removed sections of 1PM1381G, 1PM1800G, 1PM1026G, and 1PM1232G will be replaced before fuel load.

B. Inspection Of Cables At Pull Points For Damage Before Hi-Pot Test Performance

Pullby damage not penetrating the jacket was observed on two unidentified cables in a condulet in conduit MC926B. Also, abrasion damage penetrating the jacket but not the assembly wrap, shield or insulation was observed on one unidentified cable in junction box JB830 adjacent to conduit MC942B which forms a conduit pair with MC926B. Those cables (both active and abandoned, all of which pass through conduit MC926B) were dry hi-pot tested and successfully passed.

C. Inspection Of Cables That Were Too Short To Hi-Pot Test

Abandoned cables ABN2570B and ABN2571B (active numbers unknown) were removed from conduit MC1008B and visually inspected by TVA for pullby damage since they were too short to hi-pot test. These cables were cut off within the conduit run and therefore would not accommodate a hi-pot test. No pullby damage was observed, however, cable ABN2570B had a stretched jacket (narrowing down of outer jacket and cable identification print lettering distortion) at one point. By procedure, abandoned cables cannot be used in an active circuit without engineering approval. TVA is continuing its evaluation of ABN2570B as a part of the broad evaluation of cable defects found during cable replacement. However, since no evidence of damage inflicted as a result of pullbys was observed, subsequent evaluations of this cable will not impact the validation of the threshold between high- and low-risk pullby categories.

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LOW-RISK CABLE TEST ANOMALIES AND INSPECTIONS

SUMMARY

The cables noted in A and B above were successfully hi-pot tested since pullby damage was apparent to the cable jackets. Since no pullby damage was identified on cables noted in C above, hi-pot tests were not performed. The pullby damage found during the inspections of cable replaced in low-risk conduits or at pull points before hi-pot test performance would not have resulted in the cables' inability to perform their intended functions. The results of these inspections and tests have validated the threshold between high and low-risk conduits.

III. CONCLUSIONS

Pullby damage found in low-risk conduits during the testing and visual inspections would not have resulted in the cables being unable to perform their intended safety function. Cables having a high risk of sustaining pullby damage are being replaced. Cables from Brand Rex contract 80K6-825419 will perform their intended long-term and accident functions. The mechanically inflicted damage is considered isolated and therefore requires no further field action other than the replacement of those cables.

ENCLOSURE 2

LIST OF COMMITMENTS

1. Before fuel load, TVA will repair, replace, or rework the removed active cables as documented on their associated corrective action reports. (See Table 1 of Enclosure 1.)

2. Prior to fuel load, TVA will disposition the 2PV142B and ABN2570B cable anomolies as a part of the broader evaluations of defects found during cable replacement.