

Changes to Table 6. Summary of Aging Management Programs for the Electrical Components Evaluated in Chapter VI of the GALL Report (Chapter VI in GALL Vol. 2)

ID	Type	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Related Generic Item	Unique Item	Basis for Change
2	BWR/ PWR	Electrical cables, connections and fuse holders (insulation) not subject to 10 CFR 50.49 EQ requirements	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	No	L-01 LP-03	VI.A-2 VI.A-6	<p>Electrical failure is a loss of intended function potentially caused by an aging effect. It is not an aging effect and is not a term defined in Chapter IX.</p> <p>Connections already include fuse holders (insulation) and are managed by the same AMP. Since fuse holders (insulation) is already included under connection, there is no need to list fuse holders as a separate line item under VI.A.6 and generic item LP-03 since they are redundant.</p>

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3	BWR/ PWR	Conductor Insulation for electrical cables and connections used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements that are sensitive to reduction in conductor insulation resistance (IR)	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Electrical Cables And Connections Used In Instrumentation Circuits Not Subject To 10 CFR 50.49 EQ Requirements	No	L-02	VI.A-3	Component name changed for technical accuracy. Connections do not have a conductor, only insulation Electrical failure is a loss of intended function potentially caused by an aging effect. It is not an aging effect and is not a term defined in Chapter IX.

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4	BWR/ PWR	Conductor insulation for inaccessible medium voltage (2 kV to 35 kV) cables (e.g., installed in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements	<p>Reduced insulation resistance</p> <p>Localized damage and breakdown of insulation leading to electrical failure</p> <p>due to moisture and voltage stress</p> <p>intrusion, water trees</p>	Inaccessible medium voltage cables not subject to 10 CFR 50.49 EQ requirements	No	L-03	VI.A-4	<p>To accurately define the aging effect associated with m-v wetted cables. Reduced insulation resistance is also the term defined in Chapter IX.</p> <p>Electrical failure is a loss of intended function potentially caused by an aging effect. It is not an aging effect and is not a term defined in Chapter IX.</p>

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5	PWR	Connector contacts for electrical connectors exposed to borated water leakage	Increased connection resistance resulting from corrosion of connector contact surfaces due to intrusion of borated water	Boric Acid Corrosion	No	L-04	VI.A-5	To accurately define the aging effect associated with connector contacts exposed to borated water. The term increased connection resistance more accurately describes the actual aging effect resulting from corrosion of connector contact surfaces due to intrusion of borated water. Increased connection resistance is also the term defined in Chapter IX.

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6	BWR/ PWR	Fuse Holders (Not Part of a Larger Assembly): Fuse holders – metallic clamp	Increased connection resistance resulting from chemical contamination, corrosion, and oxidation or fatigue due to ohmic heating, thermal cycling, electrical transients, frequent manipulation, or vibration.	Fuse holders	No	LP-01	VI.A-87	<p>To accurately define the aging effect associated with the metallic clamp on fuse holders. The term increased connection resistance more accurately describes the actual aging effect resulting from chemical contamination, corrosion, and oxidation or fatigue due to ohmic heating, thermal cycling, electrical transients, frequent manipulation, or vibration. Chemical contamination, corrosion, and oxidation <u>do not</u> cause fatigue. Increased connection resistance is also the term defined in Chapter IX.</p> <p>Line item VI.A-6 was deleted so VI.A-7 now applies.</p>

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7	BWR/ PWR	Metal enclosed bus - Bus/connections	Increased connection resistance Loosening of bolted connections due to thermal cycling and ohmic heating	Metal Enclosed Bus	No	LP-04	VI.A- 11 10	To accurately define the aging effect associated with metal enclosed bus. The term increased connection resistance more accurately describes the actual aging effect resulting from a loosening of bolted connections. Increased connection resistance is also the term defined in Chapter IX. Loosening of bolted connections is to be deleted. Line item VI.A-6 was deleted so VI.A-10 now applies.

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8	BWR/ PWR	Metal enclosed bus – Insulation/insulators	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Metal Enclosed Bus	No	LP-05	VI.A- 4413	<p>To accurately define the aging effect associated with metal enclosed bus-insulators. Electrical failure is a loss of intended function potentially caused by an aging effect. It is not an aging effect and is not a term defined in Chapter IX. Reduced insulation resistance is the term defined in Chapter IX.</p> <p>Line item VI.A-6 was deleted so VI.A-13 now applies.</p>

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9	BWR/ PWR	Metal enclosed bus – Enclosure assemblies	Loss of material due to general corrosion	Structures Monitoring Program	No	LP-06	VI.A- 13 12	Line item VI.A-6 was deleted so VI.A-12 now applies.

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10	BWR/ PWR	Metal enclosed bus – Enclosure assemblies	Change in material properties Hardening and loss of strength due to elastomers degradation	Structures Monitoring Program Metal Enclosed Bus	No	LP-10	VI.A- 4211	<p>To accurately define the aging effect associated with metal enclosed bus-enclosure assembly elastomers. The term change in material properties more accurately describes the actual aging effect and encompasses other material parameters such as cracking, and shrinkage. Change in material properties is the term defined in Chapter IX.</p> <p>Line item VI.A-6 was deleted so VI.A-11 now applies.</p> <p>During conduct of XI.E4 inspections, accessible gaskets and sealants will be inspected for degradation which could permit water to enter the bus.</p>

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11	BWR/ PWR	High voltage insulators	<p>Reduced insulation resistance Degradation of insulation quality due to presence of any salt deposits and surface contamination; Loss of material caused by mechanical wear due to wind blowing on transmission conductors</p>	Plant specific	Yes, plant specific	LP-07 LP-11	VI.A-98 VI.A-109	<p>To accurately define the aging effect associated with h-v insulators. Reduced insulation resistance is also the term defined in Chapter IX. Degradation of insulator quality is to be deleted.</p> <p>Line item VI.A-6 was deleted so VI.A-8 & 9 now applies.</p>

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12	BWR/ PWR	Transmission conductors and connections; switchyard bus and connections	Loss of material due to wind induced abrasion and fatigue; loss of conductor strength due to corrosion; increased resistance of connection due to oxidation or loss of preload	Plant specific	Yes, plant specific	LP-08 LP-09	VI.A- 4615 VI.A- 4514	Line item VI.A-6 was deleted so VI.A-15 & 14 now applies. Fatigue will not cause loss of material.

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13	BWR/ PWR	Cable Connections – Metallic parts	Increased connection resistance Loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation	Electrical cable connections not subject to 10 CFR 50.49 environmental qualification requirements	No	LP-12	VI.A-1	To accurately define the aging effect associated with the metallic parts of cable connections. The term increased connection resistance more accurately describes the actual aging effect resulting from a loosening of bolted connections. Increased connection resistance is also the term defined in Chapter IX. Loosening of bolted connections is to be deleted.

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14	BWR/ PWR	Fuse Holders (Not Part of active equipment Larger Assembly) Insulation material	None	None	NA - No AEM or AMP	LP-02	VI.A- 76	To provide a technically accurate exclusion boundary for fuse holders. For AMR purposes, the term active equipment more closely aligns with the LR Rule than Larger Assembly. Line item VI.A-6 was deleted so a new VI.A-6 now applies here.