

Univeristy of Illinois Urbana Champaign Memorial Stadium North Performance Center Final Commissioning Report Summary



7/20/21

Overview

This Final Commissioning Report includes documentation developed and collected as part of the commissioning process led by E Cube, Inc. for the UIUC Memorial Stadium North Performance project in Champaign, IL. Commissioning services were provided in the interest of meeting the requirements of the LEED-NC v3 Fundamental Commissioning Prerequisite and Enhanced Commissioning Credit, helping ensure that systems in the scope of work operate in accordance with the design intent.

Completed commissioning documentation is included in this report package and constitutes a record of the independent quality assurance program executed by E Cube and the project commissioning team. The full commissioning report should be provided to this project's facility operations staff, as its contents provide useful information to help ensure continued proper operation of the systems in the scope of work.

Documentation / Reporting

E Cube utilized *CxAlloy* web-based software to document the commissioning process and to collect and organize reports / documents submitted by commissioning team members. Commissioning documents developed for this project can be found on *CxAlloy* using the following link:

<https://tq.cxalloy.com/project/10244>

This project will now be "archived" on *CxAlloy*. In the archived mode, documentation will still be available for viewing and downloading, but modifications will not be possible. We recommend *CxAlloy* be utilized in the future as a reference, as it contains valuable information pertaining to the commissioning process.

Commissioning Process

The commissioning process was a comprehensive, multi-phase effort led by E Cube, Inc. and supported by the Commissioning Team. As part of the commissioning process for this project, the following key tasks were completed:

Design Phase

Owner's Project Requirements

The Owner's Project Requirements (OPR) document was reviewed: This helped establish the Owner's goals for the facility and guide associated design decisions. The document was provided to the design team to assist with development of their Basis of Design. The final version of the OPR is included in this package.

Basis of Design

The design team developed a Basis of Design (BOD) narrative describing the design approaches, equipment and systems being designed to meet the requirements set forth in the OPR. E Cube reviewed this document

and provided review comments. The final version of the BOD is included in this package.

Commissioning Plan

A Commissioning Plan was developed in the design phase. This helped clearly communicate the Commissioning Process to the team and included team roles / responsibilities, sample documentation, a description of the commissioning approach and a draft commissioning schedule. The final version of the Commissioning Plan is included in this package.

Commissioning Specifications

Commissioning Specifications were developed and submitted to the design team who incorporated them into the project's bid and construction documents: These established contractual commissioning-related roles and responsibilities of the installing contractors.

Design Reviews

The Design Documents were reviewed, and comments were submitted to the design team. The design team then reviewed and responded to the comments and the team discussed any critical items. This helped identify design issues so that they could be corrected before the construction phase. For this project, design reviews were conducted during the Design Development and Construction Documents phase. The final version of the design review report is included in this package.

Construction Phase

Commissioning Meetings / Status Reporting

At the beginning of the construction phase, a Commissioning Kickoff meeting was held to discuss and plan for the Commissioning Process. E Cube provided information regarding the Commissioning Process, team roles/responsibilities, documentation and general schedule milestones. Regular meetings were held thereafter until project completion to help ensure timely and accurate completion of Commissioning tasks, resolution path for commissioning issues and encourage a collaborative atmosphere.

E Cube provided regular commissioning status updates to the team using *CxAlloy* and via meeting minutes. A final version of the Commissioning Status Report and meeting minutes are included in this package.

Submittal Review

Submittals for major equipment and systems in the commissioning scope of work were reviewed. Review comments were submitted directly to the engineer of record who incorporated those comments into their official, stamped review at their discretion. This helped identify deviations from design requirements, missing information or coordination issues. A copy of the submittal reviews for this project is included in this package.

Pre-Functional Procedures / Checklists

Pre-Functional Procedures/Checklists were developed by E Cube and completed by installing contractors. These checklists helped ensure equipment installation matched the design intent and manufacturer's requirements. They also serve as a record of final equipment installation characteristics. E Cube conducted a spot-check of equipment installation in the field as part of this work.

Based on this process, the equipment in the Commissioning scope of work appears to be installed per the design intent, except where noted and unresolved on the Commissioning Issues Log.

Contractor Testing, Startup and Reporting

E Cube reviewed the equipment / component testing, equipment startup and test, adjust and balance procedures and reports completed by the installing contractors. E Cube also witnessed a representative portion of each type of testing relevant to the systems in the commissioning scope of work.

