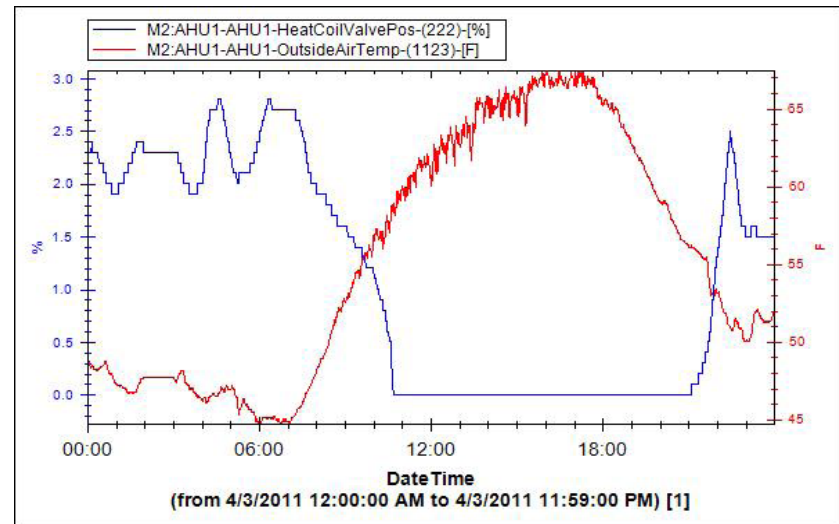
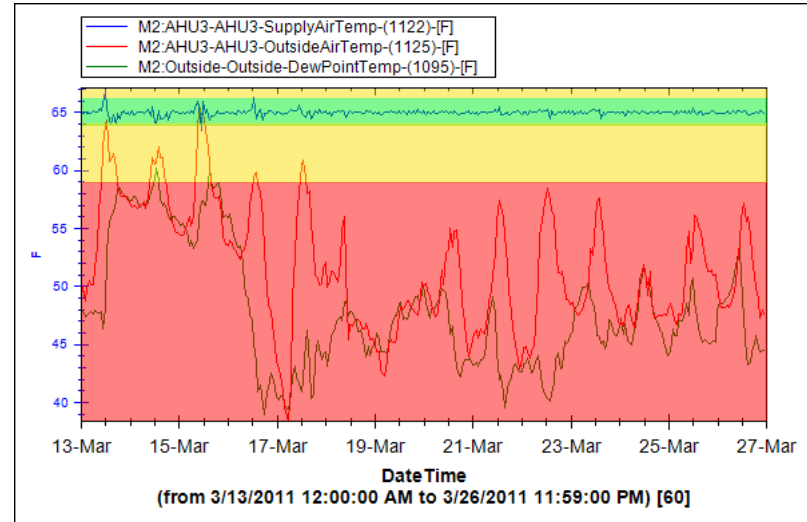
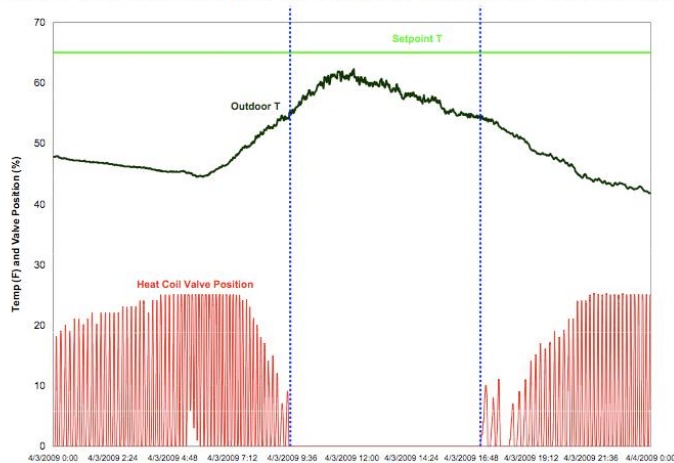


