



ISSUES IDENTIFIED BY COMMISSIONING, AGAIN AND AGAIN



LIFE SCIENCES

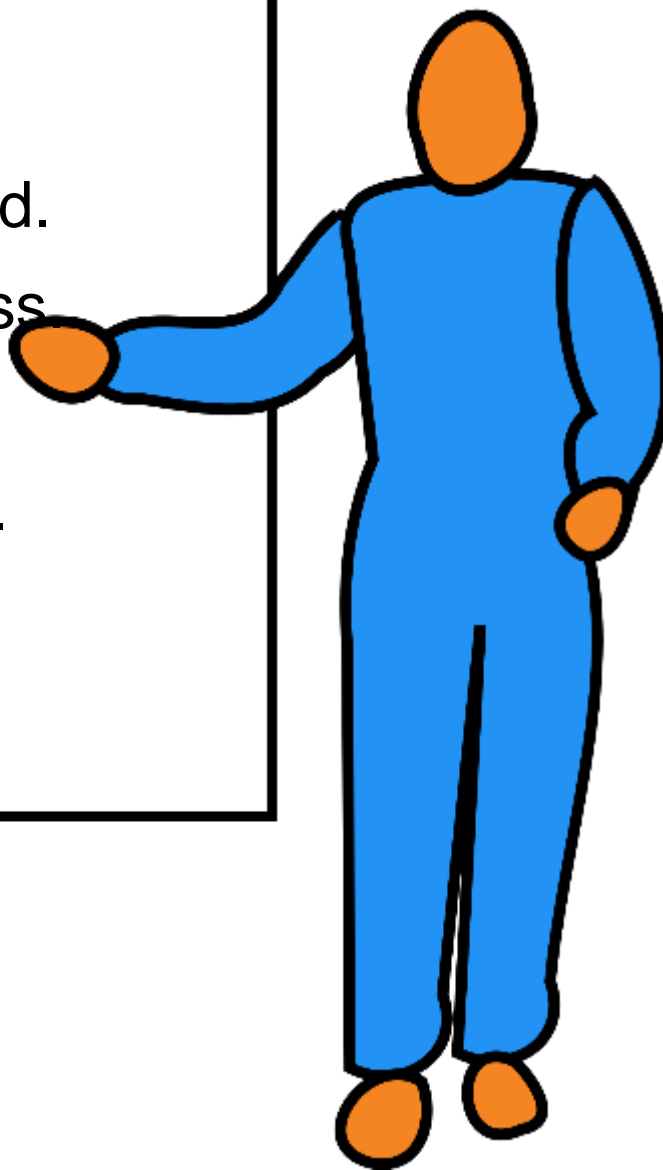


Joby
Evans,

Merrick &
Company

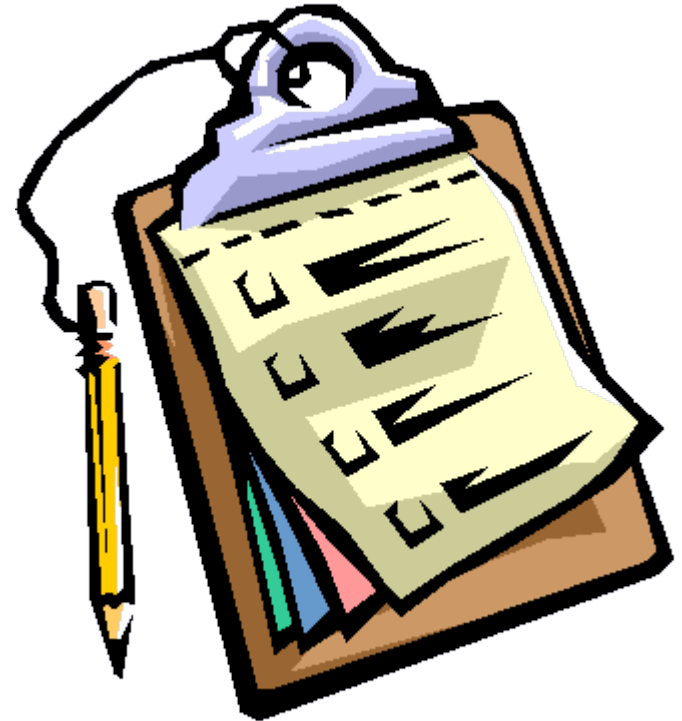


- Objective.
- Commissioning defined.
- Commissioning process
- Predesign/Planning.
- Inspection and testing.
- Conclusion
- Questions.



Objective

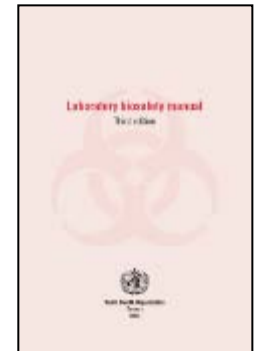
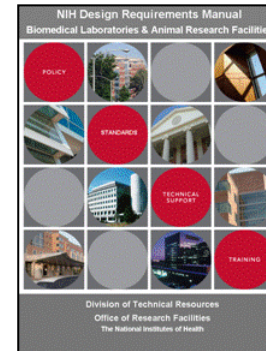
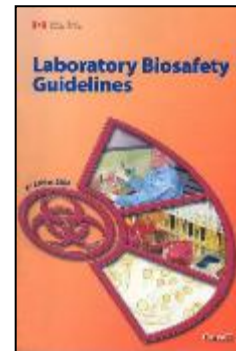
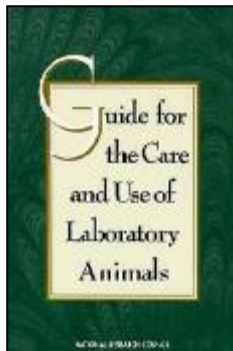
- Identify typical issues found during laboratory commissioning, to identify solutions and resolutions, and to suggest ways to potentially eliminate the issues prior to commissioning.



