Verification and Validation of Circuit Interrupting Ratings for Low Voltage Protective Equipment

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Protecting People and the Environment

Purpose of Interrupting Ratings

The interrupting rating of a protective device provides assurance that for a given voltage and current, the device will be capable of interrupting a fault with a magnitude up to and including its rating, without significant damage to the protective device itself, or the emission of flame, hot gasses, or particles that could impact nearby equipment (specific language included in applicable standards)

Basis for Interrupting Ratings

- Plant specific licensing basis although most likely required for devices that provide 1E/non-1E isolation
- Lots of Operating Experience on this subject
  - NRC Information Notices
    - 2006-31 Inadequate Fault Interrupting Rating of Breakers
    - 2002-01 Metalclad Switchgear Failures
    - 1991-29 Deficiencies identified during NRC EDV inspections
  - NRC Generic Letter 88-15 Electric Power Systems – Inadequate Control Over Design Process
  - Recent Vendor Inspection NONs at AZZ and WECTEC

Applicable Commercial Standards

- Molded case circuit breakers – UL 489
- Low voltage circuit breakers – ANSI C37.50
- Class J and L current limiting fuses – UL 198C

Discussion Point - Establishment of Initial Interrupting Ratings

- Initial testing per UL/ANSI standards either by commercial OEM or dedicating entity
- Possible industrywide approach to accepting commercial UL/ANSI testing
  - Similar to ILAC for calibration laboratories
  - Need some nuclear industry oversight
    - Assessment of adequacy of UL/ANSI standard with regard to testing scope, sample size, frequency, requirements for retesting
    - Verification that standards have been met

Discussion Point - Verification of Interrupting Ratings as Part of Dedication Process

- Verification that no changes made to breakers that would invalidate interrupting ratings
  - Possible reliance on other non-destructive tests in combination with visual examination of key physical characteristics
- Breakers traceable to OEM report with verified C of C from OEM (need to develop standard language)

Challenges that Need to Be Addressed

- Access to commercial test reports
- How to address any weaknesses in commercial standards
- Supply chain verification issues when purchased from distributors
- Development of standard contract language (similar to ILAC)