Lab 3

Query 1 Findings

Query 3 Overview

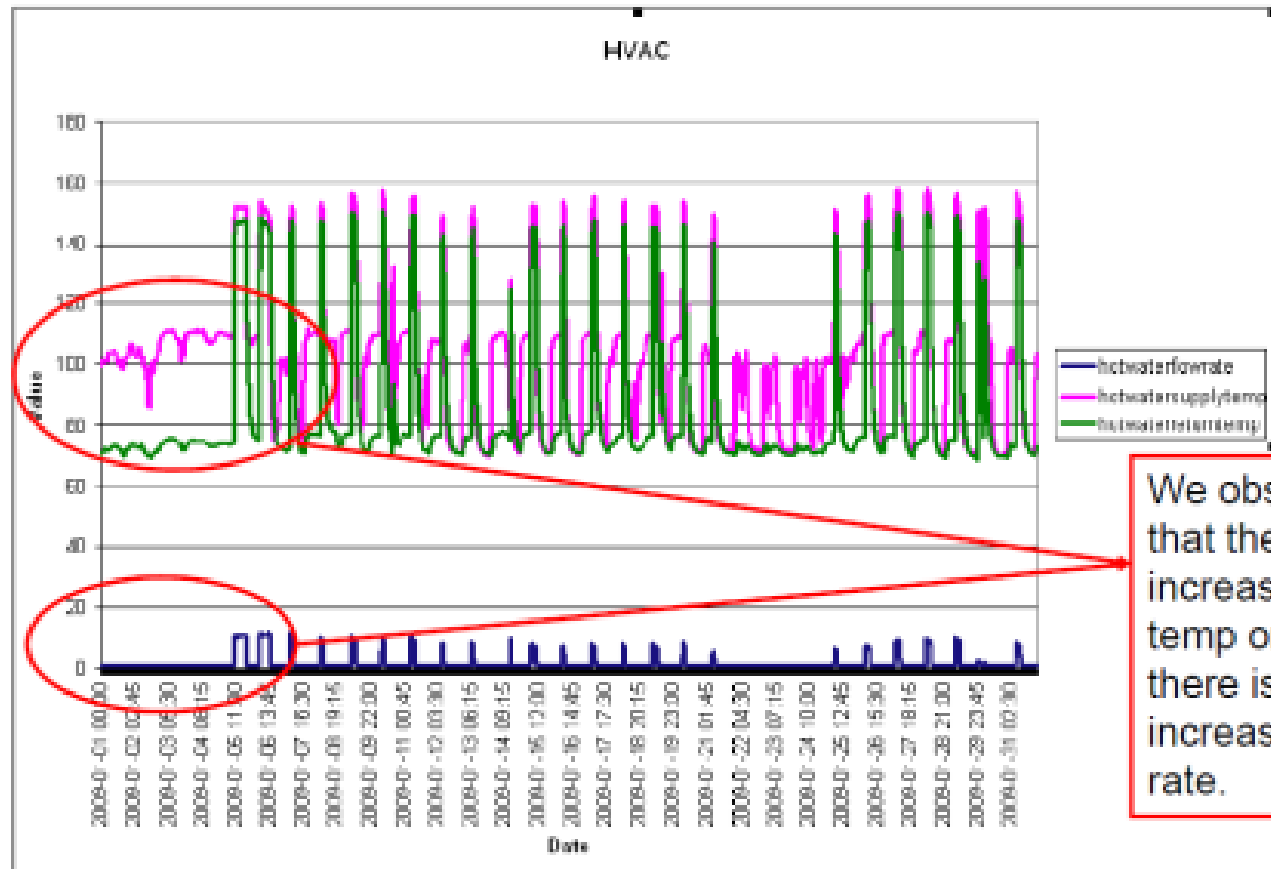
System Response- Heating coil valves are only at appropriate times, however they fluctuate open/closed rapidly in small time increments.