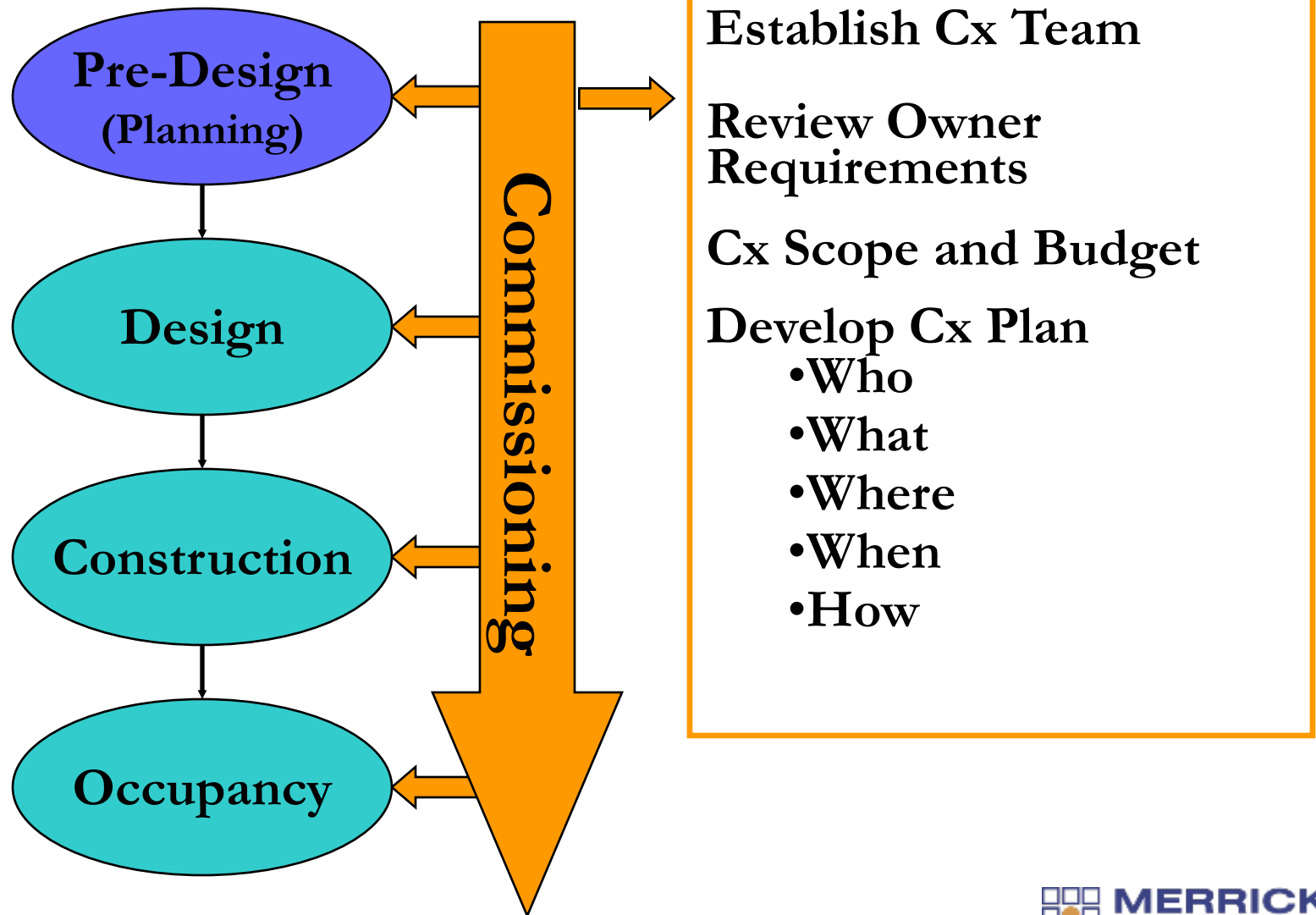
Commissioning Defined

ASHRAE Guideline 0, The Commissioning Process, defines commissioning as "a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meets defined objectives and criteria".

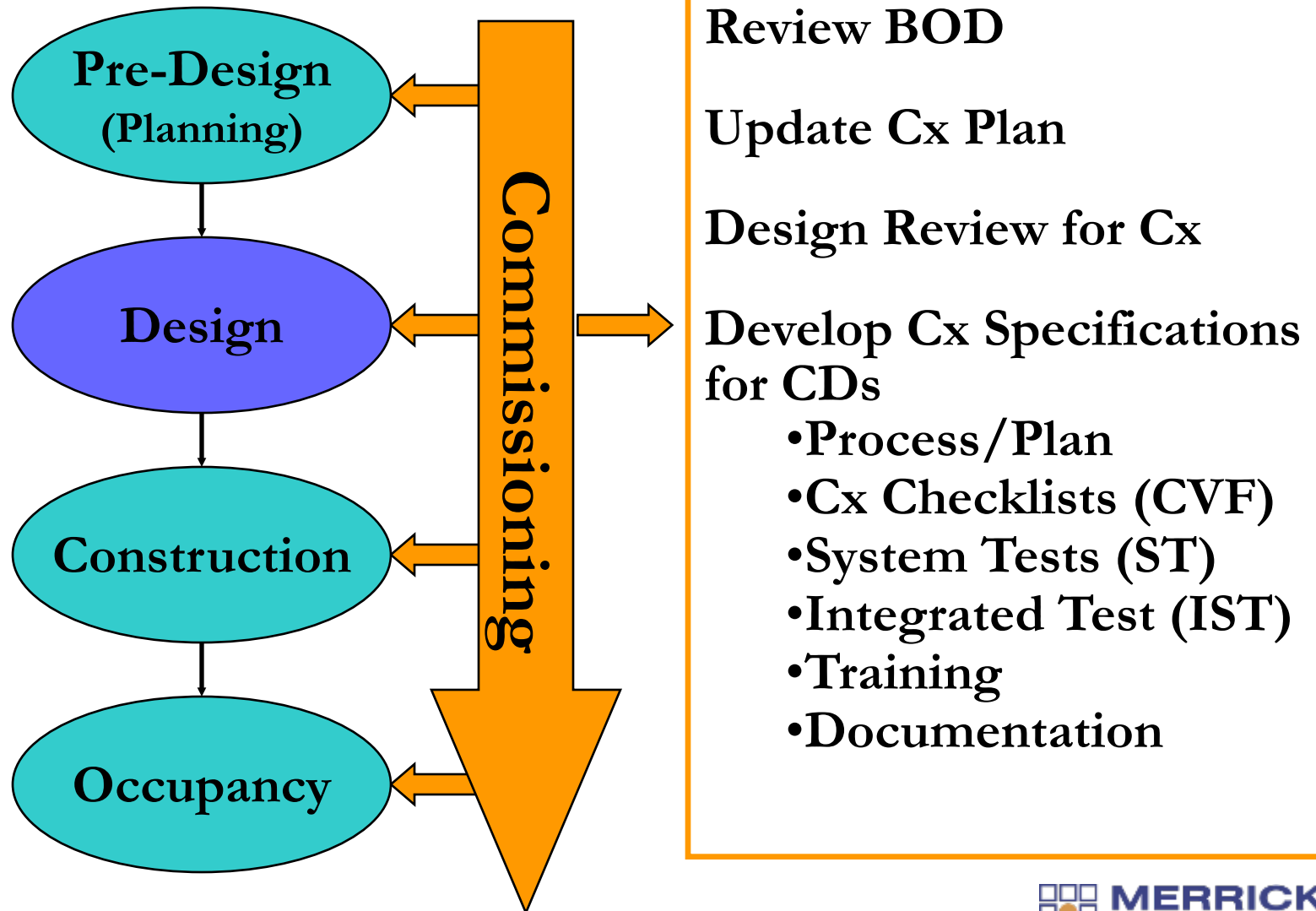
- Commissioning ensures building quality using peer review and in-field or on-site verification.
- Drivers for Commissioning; energy, performance, mission critical, environmental controls and occupational safety, projects with special performance requirements



