

# Building Commissioning Requirements

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# Commissioning Requirements

## GS 143-135.37d Summary

- ❑ Each building and energy and water system component to be commissioned.
- ❑ Start no later than the schematic design phase of the project.
- ❑ Continue through the initial operations of the building.
- ❑ Public agency determine what level of commissioning is appropriate.

# SCO Commissioning Guidelines

- ❑ Developed in sub committee by members of NCCX (NCCX.org) an ad hoc Cx committee. Committee members from State Universities, SCO, Agencies and private sector.
- ❑ Used ASHRAE guidelines on the commissioning process as a reference.
- ❑ Reviewed with input by main committee.

# What is Commissioning (Cx)

Commissioning is a quality assurance process that verifies and documents that buildings and components and systems operate in accordance to the owner's project requirements and the projects design documents.

# 3<sup>RD</sup> Party, Independent Commissioning Authority

- The Commissioning Authority (CxA) is independent of the design team and construction contractors

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- CxA is an agent of the owner
- CxA required on larger, more complex projects

# When a CxA is required

- Building is over 40,000 gsf. Some exceptions being warehouses, storage and utility buildings, etc.
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- Building contains central energy equipment such as chillers and boilers.

# When a CxA is required

- ❑ Buildings greater than 20,000 gsf and less than 40,000 gsf that are complex in nature, such as data centers and laboratories
- ❑ Building renovations that are over 20,000 gsf and cost more than 50% of insurable value of the building

# Systems that are Commissioned if a CxA is required

- ❑ Mechanical - HVAC equipment and controls, heat recovery and renewable energy systems, laboratory systems, TAB validation.
- ❑ Electrical - Lighting controls and renewable energy systems.
- ❑ Plumbing - Potable hot water systems, rain water, gray water and irrigation systems.

# Buildings and Systems not requiring Independent CxA

- Designer lead Cx will be used on projects that the guidelines do not require a CxA.
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- Other systems such as building envelop, emergency or standby power systems, data communications, A/V equipment can be commissioned by designer or by CxA. Life safety requires 100% verification by the designer.

# Commissioning Authority (CxA) Selection

- Recommend CxA selection in Pre-design, must be hired by Schematic Design
- CxA must be a registered engineering firm in NC
- CxA is a qualifications based selection process

# Commissioning Authority (CxA) Selection

- ❑ Guidelines give a list of 10 attributes to consider in selection the CxA
- ❑ The CxA contract is in a form of a letter agreement approved by SCO
- ❑ For complex projects owner may want to consider a two part contract, Design phase part and a Construction and Occupancy phase part

# Cx Process and CxA Responsibilities - References

- ASHRAE Guideline 0-2005, The Commissioning Process

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- ASHRAE Guideline 1.1-2005, HVAC&R Technical Requirements for the Commissioning Process

# CxA Responsibilities – Design Phase

## Includes

- ❑ Help the owner to develop and maintain the Owner's Project Requirements (OPR)
- ❑ Review SD, DD and CD documents
- ❑ Provide design team draft commissioning specifications
- ❑ May provide a sample of testing required to help inform contractors of typical assistance required

# CxA Responsibilities – Construction Phase

## Includes

- Review equipment submittals of systems to be Cx
- Review contactors start up tests
- Verify TAB effort
- Write and conduct functional testing of systems requiring Cx
- Review O&M manuals, as built documentation, and training agendas

# CxA Responsibilities – Occupancy Phase Includes

- ❑ Opposite seasonal testing
- ❑ 10 month warranty review
- ❑ May assist the owner with 12 month building measurement and verification of energy performance

# Designer Responsibilities – During Cx Process Includes

- Participate in the entire Cx process.
- Maintain and update the Basis of Design document throughout the project.  
Provide Basis of Design document training to facility personnel at completion of the project.

# Owners Responsibilities – During Cx Process Includes

- A representative of the owner who will be responsible for the O&M of the building will be involved in the entire Cx process
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- Owner's assigned project planning and Capital Project Coordinator(s) will also participate in all Cx phases

# Building Performance Verification

# Bldg Performance Requirements

## GS 143-135.37e Summary

- Each building shall have a separate meter for electricity, natural gas and fuel oil, and water utility entering the building.
- Starting with the first month of operations the public agency shall collect data for the first year of operations.

# Bldg Performance Requirements

## GS 143-135.37e Summary

- The public agency shall compare actual energy and water consumption with the predicted energy and water usage and report findings to SCO.
- If energy or water usage exceeds predicted usage by more than 15%, the public agency shall determine cause of discrepancy and recommend corrections to meet the standard.

# Building Performance Verification Designer Responsibilities

- Designer ensures all energy and water input is metered to meet requirements of the legislation, including both utility and central plant provided services
- Designer determines if sub metering is required in more complex projects to help evaluate future building performance

# Building Performance Verification Designer Responsibilities

- Develop a Measurement and Verification Plan in DD phase and update and finalize in the CD phase
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- Where applicable the CxA will review the plan to ensure all applicable and needed building parameters are monitored and measured

# Building Performance Verification Owners Responsibilities

- Responsible for collecting and validating all utility metering data and where applicable sub metering and BMS data
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- After 12 months of operations compare actual energy and water usage with energy model results and assumptions

## □ Maybe Some Examples

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# Building Performance Verification Owners Responsibilities

- If water or energy use exceeds model projections by 15%, investigate and resolve any issues found, or recommend future corrections or modifications
- Provide a performance report within 60 days of 12 month verification period to State Construction and State Energy Offices

# Additional Information

NCCX Web Site - [NCCX.org](http://NCCX.org)

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