

Date of Report: September 7, 2017

Project Name: **Buckeye Woods Indoor Air Quality Investigation**
Client/Owner: **Southwestern City Schools**

Distribution:

| | | |
|----------------------|---|-------------------|
| Mr. Mark Waller | - | SWCS |
| Mr. Doug Sales | - | Heapy Engineering |
| Mr. John Harpest | - | Heapy Engineering |
| Ms. Danielle Bowling | - | Heapy Engineering |

Purpose: Investigate indoor comfort issues

Contacts:

Items:

The system operation was reviewed in room 207 during this visit and the following unit operating criteria was observed.

1. The chilled water temperature supplying the coil was measured at 51F entering.
2. The chilled water valve is operating as a modulating control.
3. The fan operation is constantly ON.
4. The fan speed is currently set MEDIUM on the selector switch.
5. There is a supply air temperature sensor installed in the supply duct.
6. There is a common outdoor air duct (12 inch round) with a single control damper and 2 position actuator that feeds the two blower coil return plenums of the units in the adjacent classrooms, this control damper is closed at this time and only opens when the heating water system is active and there is a call for cooling in the classroom somewhat of an economizer cycle.

The chiller was operating with a 48F supply water setpoint which explains the 53F chilled water entering the blower water coil. This setpoint was lowered to 44F during this visit and thus provided a 46F water temperature to the coil.

The basic system is operating currently as originally designed.

There was a temperature and humidity data logger installed in room 207 on August 31, 2017 to collect data under normal operating conditions to determine what the issue is and how to correct it. The data logger was retrieved and downloaded on September 7, 2017 the data was reviewed and found to indicate levels of fluctuating humidity even when the temperature was holding or slightly below the cooling setpoint of 74F.

This condition is evident of the outdoor air leakage past the control damper and entering the system airstream at all times with the fan on constantly, the humidity levels increased as the outdoor conditions increased while maintaining room temperature due to low load conditions.

The following recommendations are provided to enhance the performance of the equipment currently in place, most can be achieved with manual and minor control logic programming;

1. Operate the fan in the auto position instead of constant, this will only operate the fan when a cooling or heating call from the thermostat is active and will prevent unconditioned outside air from entering the system constantly when the coil is inactive.

2. Set up a discharge air setpoint control for the cooling cycle of 52F, this will inadvertently convert the modulating control valve into a 2 position valve which will lower the cooling coil temperature and provide a better dehumidification cycle. This will utilize the existing supply air temperature sensor and can be accomplished with minor control programming.
3. Reset the fan speed setting from medium to low, this will only lower the fan performance by 100 cfm but will slow down the temperature and air changes in the room which will also help with the dehumidification by keeping the unit in a cooling mode longer.
4. With the current outside air damper configuration as it is, no controllable minimum outdoor air control can be achieved. A solution to this issue would be to add an inline modulating control damper for each blower coil downstream from the single outside air damper to control the outside air individually for each blower coil, the availability of a modulating output on the current unit controller would need to be identified before pursuing this.

Project Review: (items identified below have been observed and may require attention or correction. Heavy generated Issues Log(s) and/or Field Report(s) DO NOT INFER, NOR RELIEVE the contractor, nor its subcontractor(s) of responsibility to perform to the project Contract Documents, Manufacturer's Installation Guidelines, applicable Local or National Codes and Proper Installation of the Product(s).

Dennis Magoto
Construction Services Representative
Dayton Office