



Transitional Operations:

Guiding Owners Through Start-up Operations and Regulatory Compliance

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Commissioning

The process of ensuring that systems are designed, installed, functionally tested, and ***capable of being operated and maintained to perform in conformity with the design intent...***

- ASHRAE Guideline 1 - 1996

Commissioning Process

A quality-based method that is adopted by an Owner to achieve successful construction projects.

- ASHRAE Guideline 0 - 2005

The economic benefits of commissioning lie in avoiding the added costs associated with non-commissioned facilities.

Benefits to Owners

- Better documentation of the Owner's needs
- Fewer unidentified deficiencies at takeover
- Systems operate at maximum energy efficiency
- Better trained operators
- Saves Money!

Benefits to Designers

- Clearer understanding of Owner's needs reduces re-design work
- Independent design reviews reduce RFIs
- Feedback on actual systems operability – lessons learned to take to the next project.

Benefits to Contractors

- Better design documents
- Early identification of issues reduces re-work
- Clear documentation of system functionality at turnover
- Reduced warranty call-backs

When to Use Commissioning

- Technically complicated facilities like laboratories, or health care facilities
- Typical Project Size
 - \$3,000,000+
- Engaged early by the owner is best
 - Pre-design (preferably)
 - Assist in programming
 - OPR Workshop
- Specific tasks defined for each phase

When to Use Commissioning

- Typical Project Scope
 - Mechanical (*chillers, boilers, VAVs*)
 - Controls (*BAS, power monitoring*)
 - Electrical (*switchboards, transformers, generators*)
 - Life Safety (*Fire Alarm, emergency lighting*)
 - Security (*card readers, door alarms, CCTV*)
 - Building Envelope

Commissioning Firm Qualifications

- History of the firm
- Evidence that commissioning is a principal enterprise of the firm
- Experience with the type of facility being built
- Commissioning expertise and capability
- Local experience over the last five (5) years on projects of similar size and scope

Commissioning Firm Qualifications

- Prior commissioning reference contacts
- Resumes of key (commissioning) management personnel and their positions
- Professional liability insurance

Commissioning Authority Qualifications

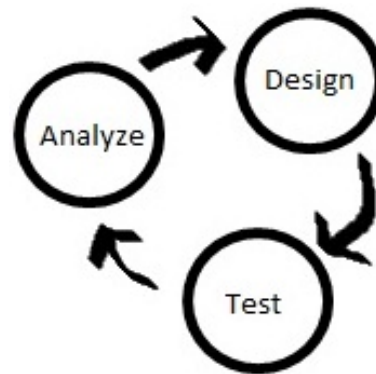
- Minimum 5 years commissioning experience
- Certification by a nationally recognized authority
 - Building Commissioning Association (BCA)
 - University of Wisconsin (Department of Engineering Professional Development)
 - AABC Commissioning Group (ACG)