Group 1 Findings

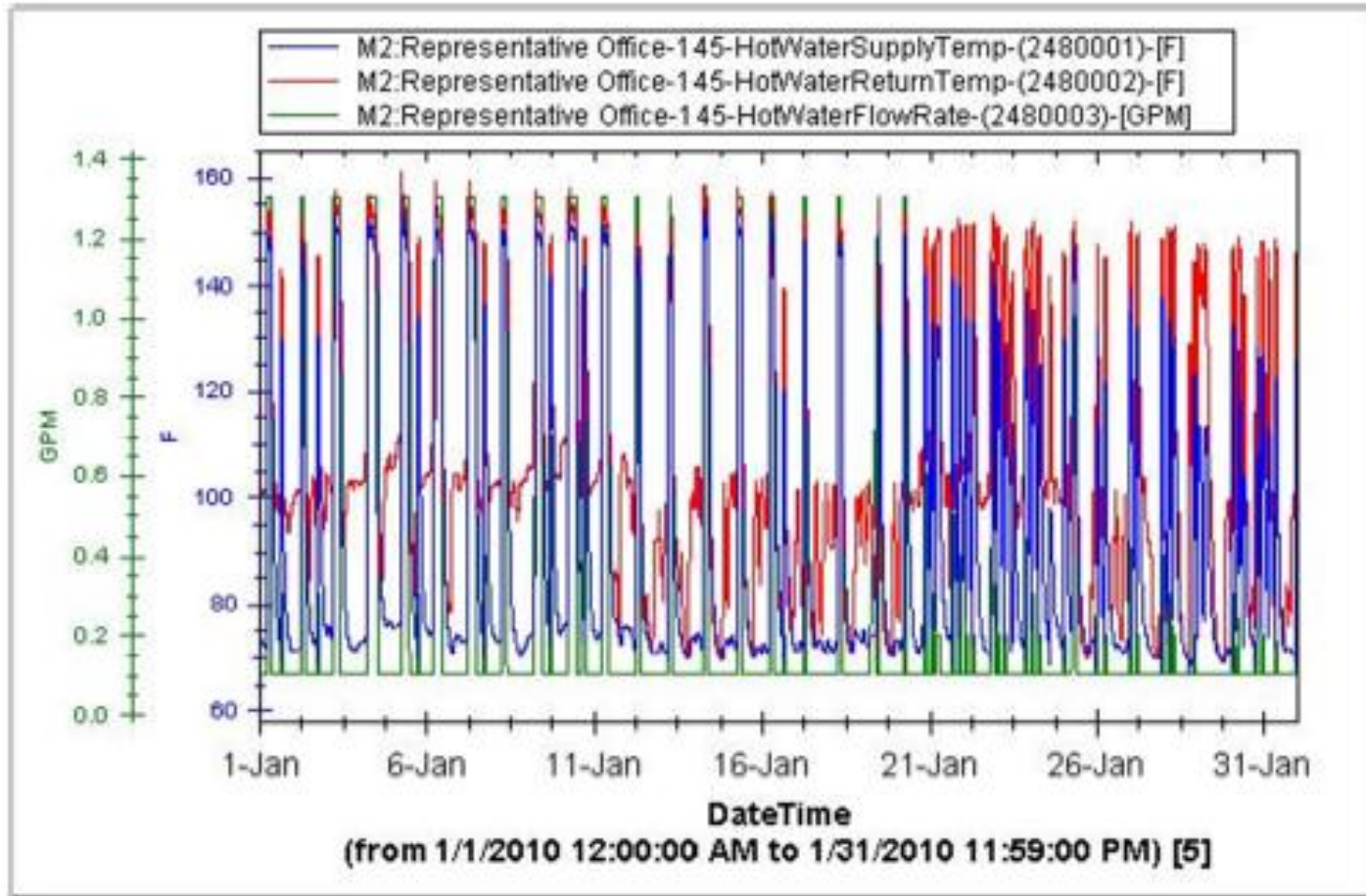
HVAC

Hot water Supply temp/ Return temp/ flow rate



We observe that there is an increase in temp only when there is an increase in flow rate.

Group 1 Findings



- Temperatures increase when there is an increase flow.
- The 2009 peak values are about 10 and the 2010 data peak at about 1.3.
- Inappropriate
- This could be an incorrect setting for the sensor.