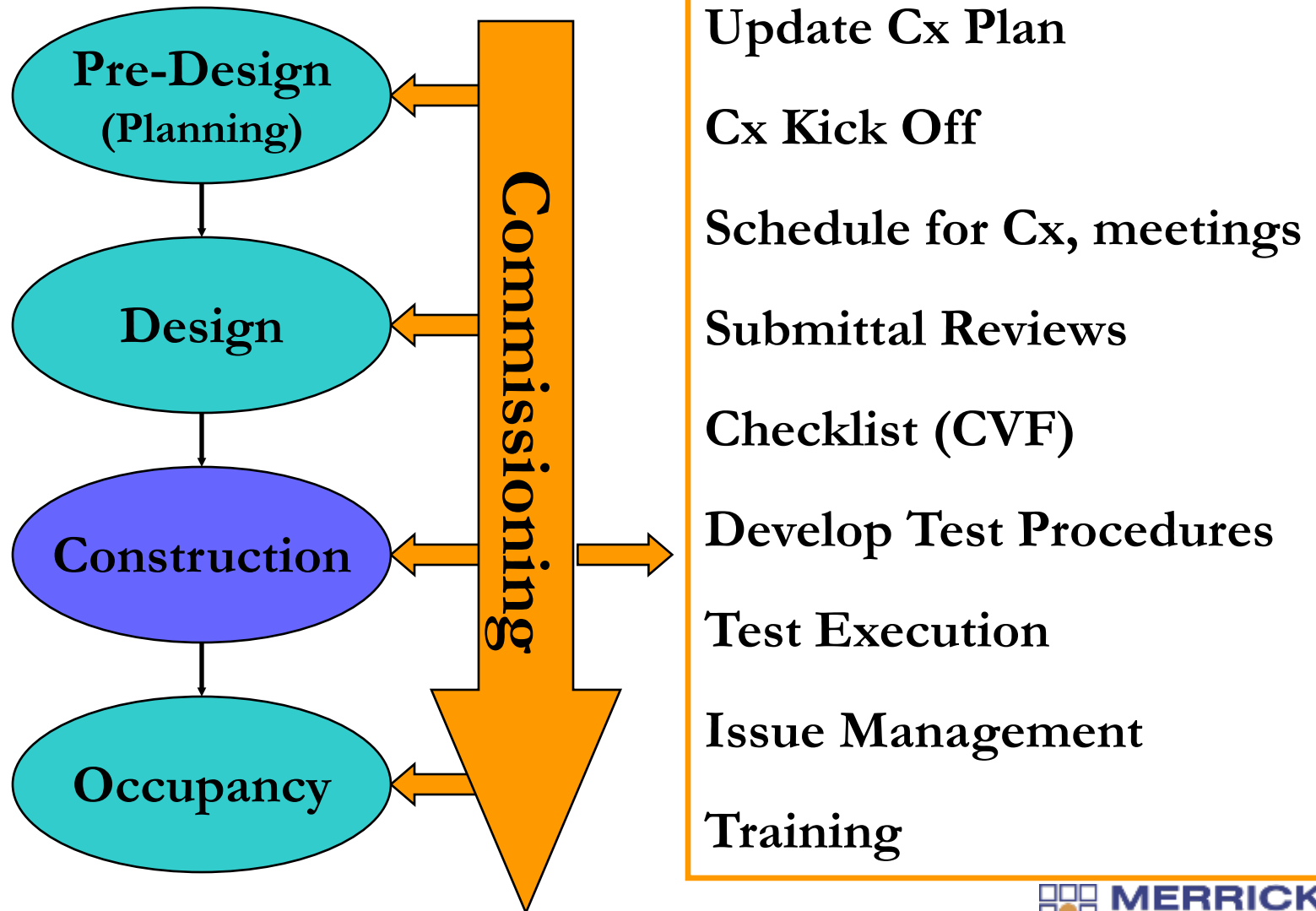
Commissioning Process



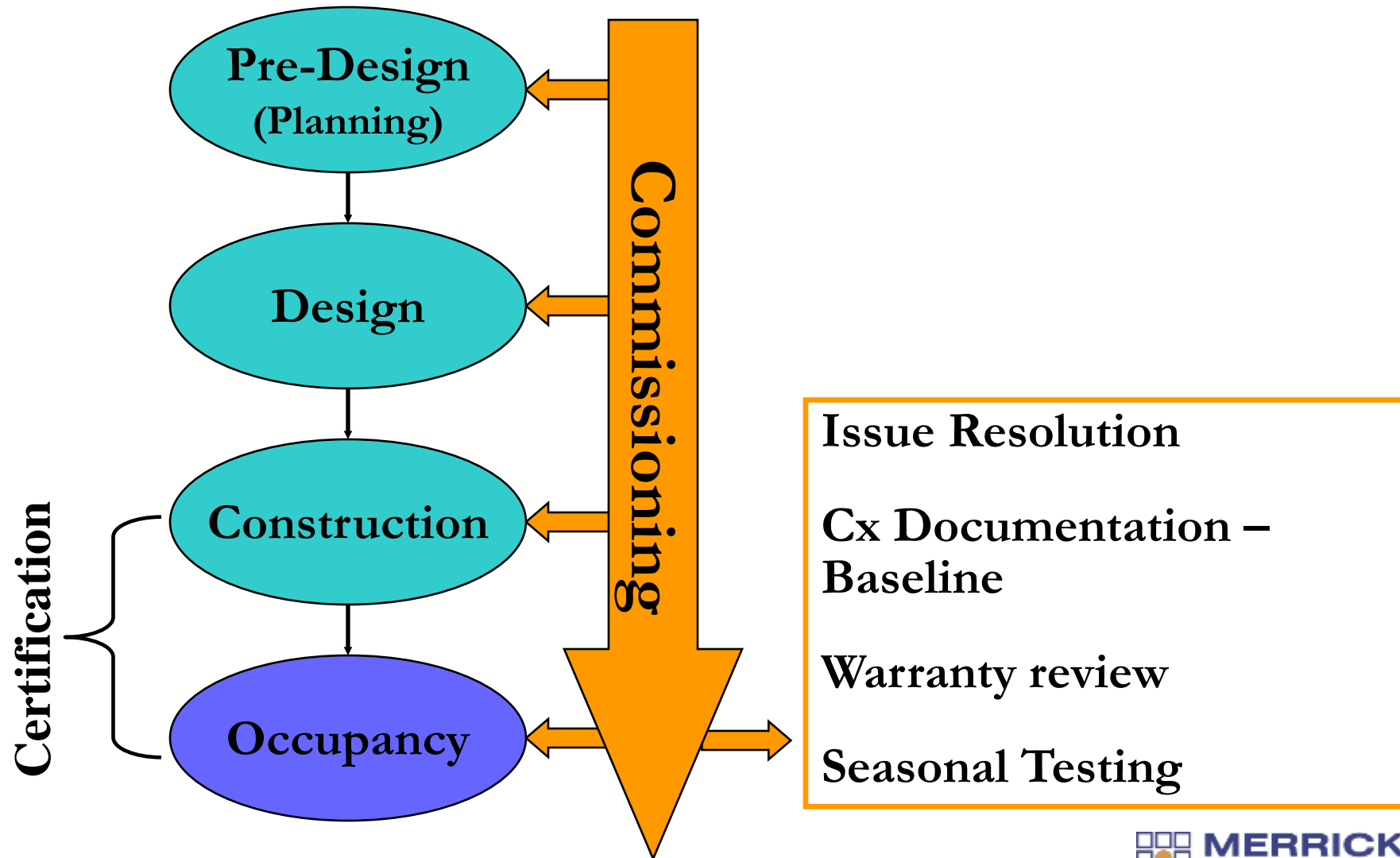
Commissioning Process



Commissioning Process



Commissioning Process



Cx Inspection/Test Program



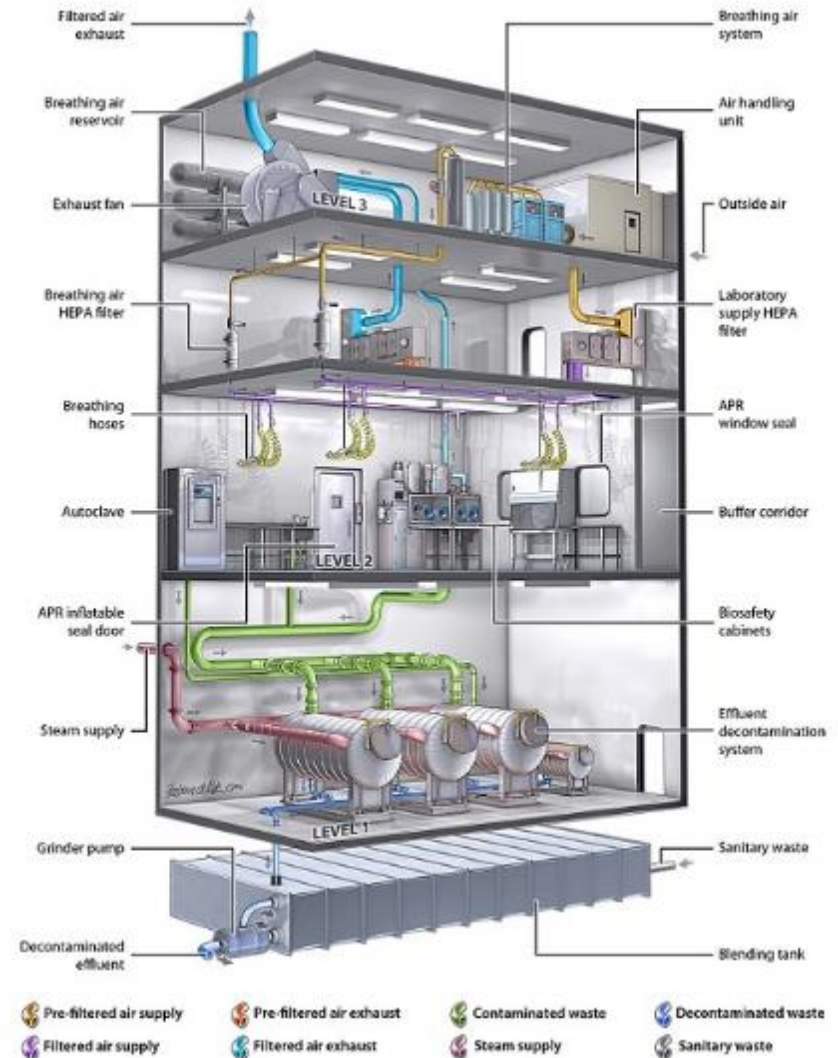
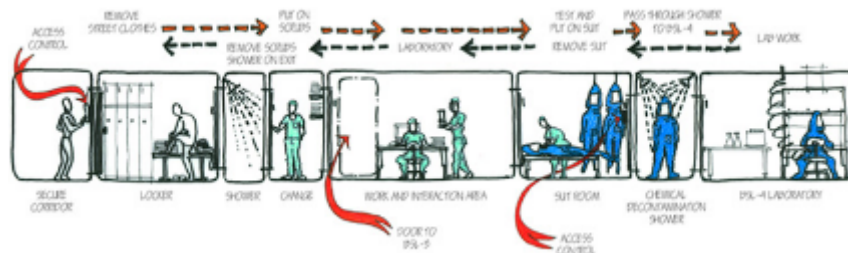
Predesign/Planning

- Define the Biosafety Level for the work you anticipate.