Cost of Commissioning

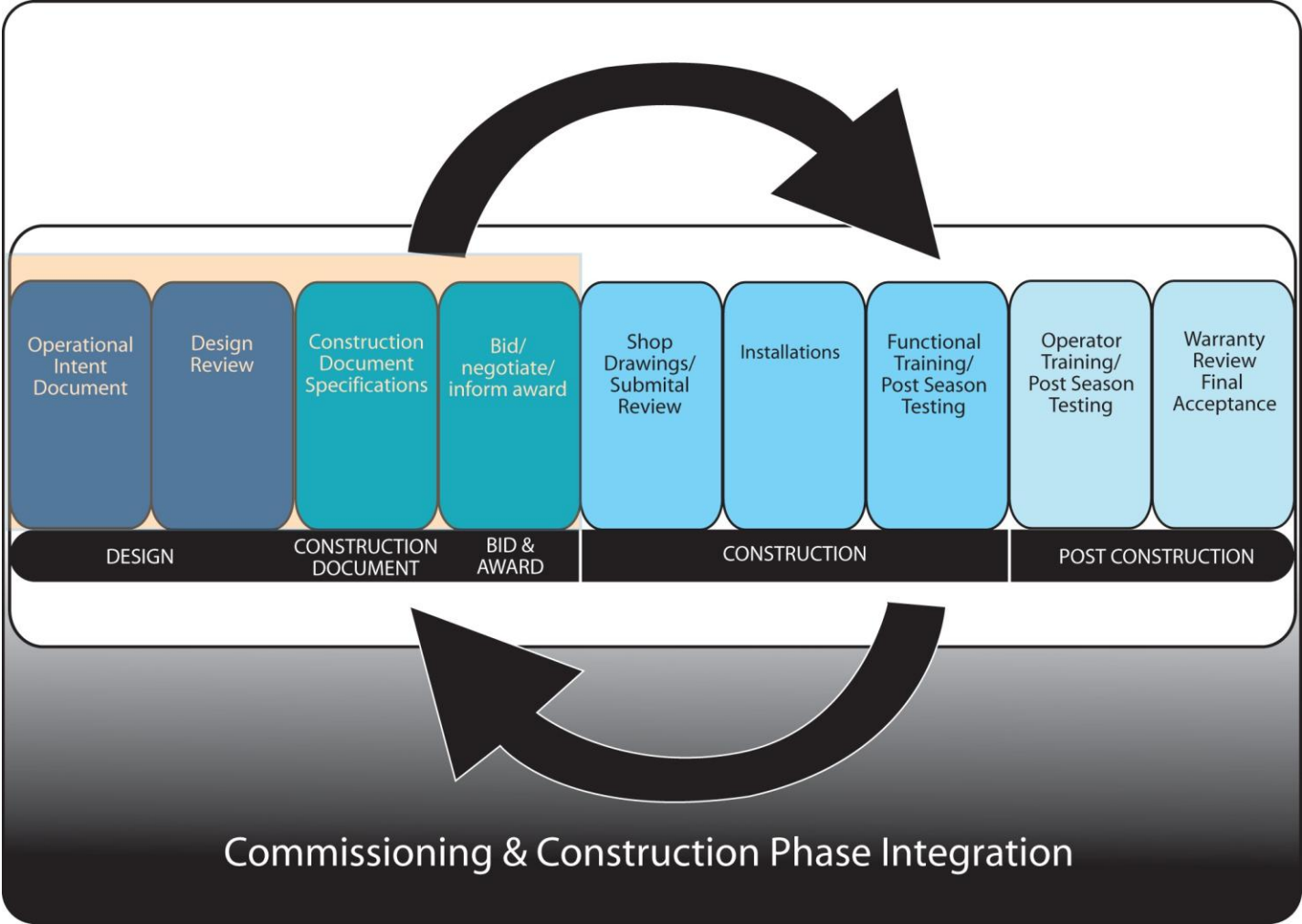
- 0.5% - 1.5% of the total construction
- 2% - 3% of mechanical construction
- 1% - 2% of electrical construction
- Avg \$1.00 per square feet