Group 2 Findings

Valve Position

◆ Valve23Pos ■ Valve13Pos ▲ Water FlowRate

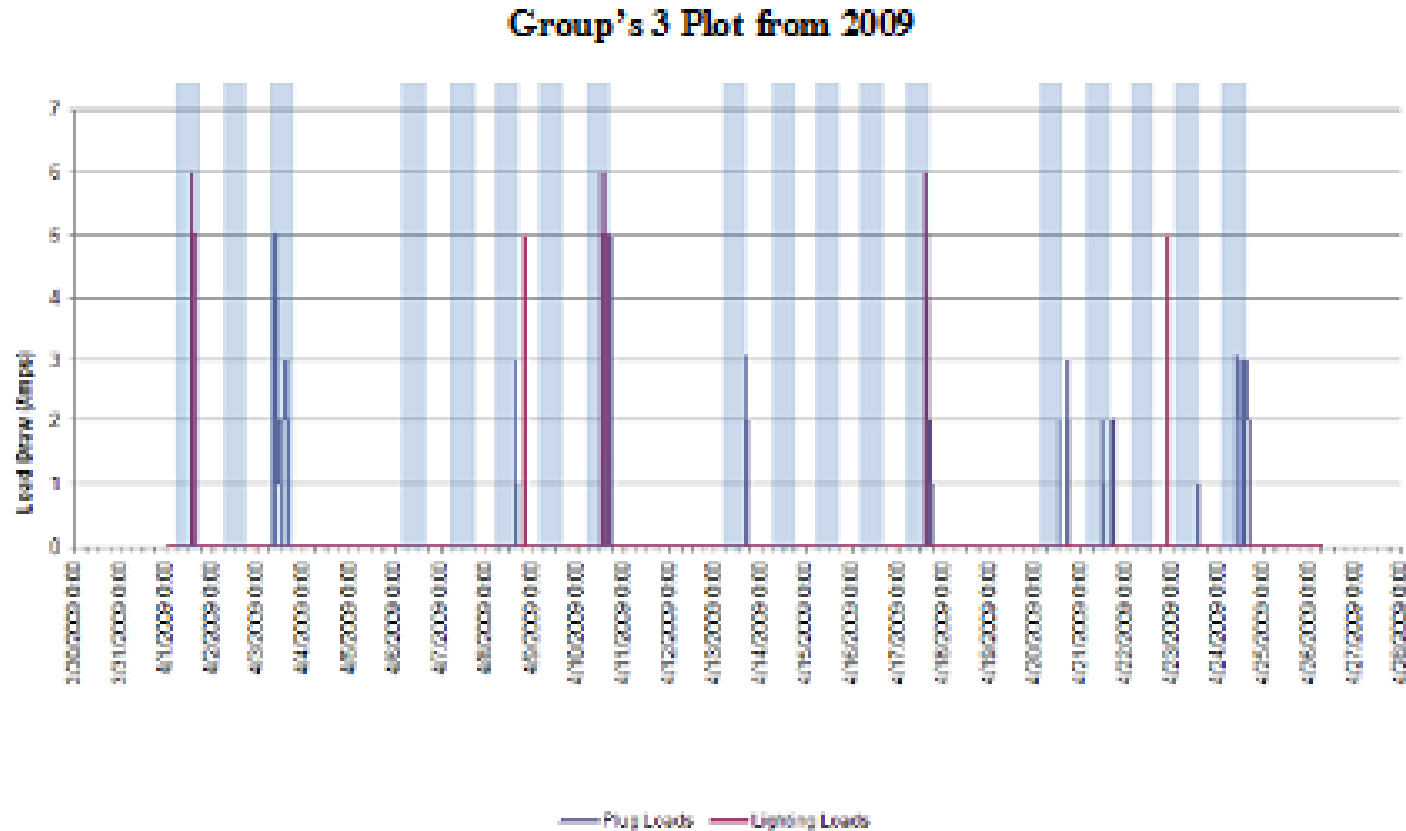
100

150

— M2 Hot Water Loop-Steam-Valve23Pos-(1136)-[%]
 — M2 Hot Water Loop-Steam-Valve12Pos-(1135)-[%]
 — M2 Hot Water Loop-HotWaterLoop-WaterFlowRate-(2410014)-[GPM]

- Could not find Valve13 and could only find Valve12 in the Y2E2 database
- Typo?
- Conclusion should be changed to accurately represent this (1/2 valve instead of 1/3 valve).
- Real photo of each system next to the schematics given in the manual.