- Identify the features necessary
 - Autoclaves
 - Decontamination processes/leakage allowances
 - Number and types of biosafety cabinets
 - Animal holding/type
- Redundancy requirements
- Minimal in-lab storage
- PPE requirements and storage/recharging stations



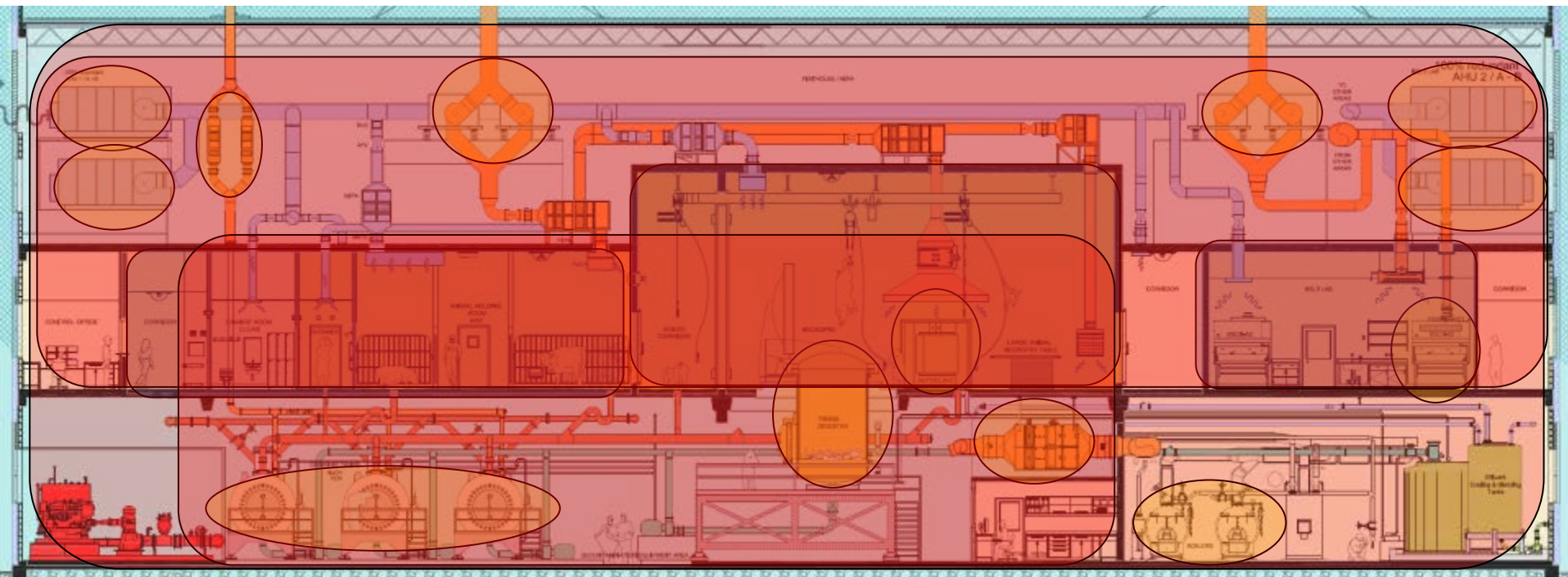
Predesign/Planning

- Biosafety level?
- A BSL-4 lab.