Program Phase

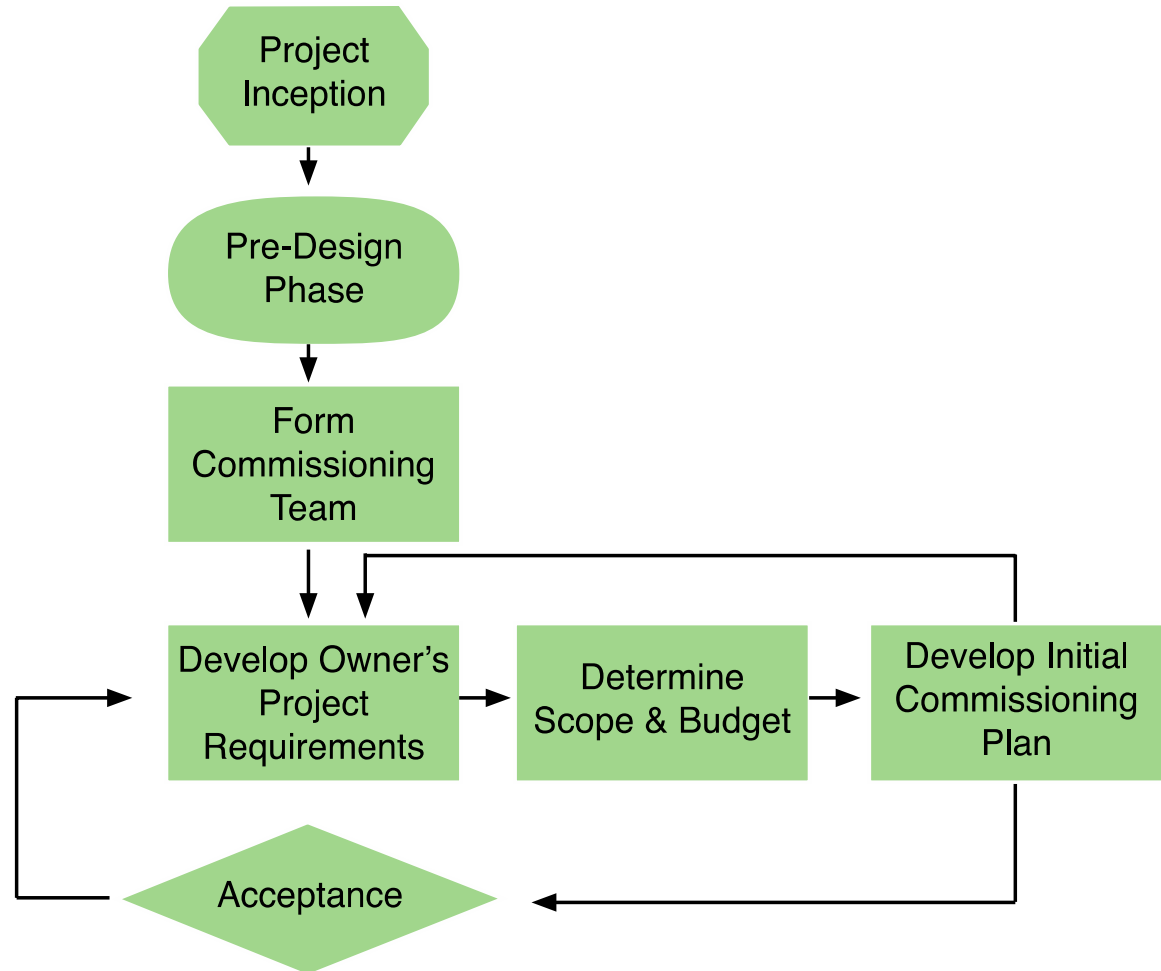
- Owner's ***Program of Requirements***
- Documentation of the ***Design Intent***
Preliminary ***Commissioning Plan***