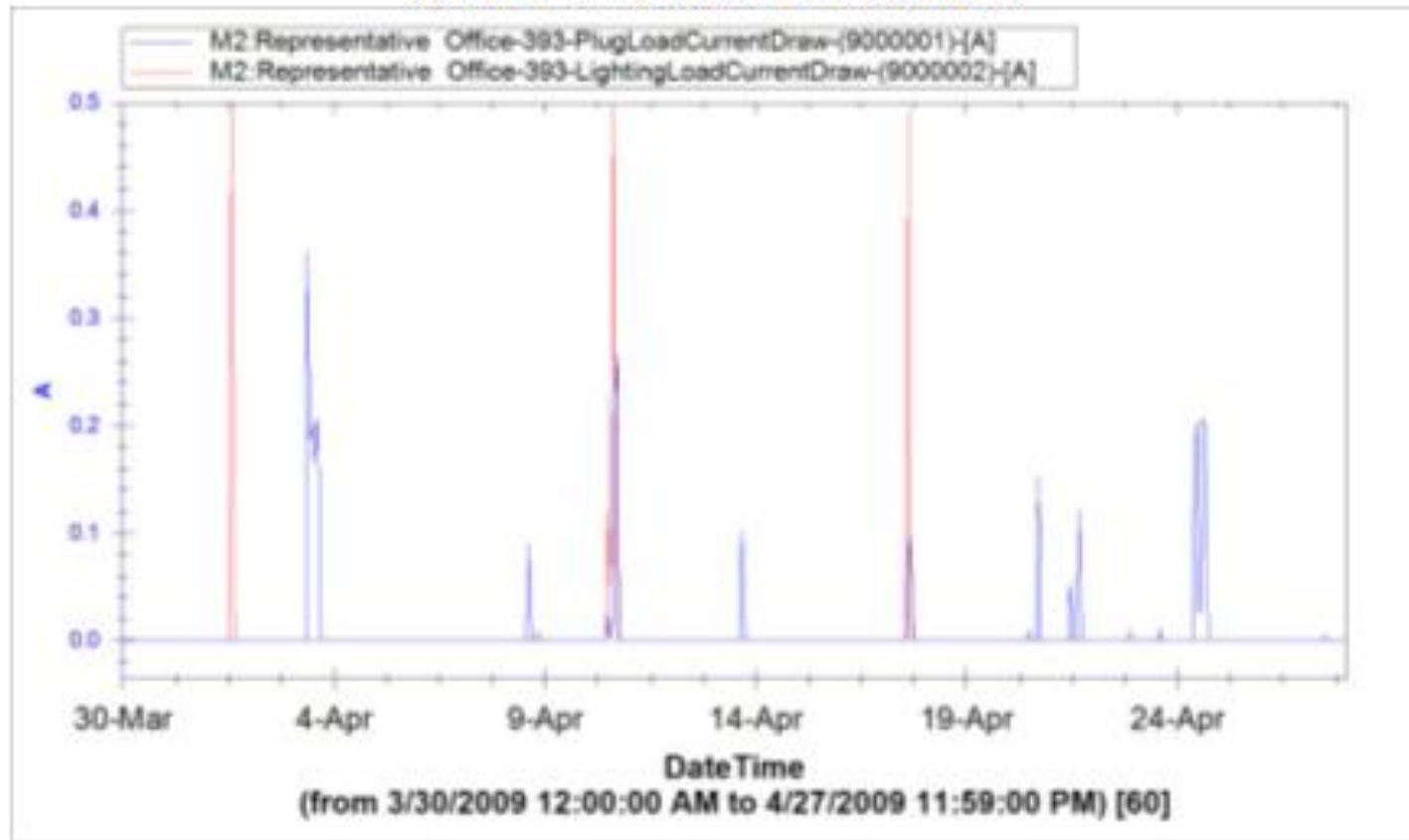
Group 3 Findings



- Not clearly stated what the columns represented in the first graph.
- Assumption and uncertainty.
- Columns should be added to the legend.