Predesign/Planning

- Biosafety level?
- A BSL-3Ag lab.



Predesign/Planning

- Identify features.



Predesign/Planning

- Identify features.



Predesign/Planning

- Identify features



Predesign/Planning

- Lot of in lab storage, is it necessary in the containment space?



Predesign/Planning

- Review personal protective equipment (PPE)



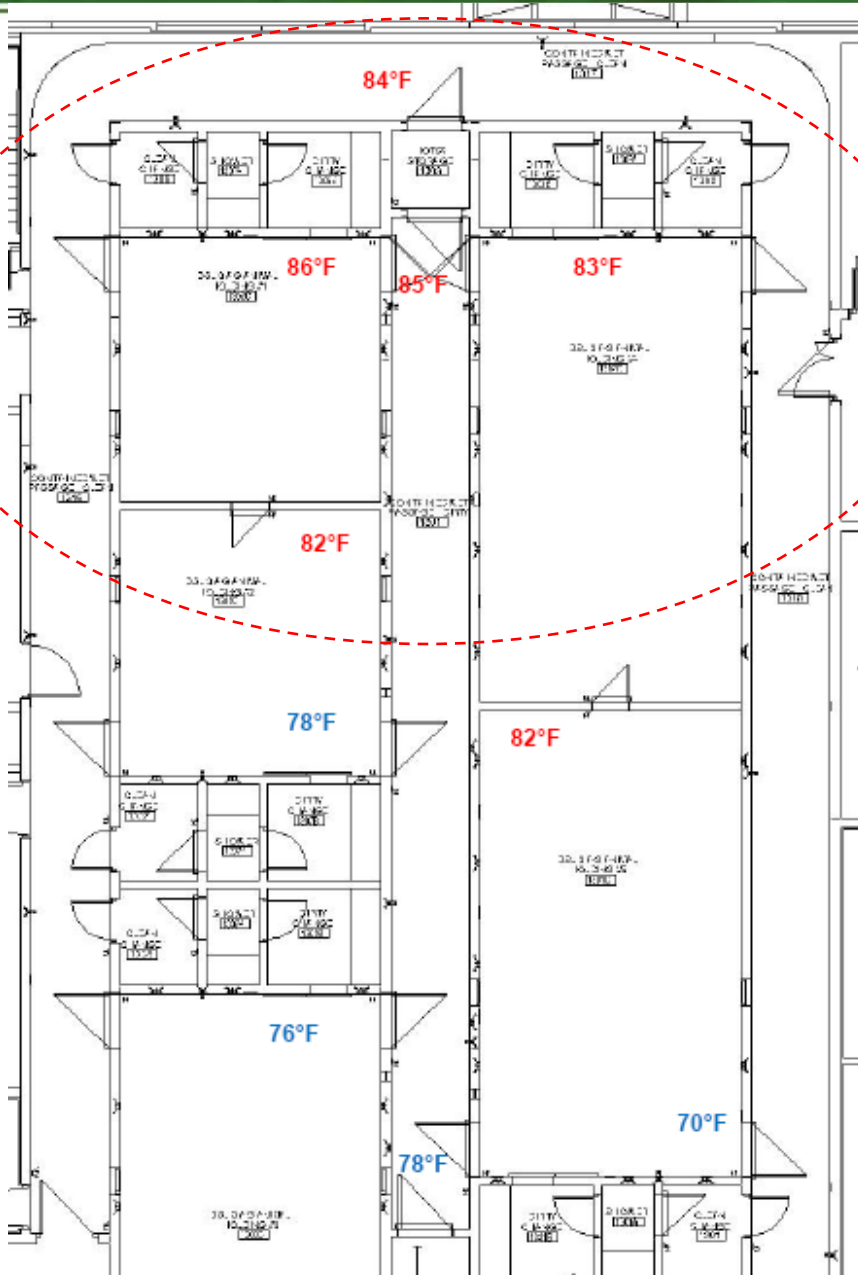
Inspection and testing

- Biosafety professionals can be an integral part of the commissioning team.



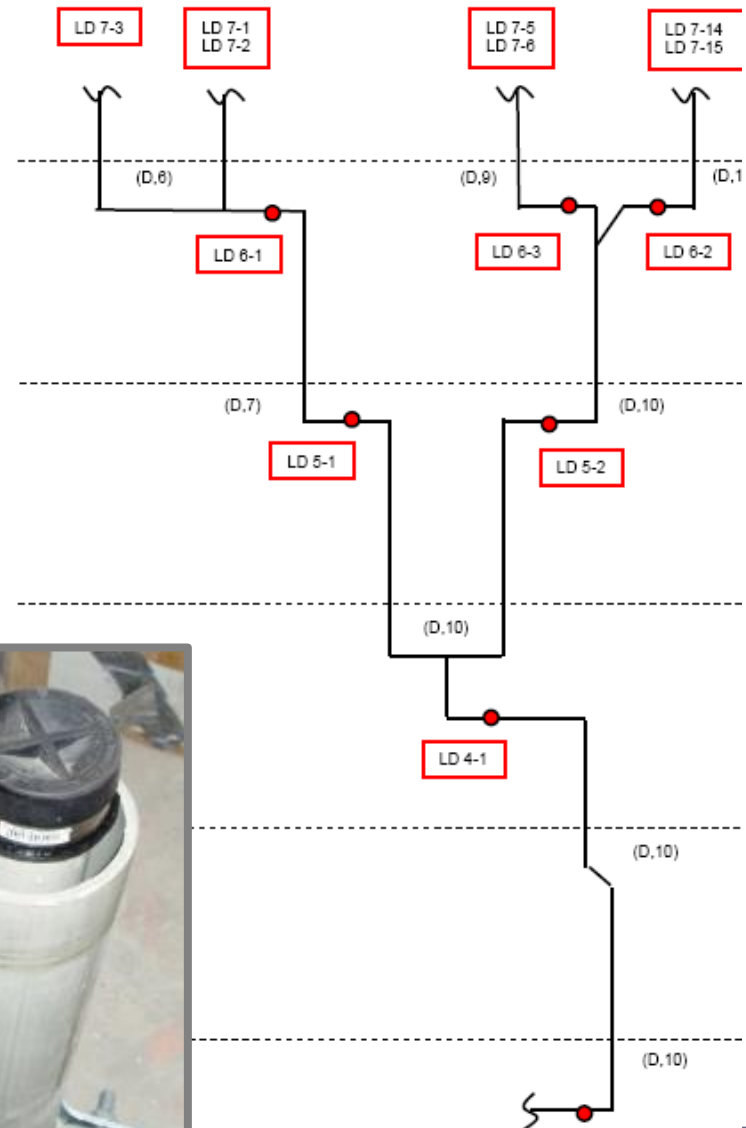
Inspection and testing

- Heat loads.