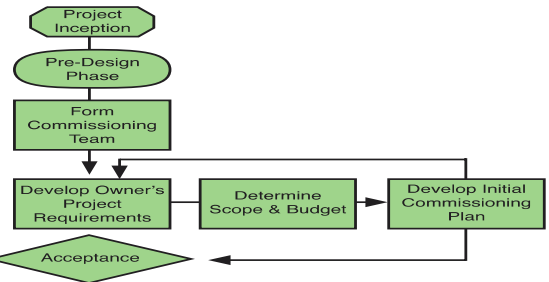
Integrate The Process



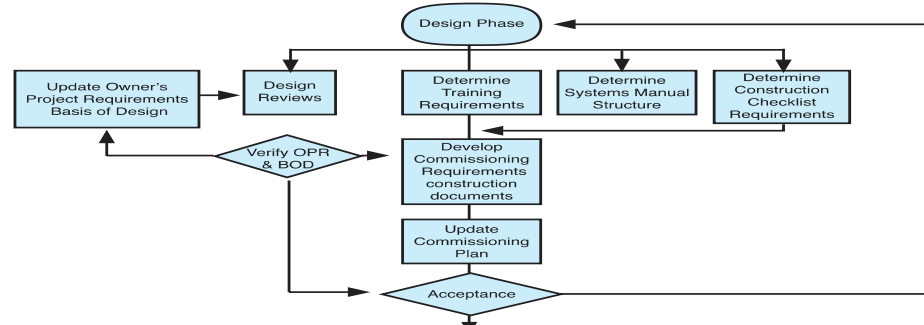
Pre-Design Phase



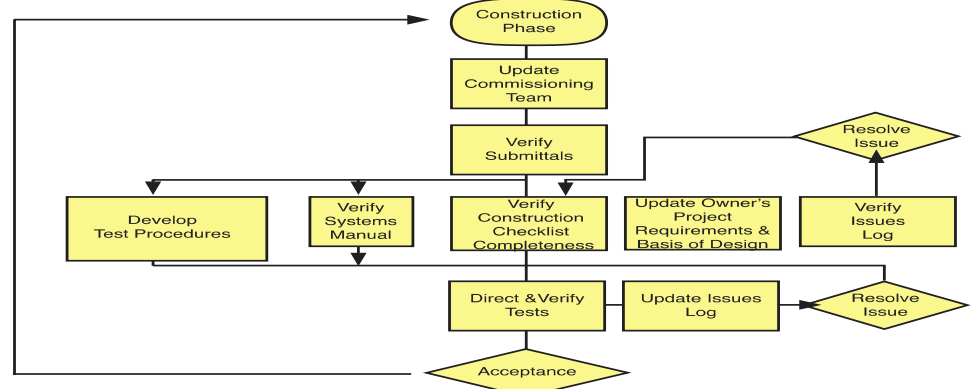
Pre- Design



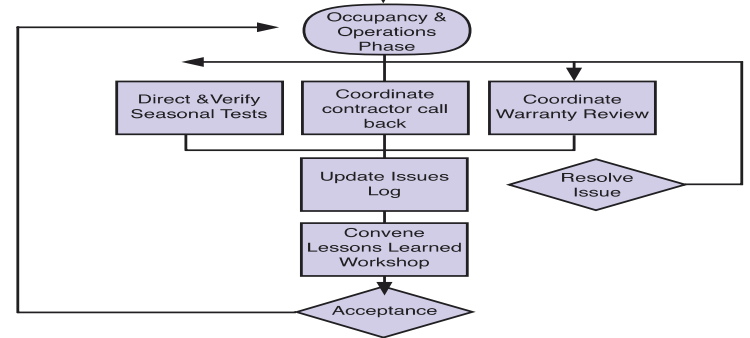
Design



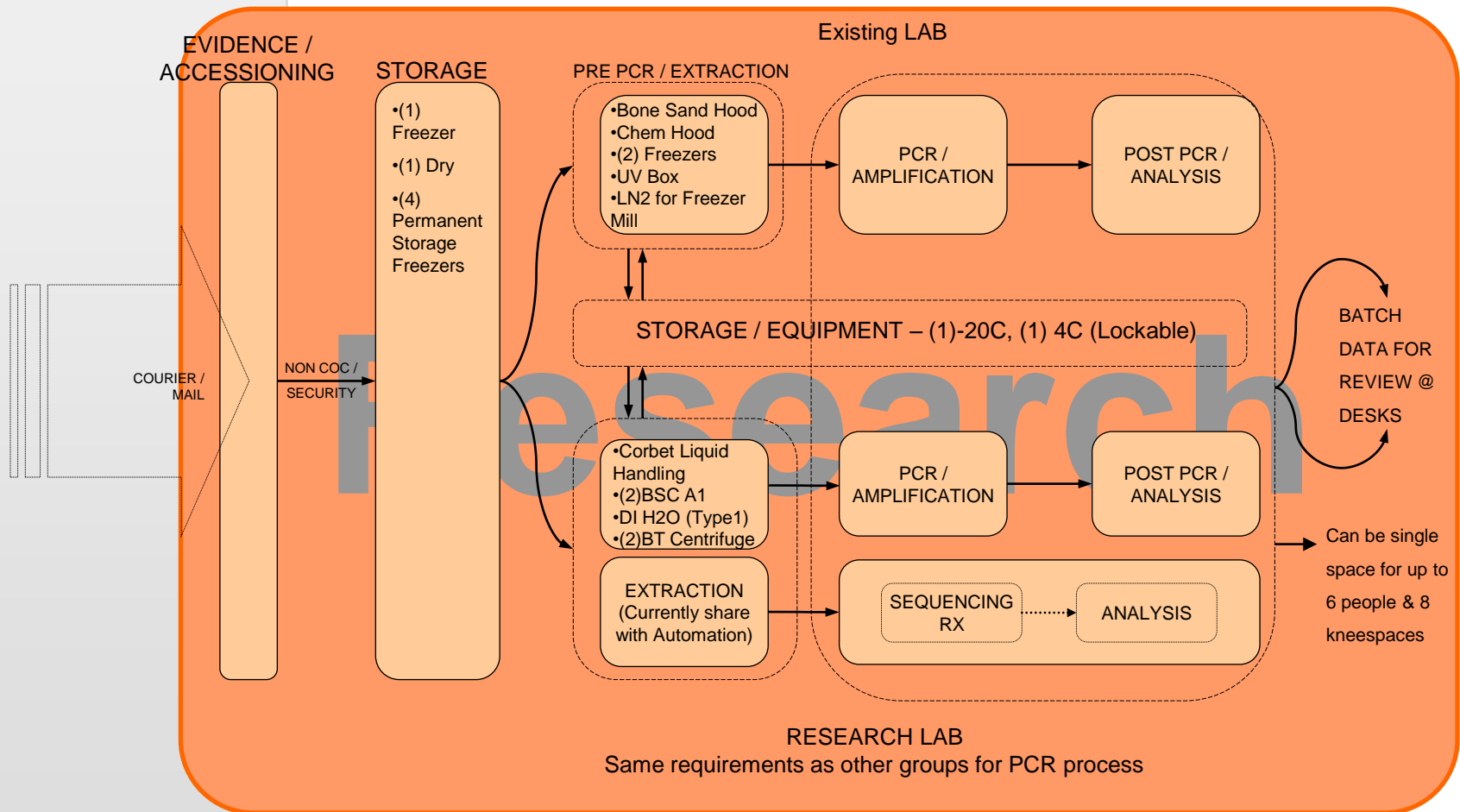
Construction



Occupancy

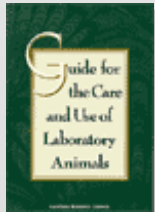
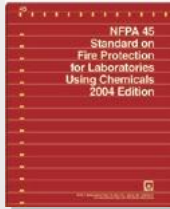


Process Flows & SOPs



Design Phase Narrative

- Mission, Goals & Meeting Minutes
- Service/Research Definition
- Regulatory Compliance
- Standard Operating Procedures (SOPs)
- Equipment Cut Sheets & Coordination
- Waste Handling
- Materials Receiving
- Inventory Control
- Security
- Staffing & Scheduling
- Service Contracts
- Community Outreach Initiatives