Please note for this project, the balancing process was not fully completed until approximately 18 months after construction was complete. E Cube's understanding is this was due to substantial delays and issues during the construction process. The facility was occupied in late 2019. A final balancing report was submitted by the installing contractor on 7/8/21.

Functional Test Procedures / Checklists

Functional Test Procedures / Checklists were developed and completed in the field by E Cube with the assistance of installing contractors. These helped verify correct system operation per the design intent and contract documents.

Please note for this project, while most systems and equipment were tested during construction (prior to facility turnover), the functional testing process was not fully completed until approximately 18 months after construction was complete. This was due to substantial delays and issues during the construction process. The facility was occupied in late 2019. Final functional testing was completed in early July 2021. Completed functional test checklists can be found in this report.

Training Program Review

Operation and Maintenance Manuals and Training Agendas were reviewed. This helped ensure correct content and organization of the manuals and ultimate ease of use by facility operators. It also helped ensure well-organized training sessions.

Turnover / Post-Occupancy Phase

Final Commissioning Report

A Final Commissioning Report was developed (this document).

Systems Manual

A Systems Manual was developed. This manual includes descriptions of the design intent, system diagrams, overall system operation guidelines and provides helpful information on the day-to-day successful operation of the systems in the commissioning scope of work. The Systems Manual is provided under a separate cover and is available on *CxAlloy*.

Seasonal / Deferred Commissioning

To date, systems were overridden to best simulate conditions of the opposite season. In order to verify systems operate properly in the opposite season, Seasonal Commissioning was completed.

Warranty Phase Review

A Warranty Phase Review was completed at 10 months after turnover. The review included a discussion with facility operations staff to review overall performance of systems and document any known issues.

Commissioning Issues

During the Commissioning process, several deficiencies / issues were noted by E Cube. These were documented in a Commissioning Issues Log on *CxAlloy*. The responsible parties responded to these issues as they were reported.

To date and to the best of our knowledge, all reported issues except for 2 have been corrected. Those issues are shown below. Full details can be found in the Commissioning Issues Log, included in this package.

<input type="checkbox"/> TST-4-1	OPEN HIGH	Actions Watch
The AHU-1 unit serving the pool area needs to have training scheduled with UIUC. When pool chemicals are added, possibly when shocking pool water, the unit should be manually set to go to "Purge" mode.		ASSIGNED TO University of Illinois
SOURCE Test 4, Attempt 2, Line 106 Coordinate purge mode schedule with UIUC		ASSET AHU-1 DISCIPLINE Controls DRAWING DUE DATE 7/29/2021
Comments 0 Files 0		CREATED BY Jim Radzienda IDENTIFIED ON 7/15/2021 8:37 AM
		View Details >

<input type="checkbox"/> TST-24-1	OPEN MODERATE	Actions Watch
BAS controls dampers and fan start/stop but noted during testing on EF-1 in the steam room that the fan belt is off the motor sheave and laying in the bottom of the belt guard. Not possible to see from the floor if the belt is broken or if it is just off of the sheaves. This is likely a maintenance item but adding to the issues list as a reminder.		ASSIGNED TO University of Illinois
SOURCE Test 24, Attempt 2, Line 2 Fan Start/Stop (BO)		ASSET EF-1 DISCIPLINE Mechanical DRAWING DUE DATE 7/27/2021
Comments 0 Files 0		CREATED BY Jim Radzienda IDENTIFIED ON 7/13/2021 4:17 PM
		View Details >

We recommend that the owner's Facility Operations staff follow-up with the appropriate contractors using the list in the *Commissioning Issues Log* to determine the final resolution of each remaining open issue.

Future Operations

The Commissioning Process has aimed to ensure proper operation of systems in the scope of work at the point of facility turnover to the Owner. **The long-term success of this facility depends in part by proactive and regular monitoring of systems performance, and especially within the first few seasons of operation.**

We recommend that the Facility Operations staff continue to evaluate the operation of the facility by setting up and using diagnostic trend reports on the building automation system as well as conducting a review on the local control panels and diagnostic histories for the MEP equipment. This way, they can continue to monitor issues, but also identify opportunities for optimization and/or fine-tuning of set points related to this system's operation. If any of these key trends indicate trouble areas, further trends can be set up to help trouble shoot those areas.

If desired, E Cube can provide post-occupancy monitoring-based commissioning services to implement automated notification (fault detection diagnostics) of systems, which is very effective in improving systems efficiency and reducing operation costs.

Thank You

We would like to acknowledge the support provided by the project team in helping achieve a successful commissioning process. We look forward to working with this team on more projects in the near future.

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