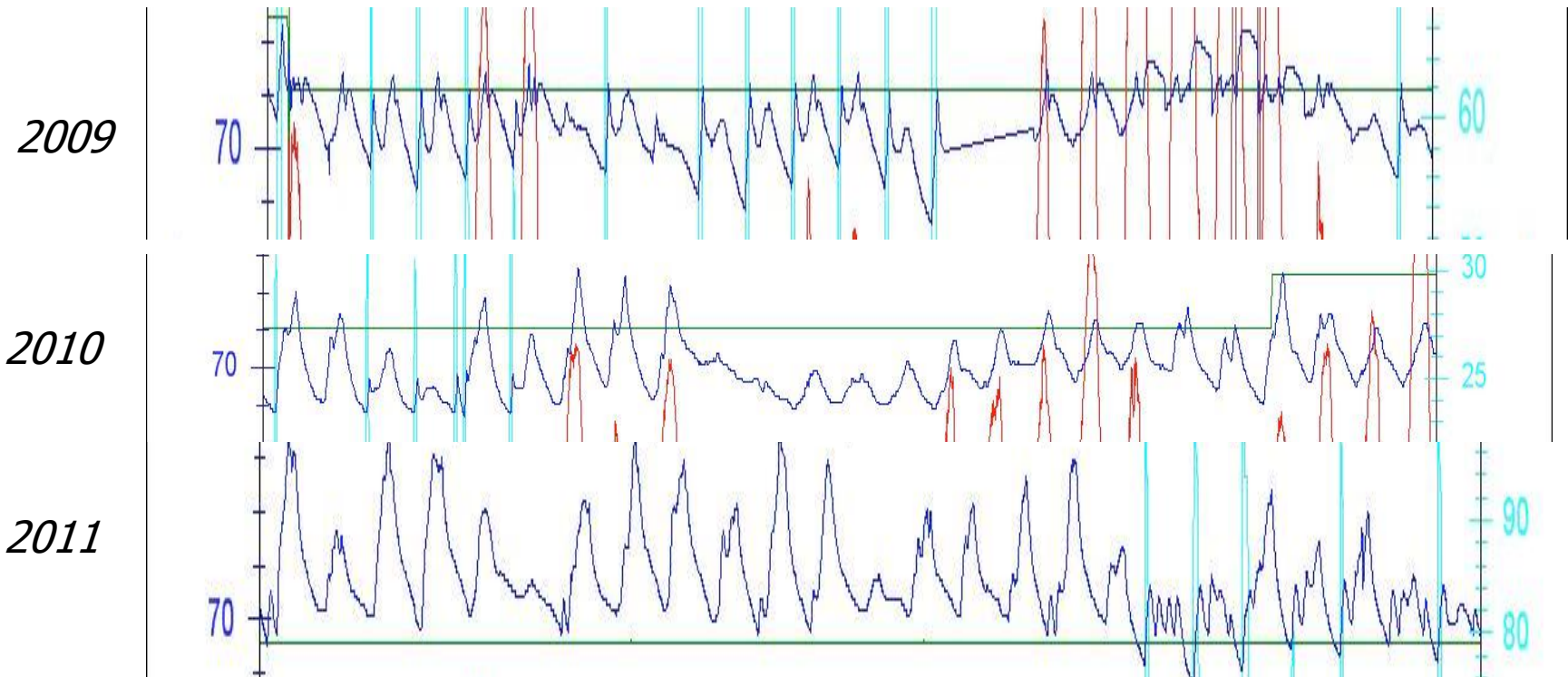
Group 3 Findings

SEE IT Generated Plot for 2009 Values



- The range of values from SEE IT goes from 0 to 0.5 amps
- Plot from the report goes from 0 to 6 amps. Missing multiplying factor?

