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Macalester College - Recommissioning Study

March, 2010

Maintenance and Operation Issues

#	Issue	Description	Recommended Action
1.	Continuous commissioning and maintenance of Energy Management Systems	To operate at peak performance requires that additional time be allocated for observing, adjusting, repairing and maintaining the digital and pneumatic control systems on campus	**Reallocate work time from existing staff or hire additional staff to perform tasks related to the operation and maintenance of the two automation and related control systems on campus**
2.	Energy Management System floor plan graphics	There are currently only 3 buildings that have floorplans on the graphics: Campus Center, Rice/Olin and 77 Mac	**Provide floor plans with temperature setpoints and 5-color spectrum for actual temperature variance from setpoint for all academic buildings**
3.	Energy Management System air-handler graphics	There are few graphics that depict air-handlers and heat exchangers which provide useful information to system operators	**Provide air-handler and heat exchanger graphics for all air-handlers, heat exchangers and pumps in the academic buildings and residence halls**
4.	Monitor for viewing EMS graphics	To fully observe all of the graphic details a larger (22” or more) monitor is desirable	**Procure a larger monitor for EMS viewing**
5.	Energy usage	The existing electrical and steam condensate	**Connect the meters to existing field controllers**

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	monitoring	meters can be connected to the EMS for building energy use tracking	**and program to read out on the EMS**
6.	Campus Center vs. Student Center nomenclature	On the automation system there are two names for the same building which makes it confusing to identify schedules, trends and operating parameters	**Rename all equipment and points associated with Student Center to Campus Center, and restart trends with new names**
7.	Return heating water temperatures	There are no sensors that indicate the temperature of return heating water so it is difficult to determine if the system is using more energy than necessary	**Install surface temperature sensors on all heating water return piping and tie in to the EMS**
8.	Building static pressure sensors – Carnegie and Library	There are no sensors to determine if the building static pressure is being properly relieved by the return air fan/dampers	**Install building static pressure sensors to use both in measuring and controlling building static pressure**
9.	Winter operation of chilled water pumps in Kagin Hall	The automation system trend identified the chilled water pumps running during the month of November when the chiller plant was no longer in operation	**Review the software program and sensor calibration or perform other troubleshooting to determine why the pumps are not operating correctly**
10.	Kagin air-handler AT-2 operating with minimum air during unoccupied heating cycle	During unoccupied periods when AT-2 needs to run for heating the space, the minimum setting of outdoor air remains although it is not required and is energy inefficient	**Review the software program and determine if there is an error, or if it needs to be modified**
11.	Kagin air-handler AT-2 in continuous operation during January, 2010	Air handler AT-2 ran on occupied cycle the entire month of January	**Review the software program and determine if there is an error or if some other factor prevented the unit from turning off as normally scheduled**
12.	Trends for chilled water plant	There are currently no trends of the operating parameters for this large chiller plant so that efficiency and performance can be tracked	**Arrange for trending of all variable parameters in the chiller plant, including chilled water and condensing water temperatures, pump and chiller operating parameters**
13.	Chapel air-handler S-1 in continuous	Trends show that air handler S-1 ran during periods when it was scheduled to be off	**Review the software program and determine if there is an error or if some other factor**

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	operation		**prevented the unit from turning off as normally scheduled**
14.	Chapel air-handler S-2 hot deck temperature fluctuation	Trends show that air handler S-2 hot deck is hunting between 75° and 95°	**Review the software program and determine if the PID loop needs tuning or if there are other factors that are causing the hunting to occur**
15.	Chilled water pump Campus Center	It was observed that the balance valve was closed to a setting of under 50% flow, according to the pointer arrow on the triple duty valve	**This valve (along with all others on pumps with variable frequency drives) should be opened to 100% because there is no reason to restrict flow on a variable pumping system**
16.	Campus Center AHU-2 and MUA #2 discharge air control	There is wide variation in the temperature between actual and setpoint, although the chilled water valve is 100% open	**Review the mechanical equipment and the software program and determine what factors are causing this variation to occur**
17.	Campus Center AHU-3 chilled water valve	There is severe hunting of this chilled water valve resulting in a 15° variance in discharge air temperature	**Review the software program and determine if the PID loop needs tuning or if there are other factors that are causing the hunting to occur**
18.	Campus Center AHU-3 mixed air damper	There is severe hunting of this actuator resulting in a 20° variance in mixed air temperature	**Review the software program and determine if the PID loop needs tuning or if there are other factors that are causing the hunting to occur**
19.	Campus Center AHU-4 mixed air and discharge air temperature swings	There is wide variation in these temperatures throughout the day (10°), indicating that the control system is not functioning properly	**Review the mechanical equipment and the software program and determine what factors are causing this variation to occur**
20.	Campus Center Game Room AHU-4 mixed and discharge air control	There is wide variation in the temperature between actual and setpoint, indicating that the control system is not functioning properly	**Review the mechanical equipment and the software program and determine what factors are causing this variation to occur**
21.	Campus Center MAU-3 discharge air temperature	There is wide variation in these temperatures throughout the day (20°) in the heating mode, indicating that the control system is not	**Review the mechanical equipment and the software program and determine what factors are causing this variation to occur**

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	swings	functioning properly	
22.	Campus Center AHU-4 return air dampers	The airflow is operating in the reverse direction from the return/relief dampers; this could be caused by the return air fan operating below design airflow, or other factors	**Review the mechanical equipment operating parameters and troubleshoot to determine what factors are causing this to occur**
23.	Weyerhauser Hall exhaust fan EF-3	This fan is creating excessive noise that can be observed both within and outside the building	**Perform troubleshooting to find out if the fan is experiencing mechanical issues that could lead to operational failure**
24.	Kagin room 102 high air flow	It appears that there is a leaking reheat coil because there is high air flow into the space, even though there is limited heat gain from the space	**Perform troubleshooting to find out if the reheat coil is leaking, or whether this is a software issue**
25.	Kagin entry foyer	This space is fully heated and cooled, but because it is all glass, uses much energy to accomplish this	**Program for a seasonal floating temperature setpoint to allow higher temperature fluctuations**
26.	Library lower level mechanical room exhaust fan and dampers	The exhaust fan is running, however the dampers to allow outside air into the space are disconnected, thereby rendering the exhaust fan useless for cooling the space	**Perform troubleshooting to find out if the damper is experiencing mechanical issues or if there are other control or programming issues that need to be corrected**
27.			
28.			