

WELCOME TO COMMISSIONING/ RECOMMISSIONING FOR LEED PROJECTS

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LEED Definition of Commissioning

- **“Verify that the building’s energy related systems are installed, calibrated and perform according to the Owner’s Project Requirements, Basis of Design and Contract Documents.”**

Who can be the LEED CxA?

LEED 2.2 New Construction EA PR1; C3
01/03/06 LEED 2.2 Subcommittee

Parting Acting as the Commissioning Authority (CxA)	Fundamental Commissioning Prerequisite [2,4, 5]		Enhanced Commissioning Credit [3 ,4, 5]
	<50k sf	.>=50k sf	
1. Employee of subcontractor of the General Contractor with construction responsibility	Y		
2. Employee or subcontractor, with construction responsibilities, or the Construction Manager (CM) who holds construction contracts	Y		
3. Employee or subcontractor, with project design responsibilities, or Architect or Engineer of Record (A/E)	Y		
4. Disinterested [I] employee or a subcontractor of The General Contractor or CM	Y	Y	
5. Disinterested [I] employee of the A/E	Y	Y	
6. Disinterested [I] subcontractor to the A/E	Y	Y	Y
7. Construction Manager not holding construction Contracts	Y	Y	Y
8. Independent consultant contracted to Owner	Y	Y	Y
9. Owner employee or staff	Y	Y	Y



Understanding the Basic Commissioning Process

Approaches

- **New Construction**
 - pre-design through occupancy & operations.
- **Existing Buildings**
 - **Retro-Commissioning**
 - In existing, non-commissioned buildings.
 - **Recommissioning**
 - In previously commissioned buildings.
- **Follow ASHRAE Guideline 0-2005.**

The Commissioning Process

New Construction

The Commissioning Process

The commissioning process involves steps that are integrated into every phase of the project:

- Pre-Design
- Design
- Construction
- Occupancy and Operations

Commissioning is NOT just test & balance at the end of a project.

The Commissioning Process

Pre-Design Phase

- **Select Commissioning Authority (CxA).**
- **Scope and budget for commissioning.**
- **Document Owner's Project Requirements (OPR).**
- **Create Commissioning Plan.**

The Commissioning Process

Design Phase

- Document Basis of Design (BOD).
- Refine scope of commissioning.
- Perform Design Reviews.
- Update Commissioning Plan.
- Include Commissioning requirements in specifications.
- Attend Pre-Bid Meeting.

The Commissioning Process

Construction Phase

- Perform/Observation test procedures.
- Documentation of deficiencies found during testing.
- Deficiency correction and retesting.
- Training of operation and maintenance personnel.
- Final report.

The Commissioning Process

Occupancy and Operations Phase

- Assist with maintenance management program.
- Adjust for occupancy/warranty period.
- Off-season tests.
- Possible “lessons learned” meeting.
- Warranty review session.
- Periodic recommissioning.

Typical Systems/Equipment to be Commissioned

Scope of work is usually determined by the Owner.
The following systems/equipment are typically included:

Mechanical Systems

- Heating, Ventilation, Air Conditioning (HVAC) (Ducting and Accessories)
- Piping Systems (Piping, Valves, Instrumentation, etc.)
- Plumbing (Piping, Valves, Equipment, and Fixtures)
- Direct Digital Controls (DDC) (Software Programming and Hardware)

Electrical Systems

- Switchgear/Transformers
- Grounding/Bonding
- Circuiting
- Lighting and lighting control

Specialty Systems

- Security Systems and Fire Alarm
- Voice/Data Systems



Systems/Equipment Required to be Commissioned for LEED NC-2.2 Projects

- Heating, ventilating, air conditioning (HVAC), refrigeration systems (mechanical and passive) and associated controls.
- Lighting and daylighting controls.
- Domestic hot water systems.
- Renewable energy systems (wind, solar, etc.).

Recommended, but not Required

- Water-using systems.
- Building envelope systems.

LEED Certification

Requirements/ Version 2.2

Energy and Atmosphere Prerequisite 1

Fundamental Commissioning of the Building Energy Systems

Requirements:

1. Designate Commissioning Authority (CxA).
 - a. CxA experienced in at least two building projects.
 - b. CxA independent of project design and Construction Manager (CM).
May be part of same company.
 - c. CxA reports directly to Owner.
 - d. Small Projects: Acceptable to have CxA as part of design or construction team.
2. CxA reviews Owner's Project Requirements (OPR) and Basis of Design (BOD).
3. CxA incorporates Commissioning (Cx) requirements into Contract Documents.
4. CxA develop and implement Cx plan.
5. CxA verify the installation and performance of the systems to be commissioned.
6. CxA to complete a summary Cx report.

LEED template letter is provided stating items have been completed.



Energy and Atmosphere Credit 3

Enhanced Commissioning/Version 2.2

Requirements:

1. Prior to start of Contract Document (CD) phase, designate independent Commissioning Agent (CxA). CxA to complete tasks 2, 3 and 6 as a minimum.
 - a. CxA experienced in at least two building projects.
 - b. CxA will be:
 - i. Independent of design and construction.
 - ii. Not an employee of the design firm, but may be contracted through them.
 - iii. Not an employee of the CM.
 - iv. Can be a qualified employee or consultant of the Owner.
 - c. CxA reports directly to the Owner.
 - d. Requirement has no deviation for project size.
2. CxA conducts as a minimum, one Cx design review of OPR, BOD and CD documents. Back-check the review comments.



Energy & Atmosphere Credit 3

Enhanced Commissioning/Version 2.2

Requirements (continued):

3. CxA reviews Contractor submittals for compliance with Owner's Project Requirements (OPR) and Basis of Design (BOD), concurrent with A/E reviews.
4. CxA develops a system manual for operating staff.
5. CxA verifies requirements for training operating personnel and building occupants.
6. CxA shall be involved with reviewing building operations within ten (10) months after substantial completion/with staff and building occupants. Include a plan for resolution of Cx issues.

Aids

BDS 15995, Commissioning:

- Establishes OSU's Commissioning standard
- General Requirements
- Defines Fundamental Commissioning
- Defines Enhanced Commissioning
- Establishes CxA Qualifications and Certification
- Lists Typical Systems/Equipment to be Commissioned
- Establishes Submittal Requirements for CxA and Commissioning Specialist
- Lists Who can be a CxA
- Establishes Sequencing and Scheduling
- Provides a Flow Chart for Commissioning
- Provides Checklists for Pre-Functional Performance Testing (Appendix A) (HVAC & Mechanical Systems, DDC Controls, Electrical Systems, and Fire Alarm)
 - Provides Checklists for Functional Performance Testing (HVAC and Mechanical Systems, DDC Controls, and Fire Alarm)



Building Commissioning Association

Recommendations:

1. Commissioning Agent (Cx) should be a member of the Building Commissioning Association (BCA).
2. Owner's Representative and OSU Architectural & Engineering Services Coordinator should take advantage of BCA training.

Questions?