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Temporary Air Conditioning Using Owner In-House Project Management

This month's Facility File will focus on the B2B May test for a K-12 school HVAC application. It would be very beneficial for the owner's building facility manager and the city's outsource/project manager to read chapter 7 (educational facilities) in the 2015 *ASHRAE Handbook — HVAC Application* to be knowledgeable of ASHRAE's guidelines when preparing for a building program that will include a temporary air-cooled chiller for air conditioning season special events and disaster relief at the school.

The owner's facility management group should also read chapters 36 through 43 of the 2015 Handbook for O&M design guidelines to assist in preparing for a central chilled water system that will only have a chiller on site at specific times during the air conditioning season. This information, combined with the owner's own knowledge of operating a K-12 school facility, will assist the design team in understanding the intricacies of owning, operating, and managing this hybrid central chiller plant. It is also recommended that the owner-design team read chapter 59 of the same ASHRAE Handbook titled *HVAC Security*, as well as include a security consultant on board to contribute to a safer building and processing design.

With all these design guidelines from ASHRAE, the engineer should meet with the owner's O&M staff to discuss specific building standards that need to be applied to this project. For this application, the city's school system already has an outsourced operation and maintenance group to maintain all the school buildings. The design team will be required to know this in advance to adjust their contract specifications pertaining to the O&M, training, preventive maintenance work order system, and energy operating budget.

In the design phase of the project, the school facility manager's O&M staff, along with the outsource firm's project manager, will want to contribute information to the design team's writing of the contract specification — specifically, the following activities: service contracts, parts inventory, and as-built drawing requirements. Reviewing the design documents, this O&M staff will want to be assured that equipment serviceability is adequate and safe (e.g., how does a temporary chiller work in sync with an existing 2-pipe heating and air conditioning system?).

The project delivery will be design-bid-build (DBB) with the temporary air conditioning project delivery method being a separate contract. This contract will be completed by a separate group of professionals within the city's building management team, acting as a temporary air conditioning consultant to the new school construction design team. This separate contract in the basis of design is to incorporate valve and capped connections at the new school building's exterior equipment room wall and for a flatbed truck with an air-cooled chiller and electric generator to provide chilled water to the existing HVAC system. The facility staff will need specialized training to assist each time the temporary chiller arrives on a flatbed for air conditioning season use.

In the construction phase, the O&M staff will want to revisit the issues first noted above during the design phase. Next comes the startup and commissioning phases, and the O&M staff will want to be proactive in following along with the DBB's mechanical-electrical in-house coordinator and the subcontractor's startup personnel. They will also want to receive equipment training from the chiller manufacturer's startup technician and system training using the O&M manuals and contract drawings (that will eventually become the as-built drawings).

Once the startup has been completed and the ATC subcontractor and 3rd-party CxTAB consultant have completed the water balancing work, the HVAC subcontractor shall go through an automatic control system initial dry-run demonstration before the DBB contractor and his subcontractors demonstrate the system to the CxTAB consultant. The ATC subcontractor should also begin collecting system performance by trending pertinent HVAC system and equipment data by trending the following.

- outdoor air dry bulb and wet bulb temperature
- chilled water supply and return temperature
- space temperatures
- alarms
- chiller control points

Taking the same approach as the design engineering, the owner's O&M personnel should use a series of computer-generated touchscreen project checklists that allows his staff to confirm that the following facility files have been collected. This process should start at the beginning of construction and not at project closeout, so that the facility files can be inputted into a CMMS system. Touchscreen O&M checklists should include:

- equipment shop drawings
- O&M manuals, parts list, and lubricants
- troubleshooting tips
- seasonal startup and shutdown instructions

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

- location of shutoff valves, ATC valves, and balancing valves
- strainers
- equipment and control devices
- access for servicing equipment.

The training process should include not only specific HVAC system and equipment training but also emergency and security plan training due to security concerns (e.g., internet access). The hydraulic modeling of the entire system should be updated after the final TAB report. This will require the TAB subcontractor to provide the water balancing reports along with the associated system flow diagrams, noting quantities and pressures for rebalancing if necessary as part of the project closeout documents. Touchscreen training checklists should include:

- equipment
- system
- emergency plan
- automatic controls
- energy management