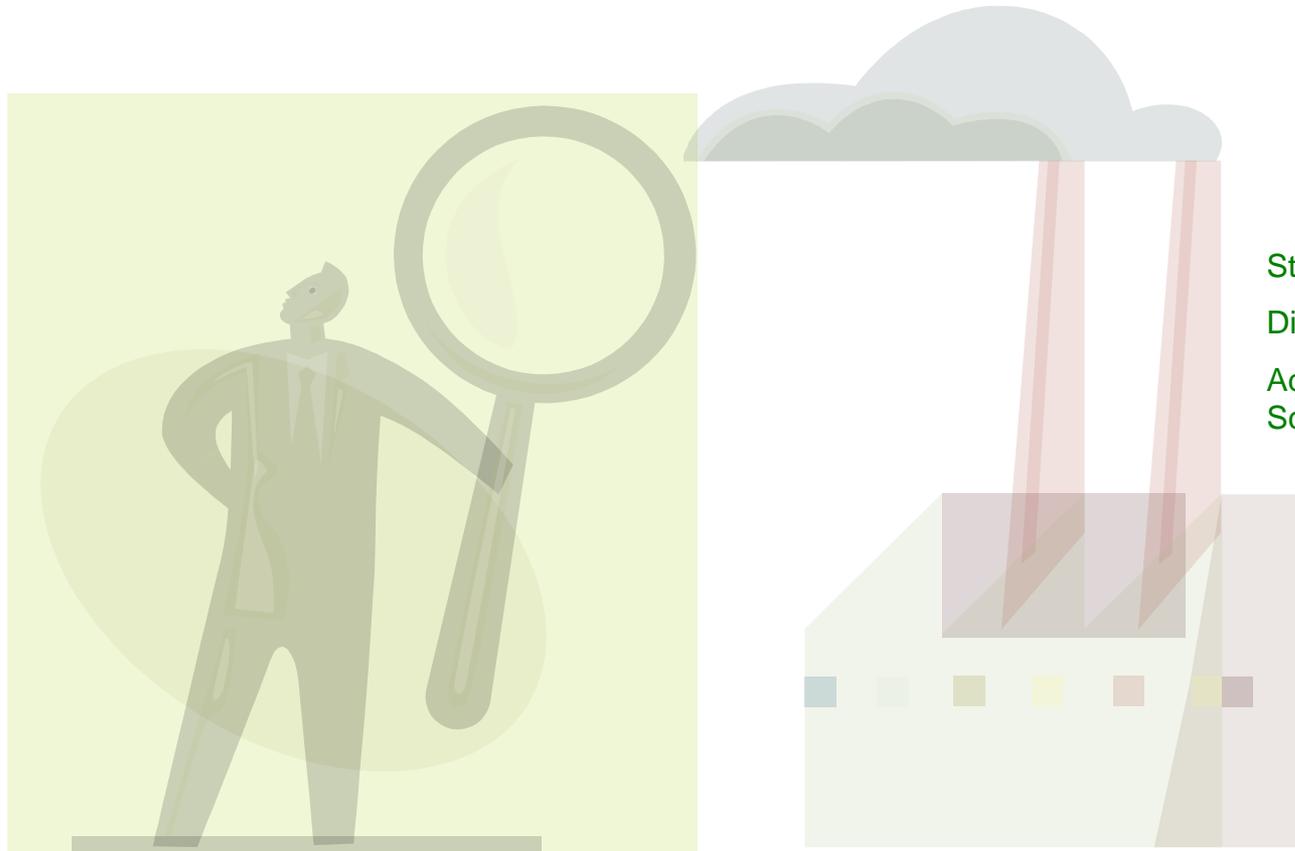


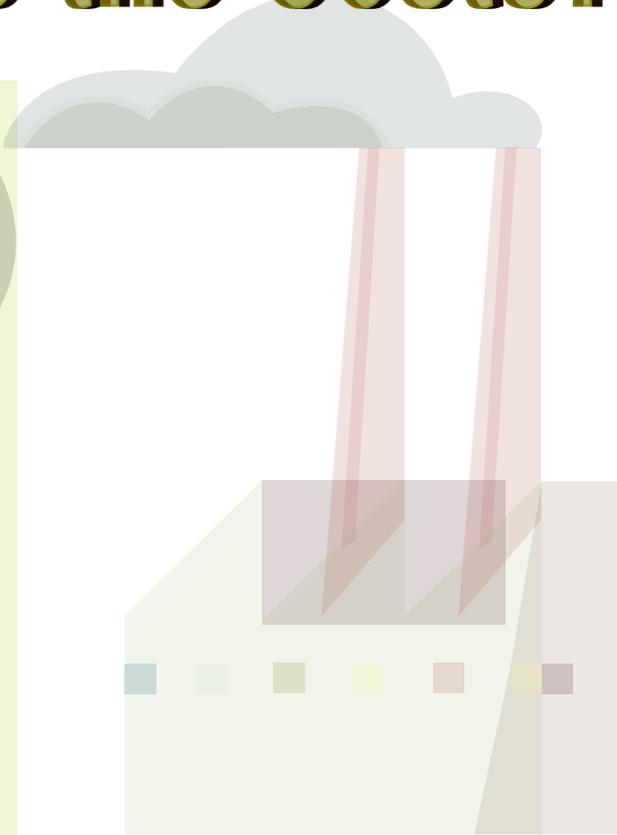
Commissioning



Steve Wolfe, LEED AP
District Facilities Manager
Adams Co. / Ohio Valley
School District

**Securing a High Performance
Building**

What is Commissioning? What Are the Costs?



What Are the Benefits? (\$\$)

What is Commissioning?



Building commissioning is the process of ensuring that all the subsystems for **HVAC**, Plumbing, **Electrical**, Fire/Life safety, Security, and **Building Envelope** are operating as intended by the building owner and as designed by the building architects and engineers.

What is Commissioning?



- **New Building commissioning**

- *New Construction*

- **Retro commissioning**