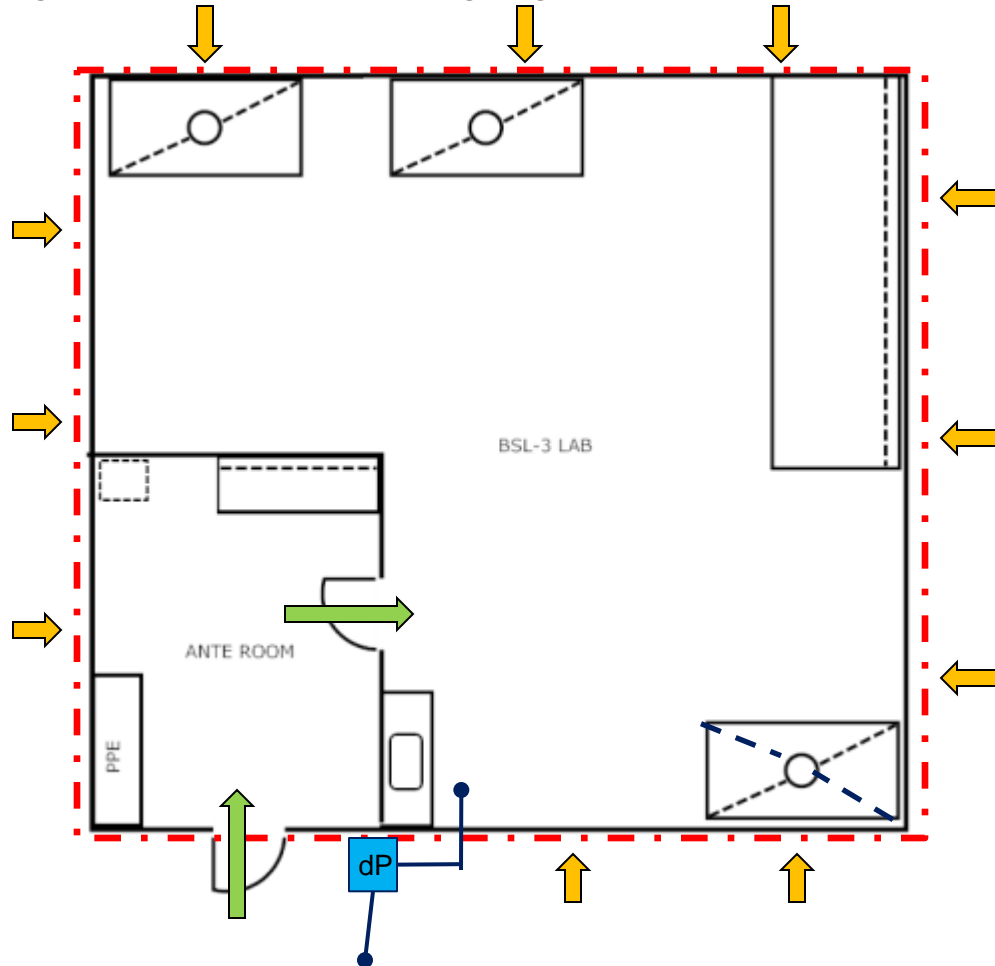
Inspection and testing

- Waste water piping.



Inspection and testing

Room leakage - Each BSL-3 enhanced containment space shall have its interior surfaces (walls, floors, and ceilings) and penetrations sealed to create a functional area capable of being decontaminated using a gaseous or vapor phase method. (BMBL)



Smoke pencil testing under Steady State conditions ($-0.05''$ to $-0.1''$ wc) or under deeper sustained negative pressure ($-0.2''$ to $> -1.0'$ wc)



