Scope of Work

2.5 Attachment B | Scope of Work

04.01 CHEM – LAB FUME HOOD AND BUILDING DDC CONTROLS

GENERAL

The current lab hood airflow control strategy is characterized by a sequence that provides for 2-position airflow control. The system was intended to operate at a constant elevated airflow level during the occupied period and a constant reduced airflow level during the unoccupied period. The air handling units serving this system are 100% outside air, requiring considerable heating energy. The current operation has very little reduction in airflow due to the existing hood design and the control sequence and schedule. To correct this issue, the hoods should be updated to current technology variable flow design and the existing building automation system should be replaced with current technology digital controls. The two parts will function as a complete system. The upgrade will result in considerable energy savings, better environmental control, and improved facility maintenance.

OBJECTIVES

- Reduce outside air being brought into the building and exhaust only the necessary amount.
- Controlling the lab hoods and building system through a single head end.

SCOPE OF WORK INCLUDES

1. Mechanical
   A. Convert all fume hoods from Constant Volume Bypass to Variable Air Volume by disabling/blocking off the existing bypass path for each device.
   B. Replace existing 2-position hood exhaust air valves with modulating hood exhaust air valves on all fume hoods.
   C. Replace existing room exhaust air valves with modulating exhaust air valves.
   D. Replace existing room supply air valves with modulating supply air valves. Reheat coils to be relocated as required.
   E. Replace controllers and actuators on supply boxes. Hot water valves to be reused.
   F. Employ a dedicated fume hood control in each room that is capable of BACnet integration to the updated BMS system.
   G. Add additional exhaust boxes, including ductwork, to rooms 002, 108, 109, 205, and 206
2. Controls
   A. Two control systems are to be provided; the lab hood control system and the building automation system. Both providers will be required to participate in assisting in a quality integration of the systems. The first will be a critical control system, specializing in the control of exhaust hood systems. The second will be a BMS that is capable of integration to the hood system and the owners existing Tridium campus head end.
   B. The hood controllers and room control system will be provided for the control contractor's installation.
   C. The hood system will include new sash sensors and fume hood monitors for each hood. Each room will be provided with a space controller to maintain temperature and pressure relationships, capable of integrating by BACnet to the BMS system.
   D. Replace the JCI Metasys controllers on the supply air and exhaust air VAV boxes that integrate with the room controllers that control the supply and exhaust flows to maintain appropriate room pressure and maintain space temperature set points via variable air volume control and reheat. This shall include a fast acting actuator, designed for use with the lab hood system.

Scope of Work

E. The new BMS system shall replace all existing JCI controllers in the building, including but not limited to the controls on AHUs, exhaust fans, fan coils, and the chiller and steam converter plant. It is the intent to replace all pneumatic controls and actuators with direct digital controls at this time.
F. The new system shall include an operator work station, web based interface, and graphics for all systems, including the new hood control system.
G. Existing sensors can be reused if applicable ad confirmed to be in good working order.

3. Electrical
   A. Provide power to new controllers as required.
   B. Existing VFDs are to be reused.
4. Structural
   A. Not applicable.
5. Architectural
   A. Not applicable.
6. Acoustical
   A. Not applicable.
7. Specialty
   A. Air balance will be required on the entire airside of the building. This shall include room airflow and pressure testing, hood face velocity testing and airflow measurement on the supply and exhaust fans.
8. Commissioning
   A. Upon installation a complete commissioning of the system will be provided. See the commissioning plan in the investment grade audit report .
   B. Manufacturer start up is required for both the lab airflow controls and the BMS. This start up shall be coordinated with the commissioning team for field witnessing.
9. Demolition and Removal
   A. Not applicable.
10. Allotments
    A. Not applicable.
11. Design
    A. Provide design as required for this FIM.
2. Measurement and Verification (M&V)
   A. Measurement and verification will be provided as spelled out in the investment audit report.
3. Training
   A. The lab hood control system will require 4 hours of owner training
   B. The BMS system will require 12 hours of owner training, including 4 hours occurring 6 months after building acceptance.

CLARIFICATIONS AND EXCLUSIONS

1. If existing equipment or components are reused, repairs to existing are not included unless specifically noted in the scope above.
2. This Proposal is based on completing the work either during the summer when school is not in session or during the school year and working off-shift work schedules as required to minimize impact to the teaching and learning environment in the buildings. This proposal is based on performing the work in accordance with the enclosed schedule and could require some service outages. During the course of the required outages, (some of which will likely not materially affect the Owner's continuing operations), McKinstry shall maintain a healthy and safe environment for the occupants.
3. This proposal is based on preparations to purchase, receive, handle, and stage material on site as well as to place construction debris in a dumpster (provided by McKinstry, if necessary) located within 100' of a building exit.
4. This proposal does not include costing for providing any "seed" stock or extra materials.

Scope of Work

5. This proposal does not include costs for hazardous material testing, removal and / or abatement. It is assumed that the Owner will bear any costs with hazardous material identification, abatement and remediation.
6. Should an authority having jurisdiction call upon McKinstry to repair or rectify real or potential code violations beyond those included in the scope above, Owner contingency funds will be used to cover the cost of repair.
7. In order to function properly, the new equipment included in the FIM described above requires interaction with many pieces of existing equipment that will remain in operation following the upgrade. Our scope of work does not include any work on the systems below other than what is required for complete installation and testing of the measures identified in this proposal.
    a. Plumbing systems (waste, water, vent, fixtures)
    b. Fire protection systems (smoke detectors, fire dampers, manual pull stations, etc.)
    c. Building envelope systems (windows, walls, glazing, etc.)
    d. Hydronic heating and cooling systems
    e. Electrical system upstream of the newly installed equipment or circuits
8. Excludes any additional structural support unless noted otherwise for proposed scope of work. Presumes the existing structural is adequate any impact or additional structural requirements for D-rating of structure is not McKinstry's responsibility. The existing structure is presumed adequate to support all existing and new dead loads. No structural revisions are anticipated to any of the building structure.
9. RCx involves testing functionality of existing HVAC equipment and controls. McKinstry will provide a list of deficiencies with repair estimates to the Owner. Repairs to existing HVAC equipment not explicitly noted in this scope are not included and will be priced separately for consideration by the Owner.