

PROCESS OF ELECTRICAL COMMISSIONING

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Presented By:
Catherine Melander, PE
LEED® AP

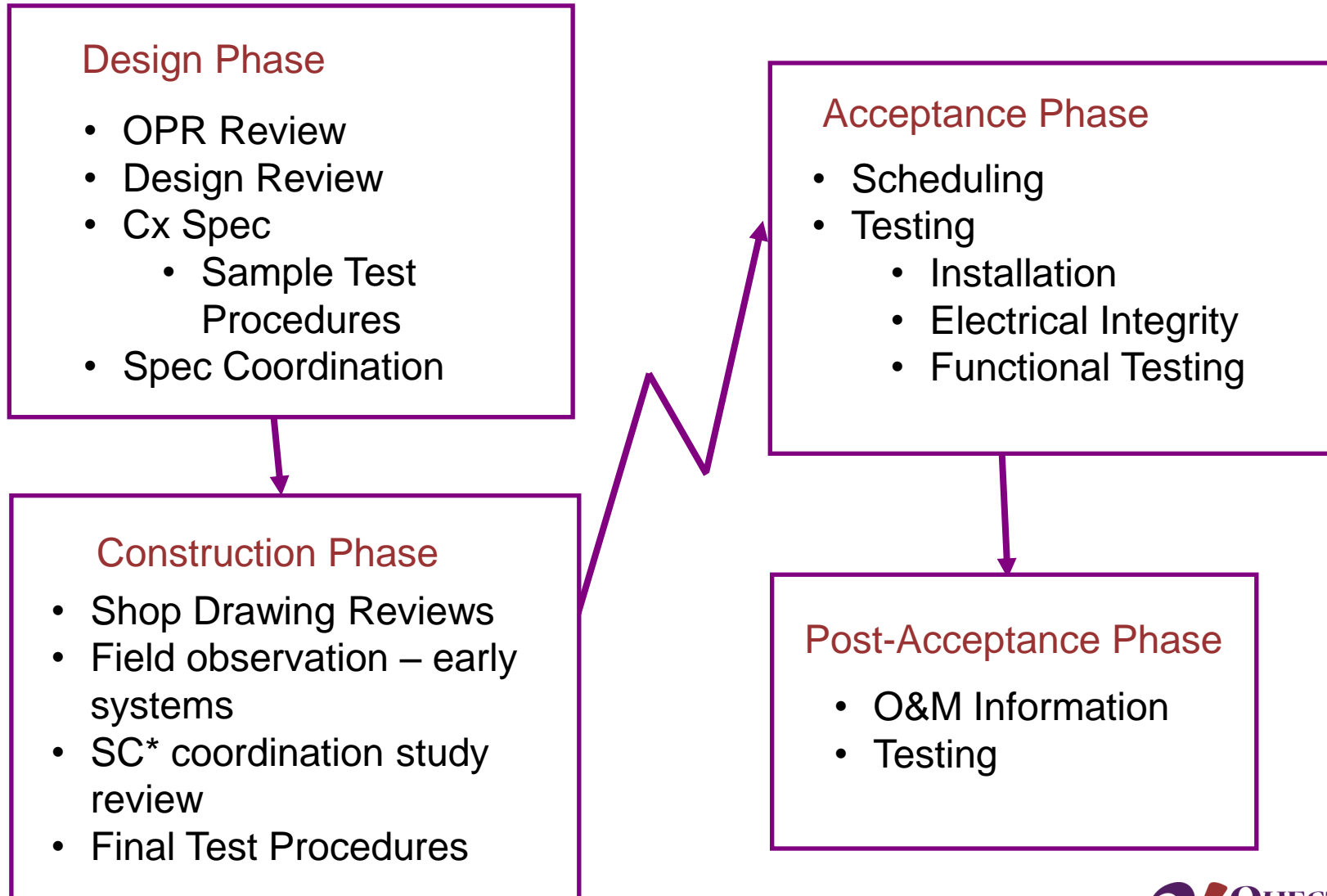


Presentation Overview

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



Electrical Commissioning Process



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