- Existing Utilities & Providers
- Internal Design Standards



Designer Compliance Discussions

- Complexity of the Design
- Can the institution maintain the intended design concept
- Cost of operation the facility
- Ways to reduce cost of overhead and maintenance





Design Phase

- Protocols/PPE
- Security paradigm
- O&M
- First responder coordination
- Inventory and equipment analysis
- Contract services providers
- Equipment coordination

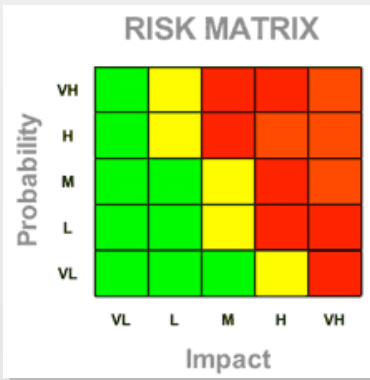


Owner Compliance Discussions

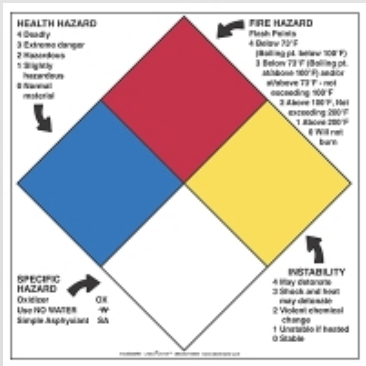
- What agents will be used? In vivo/In vitro
- Volumes & concentrations
- Volumes & types of chemicals
- Work or process flow
- Is this an organization with “*Institutional Control*”?