Inspection and testing

TYPICAL AREAS OF LEAKAGE / VISUAL RESULTS



Pass-thru frame



Access panel frame



Floor Seams



Raceways/electrical penetrations



Door frames/ thresholds



Plumbing penetrations



Thermostats



Diffuser frames/ duct connections



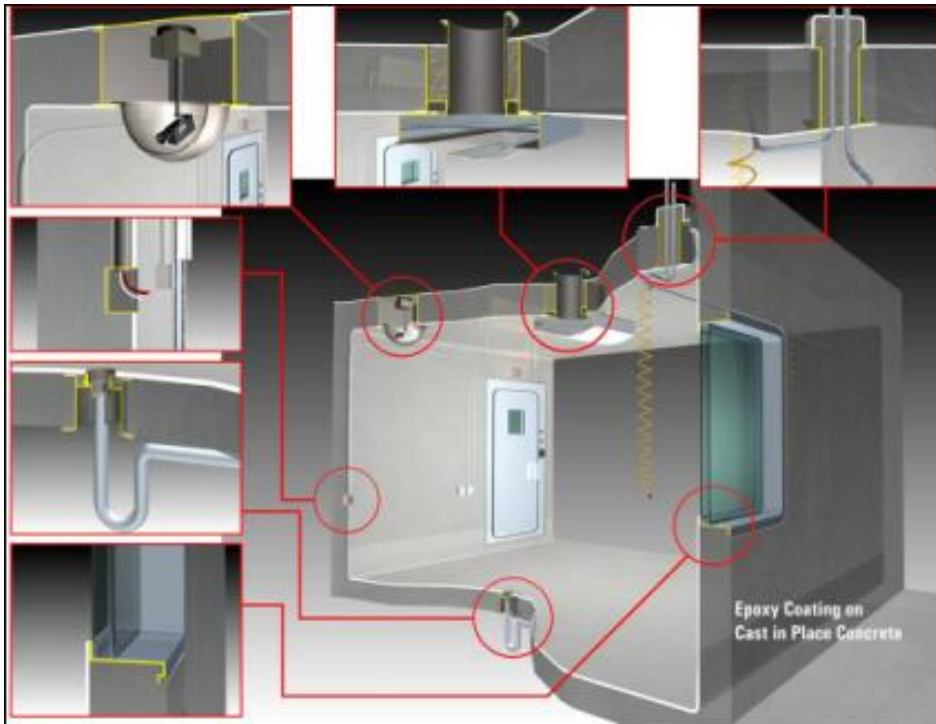
Lighting Frames



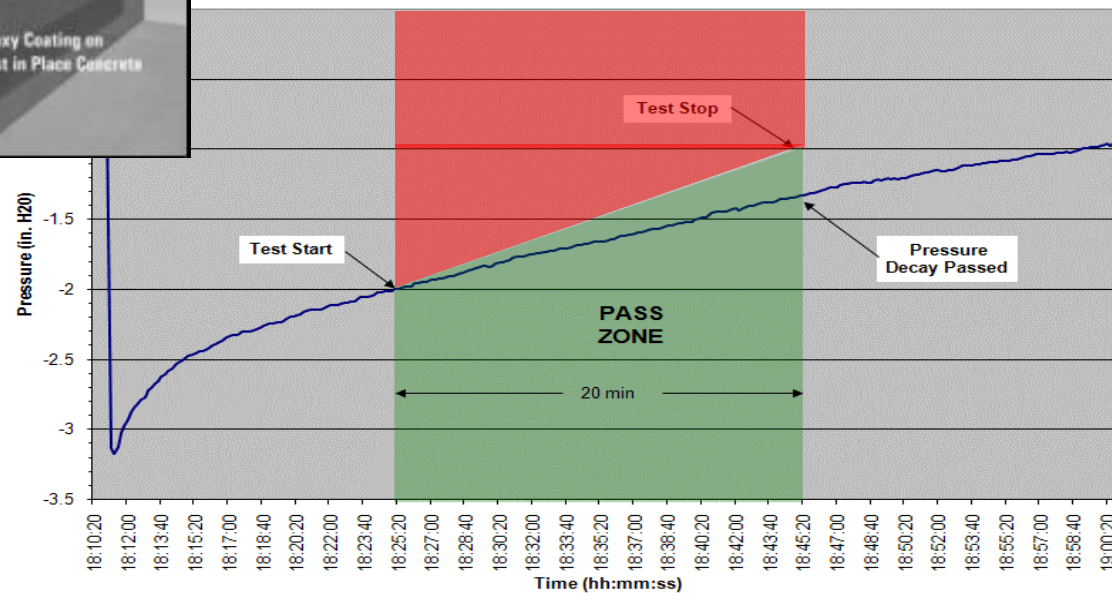
Recessed plumbing connections



Inspection and testing

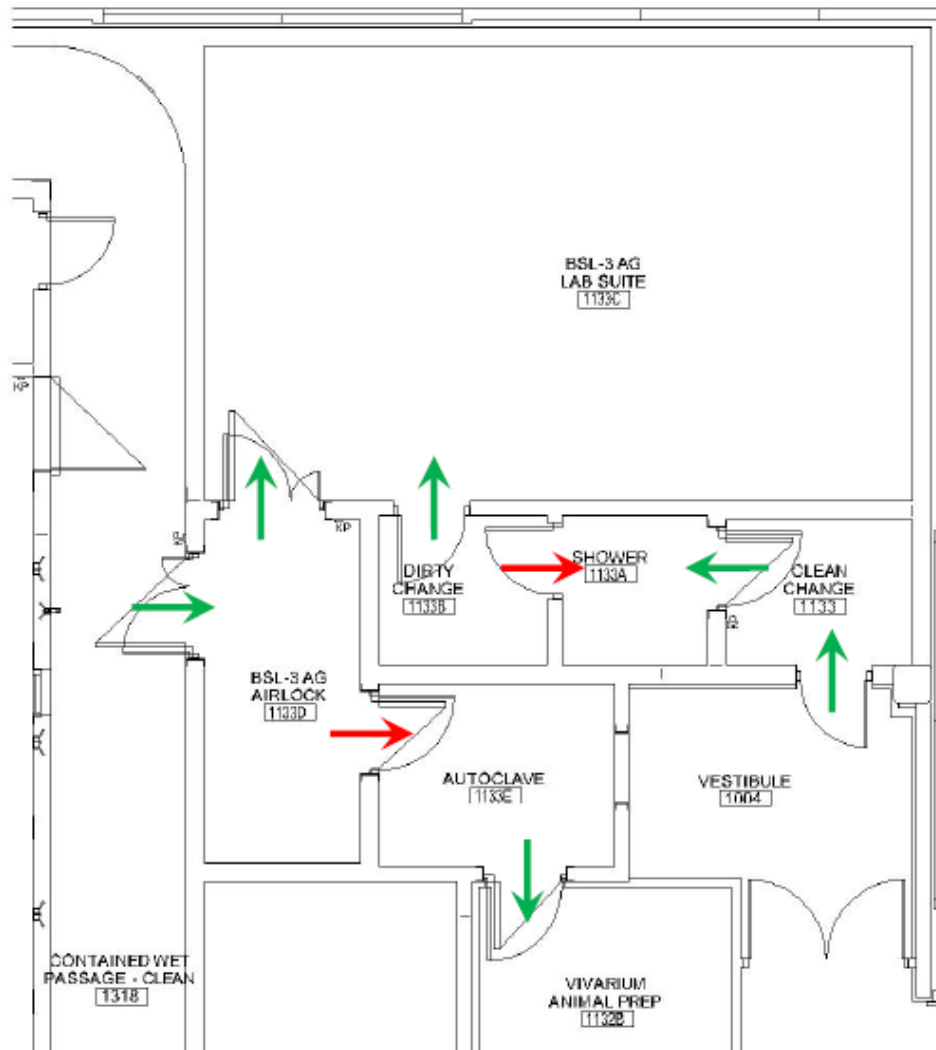


- Pressure decay testing and common leakage points





Inspection and testing

- Directional Airflow.