- *Existing Building- Never Previously commissioned*

- **Re-commissioning**

- *Existing Building- Previously commissioned*

- **Continuous commissioning**

- *Ongoing- Part of O&M*

Types of Commissioning



•New Building commissioning

Commissioning Process Overview

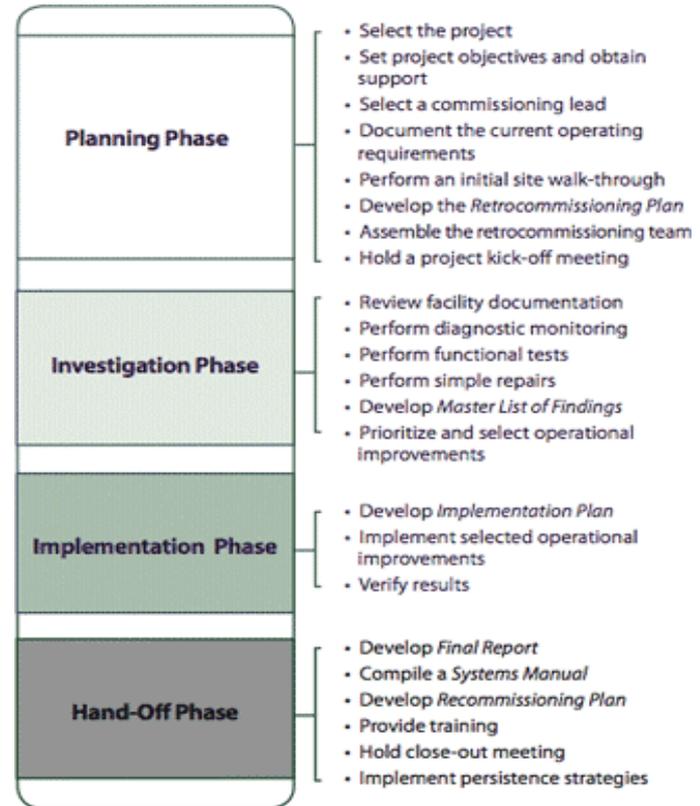


Types of Commissioning



•Retro-Commissioning/Re-commissioning/Continuous Commissioning

Retrocommissioning Process Overview



What Commissioning-

IS

- Engaging a commissioning authority and team
- Documentation
- Verification procedures, functional performance tests, and validation
- Training

IS NOT

- Construction observation (punch list)
- Start-up
- Testing, adjusting, and balancing (TAB)
- Final punch-out

Who Performs the Commissioning?