Owner Compliance Discussions



- Review existing state regulations & identify if they go beyond federal regulations (i.e., waste disposal)
- Review copies of existing policies and procedures
- Review existing operational documents
- Identifying appropriate SOPs, PPE and protocols based on risk assessments





Construction Phase Owner

- O&M protocols/PPE
- Community outreach
- First responder coordination
- Contract services providers
- Facilities inspections
- Move management
- Maintaining existing facility

Final Acceptance

- As-built documentation
- Complete commissioning and facility validation
- Complete systems (O&M) manual
- Training documents
- Specified materials inventory
- Off-season testing TBD



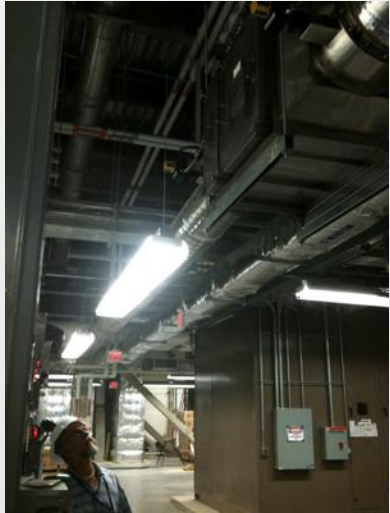


Transitional Phase

- Maintenance & documentation
- RFPs for service contracts
- Move coordination
- Instrument/equipment validation
- User walk-through tours
- Regulatory compliance documents
- Training

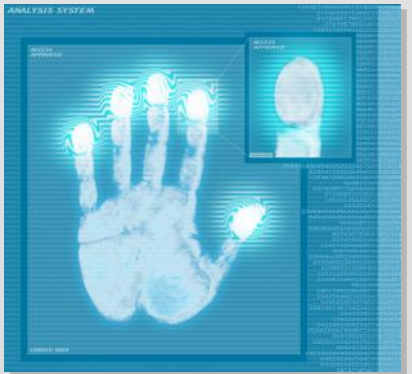
Transitional Operations

- Laboratory Commissioning
- Design Review for Compliance
- Protocol Development/Revisions
- Final Stage Operations Oversight
- Building O&M Staff
- Regulatory Compliance Enforcement/
Pre-Inspections
- Move Coordination
- Facility Wide/Multi-Science Protocols



Compliance Coordination

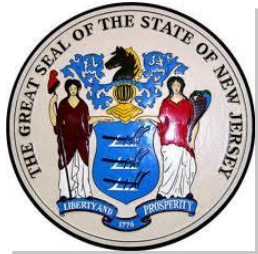
- Biosecurity Plan
- Emergency Response Plan
- Biosafety Manual
- Community Outreach Initiatives
- Protocols
- PPE
- Security
- Maintenance Safety



Compliance Coordination

- Providing Supportive Facility Cx Documentation to the Regulatory Authorities (i.e., CDC SA Registration)
- Assisting with the Development of Regulatory Documents Policies and Procedures
- Developing and Providing Training to Laboratory and Maintenance Staff
- Meeting with the Regulatory Agencies the community and first responders





New Jersey Public Health, Environmental and Agricultural Laboratory

NJPHEAL



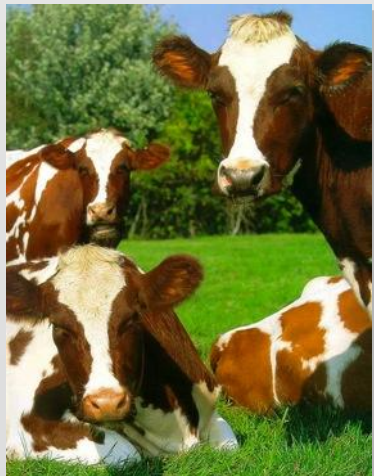
New Jersey Public Health, Environmental and Agricultural Laboratory