LEGEND

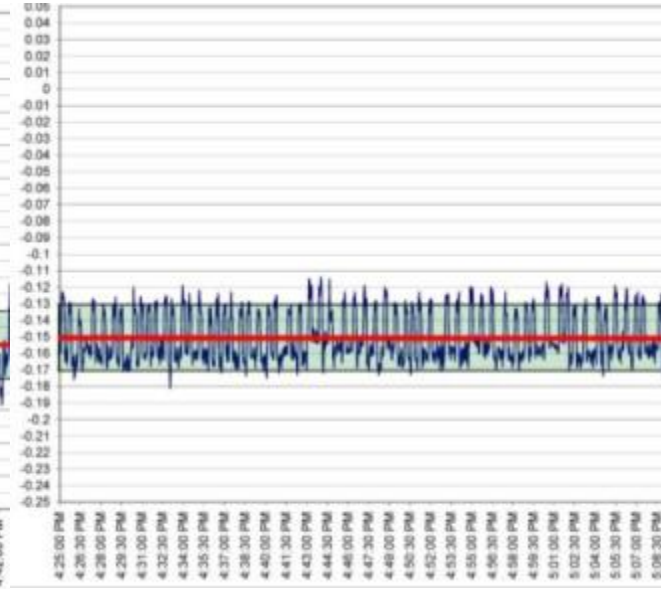
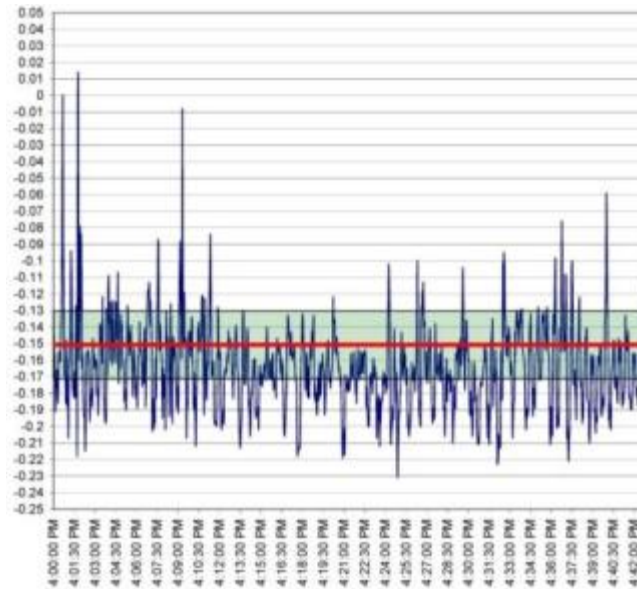
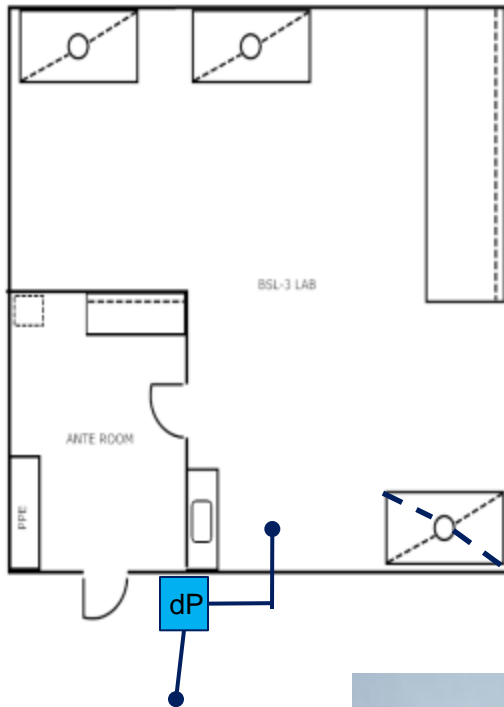
-  Airflow observed in desired direction
-  Airflow reversal observed
-  No or weak directional airflow observed

NOTES

1. Observed directional airflow reversals in Room 1133A and 1133E.
2. Airflow offsets were adjusted to achieve desired dP and directional airflows.

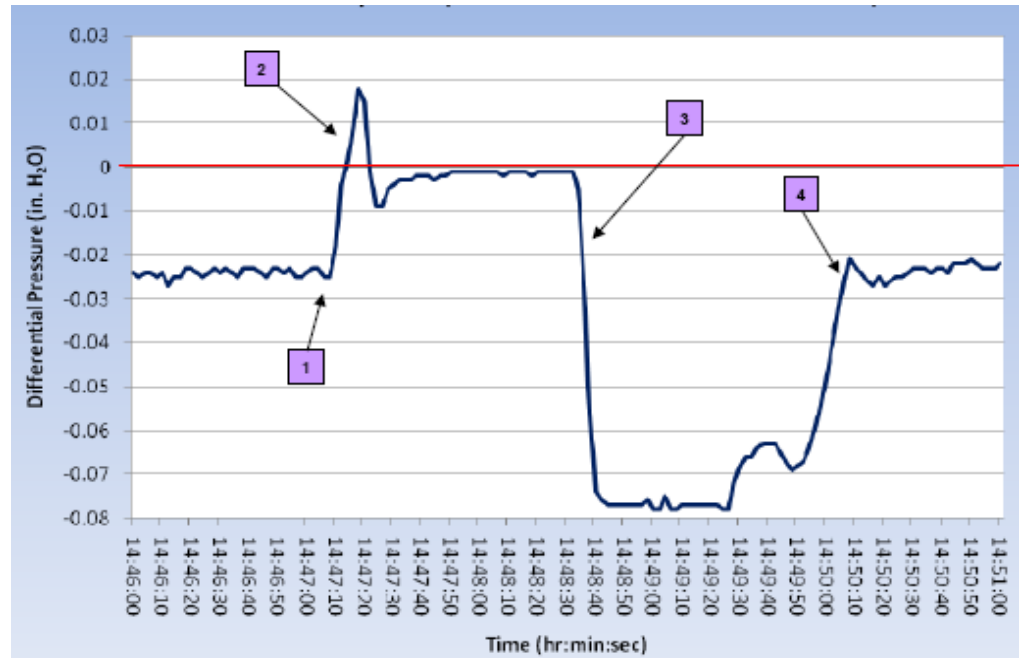
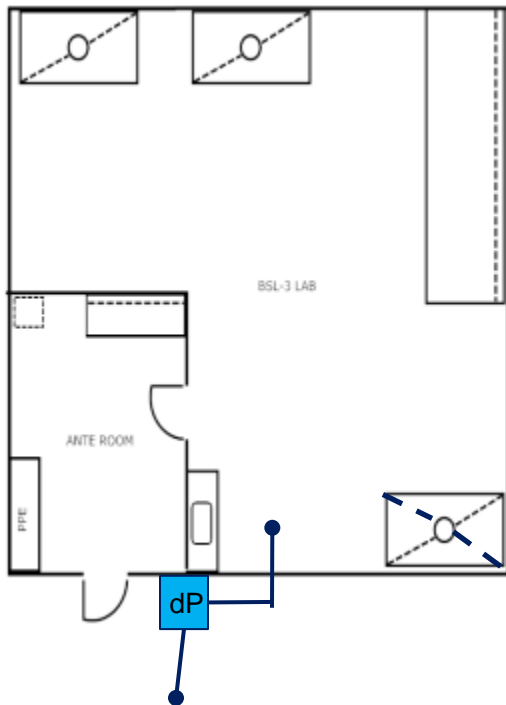
Inspection and testing

- Pressure trending and control.



Inspection and testing

- Pressure trending - reversal of directional airflow.



HVAC configuration: Venturi valves on supply and exhaust. Active pressure control of supply valve.

- 1 – Lead exhaust fan failed
- 2 - Supply damper closed to limit positive press. (8sec)
- 3 – Lag exhaust fan started
- 4 – Supply damper opened to control

Conclusion

- Concerted efforts by the owner's representatives to get early involvement of the commissioning agent can assist in reducing issues.
- Biosafety professionals can be their own best advocates for successful laboratory startup by understanding typical issues preventing project completion.



Questions



Joby Evans, PE, CxA, CAC

Joby.evans@merrick.com

o: 404-789-2715

c: 404-805-7558

Merrick & Company
160 Clairemont Ave
Suite 600
Decatur, GA 30030