The Commissioning Authority is responsible for overseeing and executing the entire commissioning process.

The Commissioning Authority should be an independent third party, knowledgeable in the design, construction and operation of engineered systems.

Cost of Commissioning



Cost of Commissioning

A 2004 report² showed that, on average, the **cost of performing commissioning was paid back in 4.8 years from energy savings alone.** When other benefits were accounted for (from improved equipment lifetimes, reduced change-orders due to early detection of problems, prevention of premature equipment breakdown by timely correction of problems, reduced operation and maintenance costs, and improved indoor environment), **they essentially offset the entire cost of new-building commissioning.**

SOURCE: The Cost-Effectiveness of Commercial-Buildings Commissioning: A Meta-Analysis of Energy and Non-Energy Impacts in Existing Buildings and New Construction in the United States, Report Number 56637, Lawrence Berkeley National Laboratory, Portland Energy Conservation Inc., Texas A&M University Energy Systems Laboratory, December 2004.

Cost of Commissioning

In the 2004 study referenced the median cost for new-building commissioning was \$1.00/square foot (0.6 percent of total construction costs).

OSFC Projects pay about .30/ SF

BCA estimates average cost to be between .5% and 1.5% of total project cost.

Cost of Commissioning



Compare the cost of commissioning against the cost of NOT commissioning.

Georgetown Exempted Village School District



- Constructed new elementary in 2006
- Remodeled high school building in 2006
- Both buildings commissioned as part of OSFC construction project
- Both buildings became Energystar® labeled facilities in 2008.
- The utility spending for the new elementary was \$36,000 less in the first year of operation than what had been predicted by building designers and engineers.
- This district became the first school district in Ohio to receive the Energystar® LEADERS award.



Adams County / Ohio Valley School District



- Three high school buildings built in 1997.



- In 2007 the district began a retro-commissioning effort.
- In 2008 each building became Energystar® labeled and demonstrated a +20% reduction in gas and propane use.



- The combined utility spending for these three buildings was \$100,000 LESS in FY2009 than in any previous year dating back to 1997.
- In 2009 this district became one of only 11 school districts nationwide to be selected for participation in the LEED for Existing School Buildings Pilot Program Grant.

Adams County / Ohio Valley School District



Three new elementary buildings completed construction in December 2009.



The buildings were commissioned in accordance to the Ohio School Facilities Commissions “Enhanced Commissioning Guidelines”.

This commissioning covers mechanical, electrical, and building envelope systems.

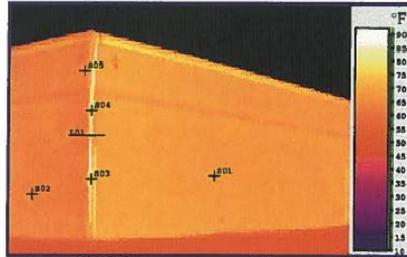


These buildings have a geothermal hydronic system, daylight harvesting, and a host of other energy saving design aspects that depend on a careful commissioning effort to ensure they operate correctly.

Incident Summary	
Location	Exterior elevation
Equipment	Wall
Incident Date	12/1/2009 9:14:47 AM
Recommendation	Inspect
Severity	Low
Units	°F
Global Emissivity	1.00

Inspection Detail	
Component Temperature	69.4
Reference Temperature	63.2
Temperature Rise	20.1
Component Emissivity	0.90
Background Temperature	43

IR image file: c42.eif

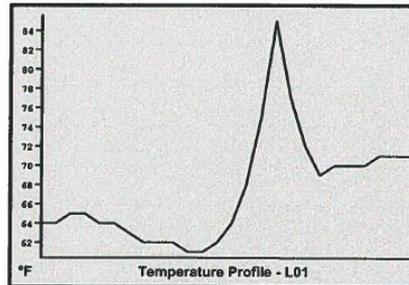


Visible Image file: c42 VIS.JPG



Comment: -- Inspect corner of wall for adequate seal. Repair as required.

