PROCESS OF ELECTRICAL COMMISSIONING

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Presented By:
Catherine Melander, PE
LEED® AP
Presentation Overview

- Electrical Systems to be Commissioned
- Phases of Electrical Commissioning
  - Design
  - Construction
  - Acceptance
  - Post-Acceptance
Electrical Commissioning Process

**Design Phase**
- OPR Review
- Design Review
- Cx Spec
  - Sample Test Procedures
- Spec Coordination

**Construction Phase**
- Shop Drawing Reviews
- Field observation – early systems
- SC* coordination study review
- Final Test Procedures

**Acceptance Phase**
- Scheduling
- Testing
  - Installation
  - Electrical Integrity
  - Functional Testing

**Post-Acceptance Phase**
- O&M Information
- Testing

*SC – Short Circuit/ Overcurrent Coordination Study*
Electrical Systems to be Commissioned

- Normal Power Systems
- Emergency/Backup Power Systems
- Mission Critical Electrical Systems
- Lighting/Lighting Control Systems
- Grounding Systems
- Low Voltage Systems (Security, Telecom, Nurse Call)
- Fire Alarm
- Loss of Power Response
Electrical Systems to be Commissioned

LEED® Concerns

- Minimum LEED requirements for Electrical
- Lighting and Daylighting Control Systems
- Consider Commissioning of Measurement & Verification (M&V) Systems
Design Phase

- OPR and DID development
  - Mechanical – Room by Room Space Requirements
  - Electrical – Infrastructure focus - Overall System not Confined to Space Except for Lighting and Receptacles
Design Phase

Design Review

- Review Design against OPR and DID
- How does Electrical Commissioning get specified?
  - Specifications - General Requirements, Technical Specification Sections
  - InterNational Electrical Testing Association (NETA) Acceptance Testing Standard (ATS)
  - Tests, Results, Equipment, Reporting
  - Sample Test Procedures
  - Technical Specification Coordination
Design Phase

- Defining Test Requirements
  - Testing equipment
  - Specialized testing – Requires 3rd Party Testing Agency – Sometimes Certified Test Agency
  - Test equipment costly, Specify Early
  - Bulky and heavy test equipment – elevator access, long runs for load bank test cables
Construction Phase

Schedule Issues

- Scheduling Testing - Many tests performed prior to energization
- Destructive Testing (High Potential cable testing) – Contractor and Functional Performance Testing Concurrent
- Life Safety Systems – Authority Having Jurisdiction- Parallel Testing
- Electrical interruptions - avoid conflict with TAB and Mechanical functional performance testing
Construction Phase

- Early observation/testing – grounding, incoming power distribution
- Meet early with Electrical Contractor and Testing Agency
- SC* Study - Complete for Use During Testing Phase

*SC – Short Circuit/ Overcurrent Coordination Study
Acceptance Phase

Testing

- Installation
- Electrical Integrity
- Functional Performance Testing
  - Interfaces/integration to other systems (BAS, Security, Fire Alarm)
  - Ground Fault Protection System Testing
  - Double Ended Substation Auto Transfer Control Test
  - Lighting Control
Acceptance Phase

Electrical Cx Scheduling – When?

- Early testing – Grounding, Incoming Power (prior to energization)
- Emergency and Backup Power Systems (minimize conflict with mechanical and other testing)
- Life Safety and Low Voltage Systems
- Fire Alarm, Security, Nurse call
- Loss of Power Response Testing
Post-Acceptance Phase

- Some O&M information covers large parts of building facility
  - One–line diagrams cover entire facility – include many electrical components/equipment
  - SC* Study provided for entire facility

Post-Acceptance Phase Testing

- No Deferred Testing Typically
- Follow-up Testing (Infrared, Regular Code Required testing)

*SC – Short Circuit/ Overcurrent Coordination Study
Emergency Generator Systems

Mark A. Gelfo, PE, LEED AP, CxA

TLC Engineering for Architecture