

# PHARMACEUTICAL COOLING TOWER

## Replacement Design-Build Project

This month's Facility File will focus on the B2B November test for HVAC applications to replace an existing cooling tower at a pharmaceutical facility. The project delivery method is design-build (D-B) with a guaranteed turnkey cost. The D-B firm will assign a project manager with pharmaceutical and infection control (IC) background to the project. The D-B firm has in-house engineering, technicians, estimator staff to be involved in the design and cost estimate the initial design phase. The scope of work will be a basis of design to meeting the owner's need to replace this antiquated unit with a 150-ton, modular blow-through cooling tower to serve the existing closed loop condenser water system.

Prior to the D-B team's concept document submission, the facility manager and his O&M staff will want to contribute information to the D-B team's writing of the contract specification/basis of design document and, more specifically, to the following activities: service contracts, parts inventory, and as-built drawings requirements. Reviewing the design phase documents, this O&M staff will want to be assured that equipment serviceability is adequate and safe (e.g., equipment located on the roof, Legionnaire's concerns).

At the recommendation of the D-B team leader, the HVAC engineer, and the O&M staff will review *ASHRAE 2015 — HVAC Applications Handbook*, chapter 58 (Integrated Building Design), to get a better understanding of how design-build is a team effort. In addition, the D-B and owner's team are directed to *2016 ASHRAE Handbook – HVAC Systems and Equipment*, and more specifically, chapters 1 (HVAC System Analysis and Selection) to select the optimum cooling tower, chapter 14 (Condenser Water Systems), and chapter 40 (Cooling Towers). It is also recommended that the design team and the owner's team review the Cooling Technology Institute (CTI) cooling tower manual and the CTI certification.

A D-B team meeting will be coordinated so that the owner representative, 3rd-party IC consultant, 3rd-party commissioning and TAB consultant, and the O&M manager review together chapters 36 through 46 of the ASHRAE handbook concerning building operations and management. This information combined with the owner's own knowledge of operating the condenser water systems and the facility's infection control department will assist the D-B team in understanding the intricacies of owning, operating, and managing this building.

The D-B team will also deliver the specific collection of equipment documents in a manner such that the O&M computer operator can input the data collection into the CMMS system so that the existing preventive maintenance (PM) program will be workorder ready for day one of cooling tower operation.

In the startup and pre-commissioning phases, the O&M staff will be proactive in following along with the D-B's trade technicians

to receive equipment, system, and ATC tablet computer training using the O&M manuals and design phase documents (that will eventually become the as-built drawings). **ES**

Once the startup has been completed, the ATC subcontractor and owner representative/3rd-party CxTAB consultant will complete the functional performance testing of the new cooling tower renovation and the associated condenser water pipe distribution and associated balancing work. The D-B team shall go through an automatic control system initial dry-run demonstration prior to the D-B firm, demonstrating the system to the CxTAB consultant. The 3rd-party infection control commissioning consultant shall complete her close-out of process, including updating the IC policy and procedure document for working at the tower. The ATC subcontractor will begin collecting condenser water system data and performance by trending the localized monitoring via computer data collection of the following:

- Outdoor air dry bulb and wet bulb temperature
- condenser water supply and return temperature
- tower water make-up
- condenser pump performance
- cooling tower and fan performance
- HVAC alarms
- safety alarms

Taking the same approach as the owner representative and design engineers, the pharmaceutical O&M personnel will use a series of computer-generated touchscreen project checklists that allows the staff to confirm that the following facility data has been collected. This process should start at the beginning of construction/build phase and not at project closeout, so that the facility files can be inputted into the CMMS system. Touchscreen O&M checklists should include:

- Equipment shop drawings
- O&M manuals, parts list, and lubricants
- Troubleshooting tips
- tower startup and shutdown instructions

The O&M staff should review the contractor-produced sheet metal field fabrication/field coordination drawings prior to fabrication. Touchscreen service checklists should include:

- Location of automatic dampers, smoke dampers, and volume dampers
- Filters
- Equipment and control devices
- Access for servicing equipment.

The training process should include specific HVAC and ATC system and equipment training but also IC policy and procedure plan training. Training should also include the preventive maintenance work order system to routinely assure continuous tower and condenser water supply performance. This will require the D-B firm to provide the associated system flow diagrams noting set points versus actual and adjustments as part of the project closeout documents. Touchscreen training checklists should include:

- equipment
- system
- emergency plan
- automatic controls
- infection control management



### AMANDA PAROLISE

Parolise is project manager consultant with BuildingSmart Software LLC. Reach her at [amckew@yahoo.com](mailto:amckew@yahoo.com).