Measurement Tool	Material	Emissivity	Temperature
S01	Wall	0.90	69.4 °F
S02	Wall	0.90	63.2 °F
S03	Inspection area	0.90	78.2 °F
S04	Inspection area	0.90	77.8 °F
S05	Wall	0.90	62.7 °F



Additional Finding Data	
Distance to finding(s)	77 ft
Airspeed @ finding area	8 mph
IR thermometer reading	67 deg f @ wall
RH Outside / Indoor	51% / 40%
Air temp Outdoor / Indoor	36 / 70
Adams County/CTC	Facility
Michael D. Spaulding	Thermographer
Snell # 091023-7	ITC # 25100

Facility Evaluation Report



Adams County School District - CTC

Finding

Schedule exception did not function.

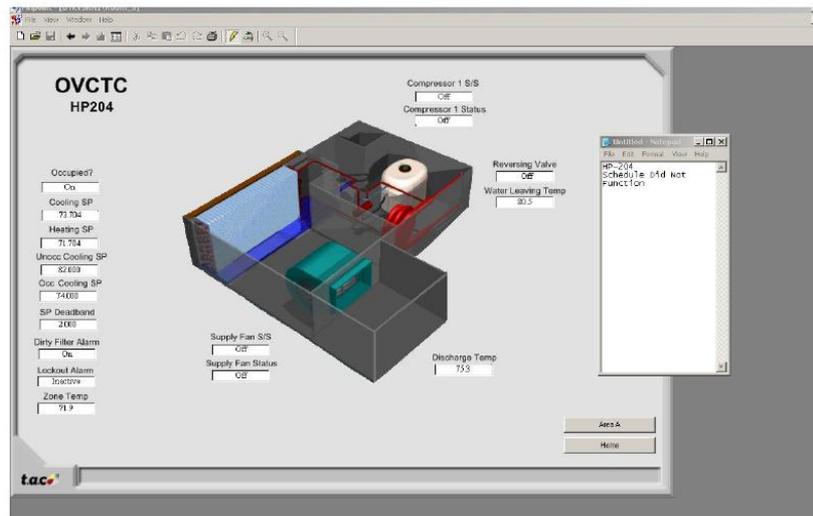
Risk

Poor control - energy penalty.

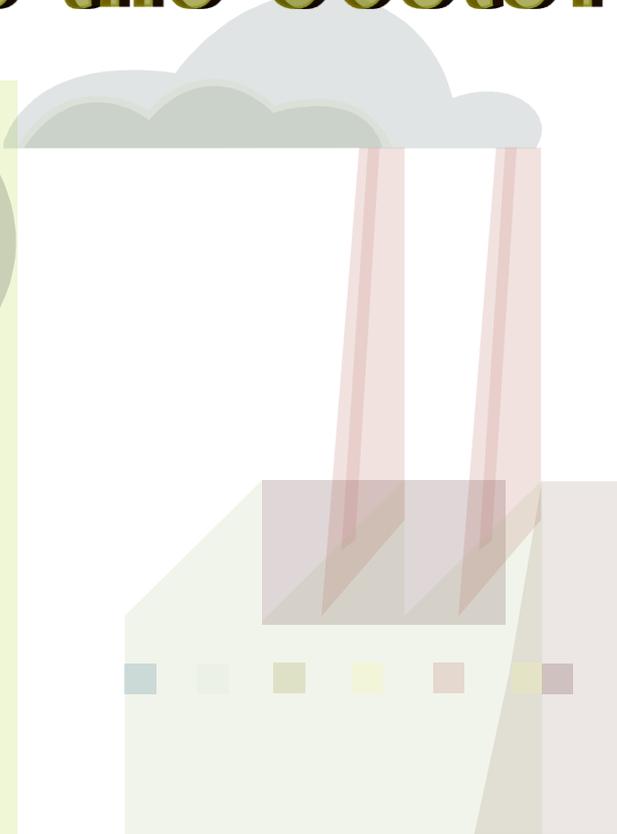
Recommendation

Repair

Asset Name *HP-204-FPT-1* Responsible Contractor *C*



What is Commissioning? What Are the Costs?



What Are the Benefits? (\$\$)

Benefits of Commissioning



• Financial Benefits

- Lower Utility Cost
- Lower Repair Cost
- Longer Asset Life Cycle
- Decreased “down time”

• Environmental Benefits

- Lower energy use results in less co2 emissions in the production of electricity
- Increased workplace occupant comfort
- Better Indoor Air Quality / Healthier Workplace

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