WHY? --- COMMISSIONING

GOALS

- Improve system performance
- Lower operating and maintenance costs
- Lower repair costs
- User comfort, safety & IAQ
- Owner quality verification
- Conforms with design intent
CONSTRUCTION PROBLEMS

- Commissioning Schedule & Cost
- Design deficiencies
- Construction deficiencies
- Product quality
- HVAC controls operation
- Energy
FIGURE 1

NOTE: CONTROLS COMM & TAB CAN BE CONCURRENT. THE PVT SHALL BE PERFORMED AFTER COMM AND TAB.
NOTE: PRE-COMMISSIONING CHECKLIST MAY BE DONE AT APPROPRIATE TIME DURING CONSTRUCTION

FIGURE 2
INTRODUCTION

- Building commissioning - HVAC, plumbing, electrical, fire protection
- Pre-design, design, construction, acceptance, post-acceptance
ASHRAE GUIDE 1-1996

- Pre-design Planning
- Design BCO Reviews
- Construction QA/QC
- Acceptance Final Testing
- Post-acceptance Warranty
Commissioning team

Required @ contract completion

After 15950 & 15990 is complete

After all tests, reports & O&M Manuals

Repetitive inspection & testing

Pre-commissioning checklists

Functional performance checklists
Installation Checklist

Required by Contract at Job Completion

Should be Performed as Scheduled?

Perform Control & Electrical Testing Later?

Contractor to Complete Master Checklist
FUNCTIONAL PERFORMANCE

- System Testing Checklist
- COE Requires Repetitive Testing
  - Pre-commissioning Checks
  - Functional Performance Tests
- Other tests are independent from 15995
- Tests aborted if not completed correctly
- Contractor covers cost of retesting
- One Complete Certified Test?
FUNCTIONAL PERFORMANCE Cont.

- All items listed on checklists
- Test only after Pre-com completed
- Prove all modes of sequence/operation
- Verify all relevant contract requirements
- Start with equipment/components
  - Progress through subsystems
  - To complete systems
- Correct all failures retest w/no errors
Commissioning Team

- Contractor/QC
- Contractor/Mechanical
- Contractor/TAB
- Contractor/Controls
- Contractor/Electrical
- Designers Agent
- COR
- User/Owner
TESTING

- Mechanical System
- HVAC System
MECHANICAL SYSTEMS

- Cooling
- Heating
- Air distribution & TAB
- Controls & EMCS
- IAQ
- Energy
MECHANICAL SYSTEMS

- Refrigeration systems
  - Chilled water pipe testing
  - Backflow prevention device
  - Refrigerant pipe testing
  - Cooling tower tests
  - System performance tests
  - Condenser water quality tests
  - Inspections after first year
MECHANICAL SYSTEMS

- Hot water heating systems
  - Backflow prevention device
  - Test during winter conditions
  - Pressure test piping system
  - Operational test
  - Water treatment test
  - First year boiler/piping inspection
  - Boiler flushed and cleaned
MECHANICAL SYSTEMS

- Air supply and distribution
  - Ductwork leak test
  - Cleaning and adjusting
  - TAB
  - Performance tests
  - Field training
HVAC SYSTEMS

- Control systems
  - Start-up Test
  - Coordination with hvac balancing
  - Calibration, adjustment and start-up
  - Performance verification test
  - Posted and panel instruction
  - Training course
FUTURE WHERE ARE WE GOING?

100% Design Build (Transformation)

- 30 page RFP (No user requests)
- All COE Guide Specifications eliminated
- Design Review 95% (1-2 day only)
- A/E responsible for QA
- Delete contractor supplemental QC’s
- COE become Code Inspectors
- Very few submittals
- Build it like downtown (type 5 construction)
HVAC Commissioning per ASHRAE 1

- States it is for Design-bid-build
- Commissioning Agency is independent contractor and works for owner under separate contract
- Includes other systems besides HVAC
- Commissioning Agent starts at design through construction to acceptance to post acceptance commissioning
- What role for COE?
HVAC Commissioning per NEBB, AABC, or TABB

- Contractor required to hire Commissioning Agent
- Increase Contract Cost
- Includes other systems besides HVAC
- Commissioning Agent starts at design through construction to commissioning to post commissioning (off season testing)
- What role for COE?
FUTURE WHERE ARE WE GOING?

- **OVERVIEW**
  - Appears that COE not responsible for quality
  - Appears COE responsible for acceptance testing
  - Since Contract oversight minimized, S&A may be reduced
  - Reduce & consolidate design sections throughout COE. Standardized RFP’s, very little design review, and hardly any in-house design
  - Customer Satisfaction?