Group 3 Findings



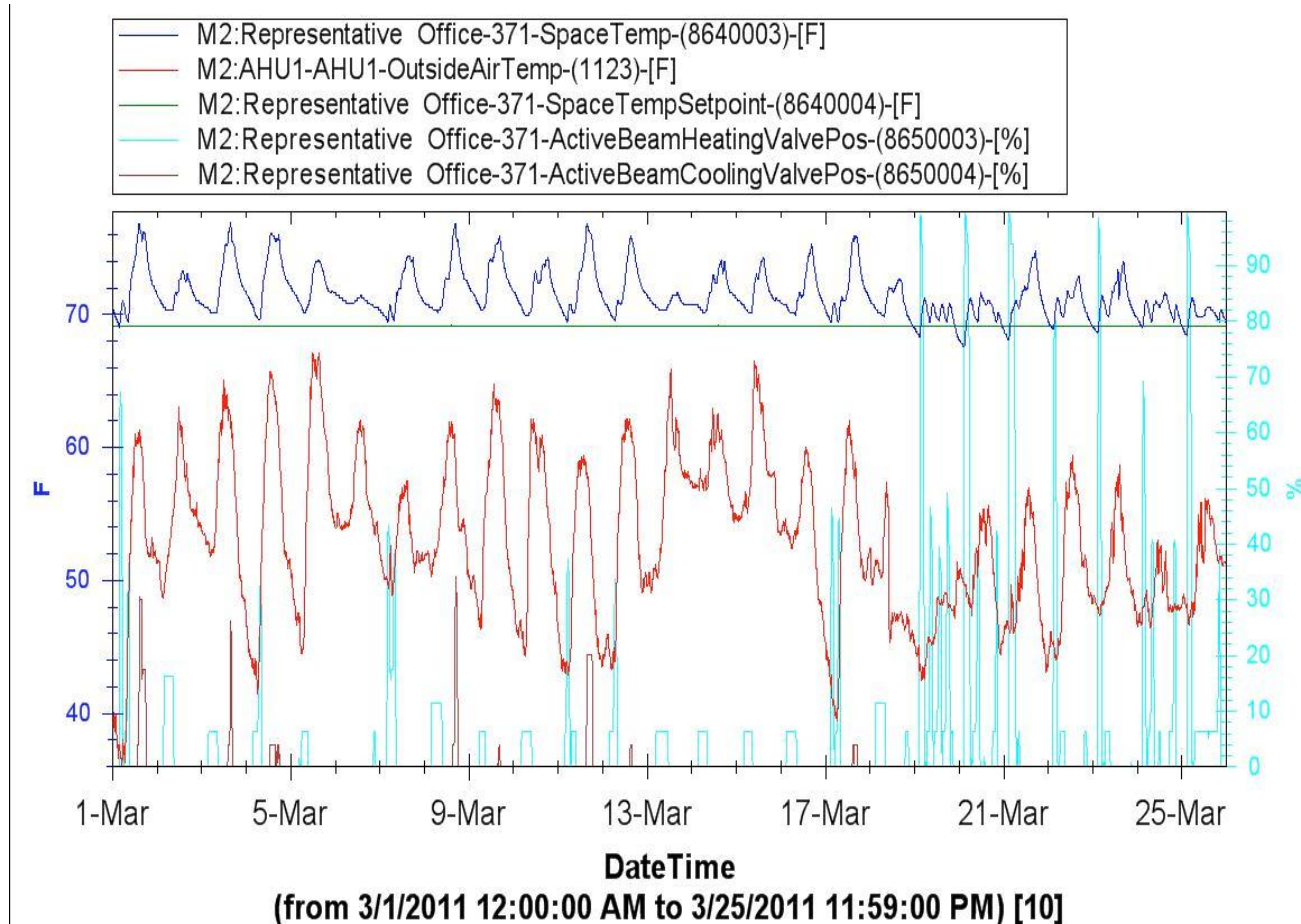
- M2:Representative Office-371-SpaceTemp-(8640003)-[F]
- M2:AHU1-AHU1-OutsideAirTemp-(1123)-[F]
- M2:Representative Office-371-SpaceTempSetpoint-(8640004)-[F]

Which one of these doesn't belong?