NJPHEAL Vision

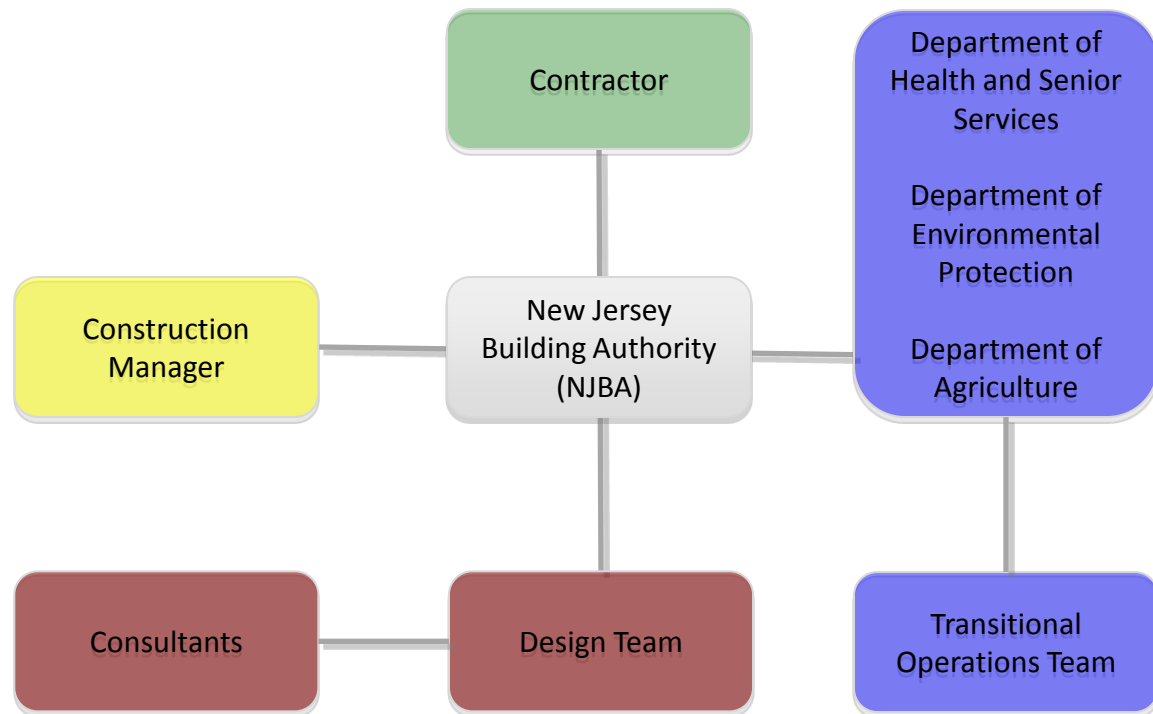
- Mission Based Objective – 15 Years
- Response to Deteriorating State PH Labs
- Anthrax Incidents after 9/11
- Increased Funding Opportunities
- Available Property – Secure Location

Consolidated Lab Services

- Clinical Public Health
- Environmental Health
- Animal Health
- Plant Health
- Laboratory Response Network



Contractual Structure



Site Location & Security



New Jersey State Police Headquarters Campus

Unique Design Challenges

- Space Types
- Facility Wide Protocols
- 24/7 Operations
- Regulatory Requirements
- Community Relations
- Katrina, China & Inflation
- Move Management
- Six Years and Counting...



Murphy's Law

- DI Water Leak X 12 (and counting...)
- Condensation flood (AHU Down)
- Sanitary Blockage Flood
- No BSL-3 exhaust fan redundancy
- Installation of separate BSL-3 exhaust fans to maintain static pressure
- Lack of supply and exhaust airflow tracking
- Static dissipating tile shrinkage
- VAV reprogramming
- Long horizontal runs perchloric acid hoods



Lessons Learned

- Users were not adequately involved in the design process
- Centralized leadership was lacking for decision making
- Poor value engineering choices
- Cx agent initially reported to the architect then the owner



Lessons Learned

- Did not adequately review existing compliance structure and documentation
- Ensure all groups understand compliance expectations
- Sharing a facility with different state entities very, very challenging

Conclusions

- Complex & time intensive process
- Expertise is essential
- Involve Cx agent early and report to the owner
- Communication/documentation
- Consolidated leadership with involved stakeholders
- Shared responsibilities
- Informed decision making is key
- Final year is the most difficult