Critical Characteristics

Craig S. Irish

VP, Sales & Marketing

NUCLEAR LOGISTICS INC

Dedication 101

- Dedication in accordance with EPRI NP-5652 "Guideline for the Utilization of Commercial Grade Items in Nuclear Safety-Related Applications (NCIG-07)"
- NRC GL 89-02, Fraudulent Parts
- NRC GL 91-05, Endorsement of NP-5652
- Required to be used in conjunction with an approved "nuclear" QA Program (10CFR50 Appendix B, ASME NQA-1) and meeting requirements of 10CFR21

NLI
NUCLEAR LOGISTICS INC

Dedication 101 (cont.)

- At NLI, dedication of all items employs Method 1, “Special Tests and Inspections” at a minimum.
- Methods 2, “Commercial Survey of Supplier” and Method 3, “Source Surveillance” used on more complex dedications in conjunction with Method 1.
- Critical characteristics selected based on safety function of item.

NLI
NUCLEAR LOGISTICS INC

Dedication 101 (cont.)

- Potential failure modes used to help develop critical characteristics to determine adequacy of safety function.
- Known industry data is used as applicable to establish critical characteristics.
- CC's selected based on achieving a level of "reasonable assurance" that you have verified and accepted the items safety function.

NLI
NUCLEAR LOGISTICS INC

CC Selection

- Item: Molded Case Circuit Breaker (MCCB)
- Safety function: To reliably supply power to Class 1E loads and protect conductors and components from overload and short circuit.
- CC's: Selected based on potential failure modes of the MCCB which would adversely effect the safety function of the MCCB.

NLI
NUCLEAR LOGISTICS INC

Sample CC's for MCCB

- FM: Unable to hold rated current.
- CC: Hold in test at rated current.

- FM: Trip outside of published band on trip curve.
- CC: Thermal trip test at 200% rated current.
- CC: High current trip test at 600% rated current.
- CC: Magnetic trip test.
- CC: Thermal trip test at 300% rated current.

NLI
NUCLEAR LOGISTICS INC

Sample CC's for MCCB

- FM: Failure of MCCB accessories.
- CC: Accessory (shunt, bell alarm, aux. switch, UV coil) operate per design.

- FM: Breakdown of breaker insulation.
- CC: Dielectric strength and leakage resistance.

NLI
NUCLEAR LOGISTICS INC

Sample CC's for MCCB

CC's to Verify Qualification

- FM: Failure to perform during seismic event.
- CC: Configuration.
- CC: Dimensions.
- CC: Weight.

- FM: Failure to perform in harsh environment event.
- CC: Materials of construction.
- CC: CC's from seismic event above.

NLI
NUCLEAR LOGISTICS INC

Verification and Acceptance

- The CC's are verified and accepted by "Special Tests and Inspections".
- Tolerances are established for each CC based published values and plant application requirements for each respective CC.
- More complicated items such as chiller units, switchgear, large motors, etc. need to have CC's verified and accepted by more then just Method 1. Methods 2 and 3 must also be used in the dedication process.

NLI
NUCLEAR LOGISTICS INC

Complex Item Dedications

- Complex items may require the verification and acceptance of CC's during the design, manufacturing and factory testing of the item.
- Examples include:
  - Winding of motors
  - Assembly/FAT of switchgear breakers
  - Assembly/FAT of chiller units
  - Assembly/FAT of stationary batteries
  - Digital equipment

NLI
NUCLEAR LOGISTICS INC

Complex Dedications:
Lessons Learned

- Plant license extension and new build have changed the use of dedication to include very complex systems.
- Due to the complexity of the equipment it is not prudent to dedicate the system after fabrication is complete.
- Requires cooperation from the OEM to include dedication activities during the fabrication and also the design stage as applicable
- May require oversight (Method 2 or 3) at several key sub-vendors

NLI
NUCLEAR LOGISTICS INC