

# Cornerstone Leads Project Team to Successful Commissioning of USDA's New BSL3Ag Large Animal Health Facility.

**T**he USDA's \$460-million expansion of research, diagnostic and biologic evaluation facilities for agricultural animals in Ames, Iowa has spanned more than seven years. The modernization effort adds a 150,000 sq.ft. BSL3Ag Large Animal Health Facility, a new 535,000 sq.ft. Consolidated Laboratory Facility, a 105,000 sq.ft. Low Containment Large Animal Facility, plus the central plant infrastructure of chilled water, steam, waste water treatment and standby power to support all new and existing buildings. The goal was to replace 1950s to 1970s vintage buildings with state-of-the-art laboratories. Cornerstone Commissioning was chosen to be the Commissioning Authority for all of this work.

## USDA Building 9 - BSL3Ag

150,000 sq. ft. Large Animal Health Facility  
22 Animal Rooms with Two Necropsy Rooms

The BSL3Ag facility was designed, constructed and commissioned using the USDA ARS 242.01m Guideline, differentiating the building from BSL-3 facilities in that the animal rooms are the primary containment barrier. The construction and testing of the building are the same as that used for BSL-4 facilities, with the exception of the breathing air system requirement. Unique systems make this facility functional, including air pressure resistant doors, carcass disposal systems, decontamination infrastructure, special security systems, liquid waste collection, N+1 redundancy building pressurization systems, double HEPA filtration in high containment areas and UPS plus stand-by power. Testing these systems through many failure scenarios to verify proper operation was a momentous task, demanding intense commitment by the entire project team.

## Owner Commitment to Commissioning

From the beginning, USDA's commitment to the commissioning process as a primary element of project delivery was strongly emphasized. The core planning team visited many biocontainment facilities in the US and abroad to learn lessons from owners that had already been there. One of the most frequently repeated themes was the high priority that needed to be placed on the commissioning process. As a result, the USDA Ames Modernization Branch strongly emphasized to the entire BSL3Ag project team that commissioning required active support by all parties. That emphasis from the Owner proved to be central to the success of commissioning, achieving buy-in to the process from the beginning.

Cornerstone's roles during the design phase included review of the design documents from a biocontainment and labo-



## Keys to Successful Biocontainment Facility Commissioning

1. Owner commitment to Commissioning Process
2. Hiring the Commissioning Authority during the design phase
3. Engaging the Project Team in Commissioning Processes

ratory commissioning perspective, and contributing to the selection and arrangement of systems. Significant time was spent refining the control sequences of operation, which proved to be an excellent return on investment for the operation of the building. We were also able to fully develop the commissioning process in a collaborative way, with feed back from the A/E and CM to ensure agreement before the construction phase.

The value of this input during the design phase cannot be overstated. Our experience with biocontainment facilities and the challenges of the turnover process allowed us to foresee problems and to ask questions to incite discussion





*“Cornerstone was fully dedicated to the project and to the commissioning process. Their strong leadership qualities pulled the whole team together to prepare this sophisticated laboratory for a conclusive turnover to the USDA. ”*

**Whitney Sanders, PE**

*Project Executive, STV Architects, Inc.  
Government's Quality Assurance Representative*

before construction begins. The design phase is the most efficient, least expensive and least painful time to do this.

#### **Hiring the Commissioning Authority Early**

Waiting to begin the commissioning process or hiring the Commissioning Authority after construction starts is a significant mistake, especially for biocontainment facilities. Contractors play a crucial role in the commissioning and turnover processes and need to understand that. A coherent commissioning specification is essential to clearly communicate their roles and responsibilities before bidding. Without it, they may under-price the work and not be able to support the process. However, more often contractors play it safe and bid more time than necessary to participate in integrated system tests. By hiring Cornerstone early in the project

roles and responsibilities were clearly defined for the BSL3Ag project before bidding. A responsibility matrix developed by USDA with tasks for quality control and commissioning proved to be an effective method to discuss over-lap and documentation, allowing the commissioning to move forward efficiently.

#### **Engaging the Project Team in the Process**

Cornerstone's understanding of the importance of engaging all parties into the integrated system tests is key. For things to run smoothly, a strong emphasis must be placed on system readiness and all activities need to be coordinated into the project schedule.

The use of an equipment startup matrix prepared the whole team for functional performance and integrated system tests. These methods prevented excessive re-testing and reduced the length of time necessary to complete all activities.

McCarthy, the Construction Manager, helped set the stage for effective integrated system tests. Their win-win approach made a huge difference in the schedule and success of tests. By dedicating the building to only commissioning activities 9-10 hours a day, solid results were obtained more quickly and easily. Without those dedicated periods of testing, problems would have taken longer to assess. Instead of wondering if pressurization spikes were caused by someone opening a door unexpectedly, the evaluation process was streamlined and appropriate changes were able to be quickly tested and implemented.

In the end, the building finished on schedule – the team effort by all parties was tremendous and the impact of commissioning evident.

#### **Project Team**

##### **Architect/Engineer**

Merrick and Company

##### **Construction Manager**

McCarthy Building Companies, Inc.

##### **Government's QA Representative and Commissioning Support**

STV Architects, Inc.

*“Cornerstone's engineers know how to effectively lead commissioning teams through Integrated System Tests. During the most challenging series of tests, when we needed new sequences for failure scenarios, Dan and his staff took the high road by not pointing fingers. Instead, they helped us brainstorm to create resolutions to make a very unique containment facility function in a way we're all proud of. I recommend them highly for commissioning biocontainment facilities.”*

**John Schneider, PE**

*Director of MEP services  
McCarthy Building Companies, Inc.*



*“Cornerstone, led by Dan Frasier, completed the BSL3Ag project with unprecedented success! When the systems were not operating as planned, he worked patiently with the team, prompting them to make adjustments. This type of leadership is a quality not found in many Commissioning Agents. The outcome was thorough and successful – a job well done.”*

**Robert Graber, PE**

*Merrick Architectural / Engineering Co.*



**cornerstone commissioning, inc.**

*Establishing a Foundation for Performance.*