Group 3 Findings

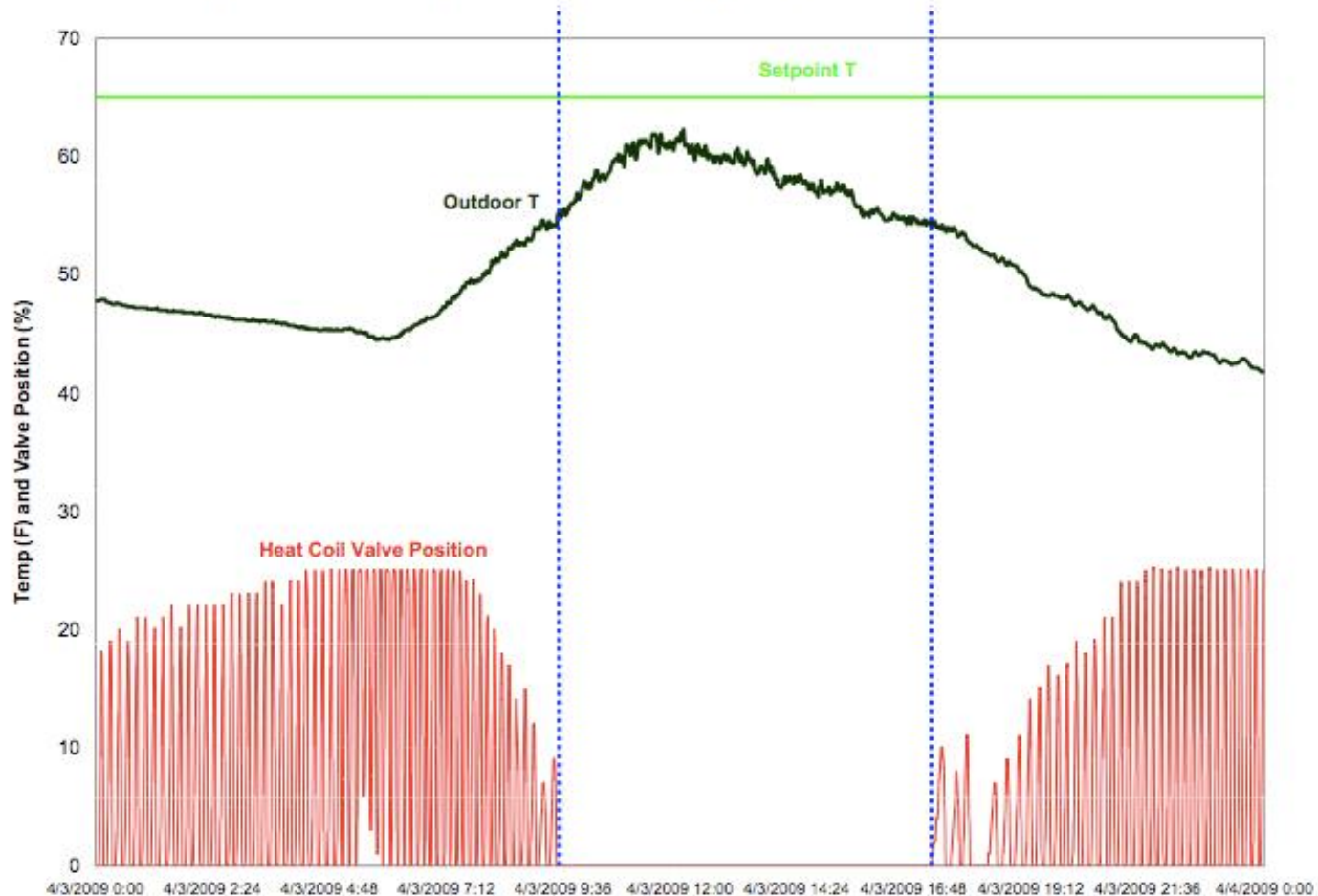
Next logical step:

Check when Active Beam was contributing cooling or heating and what effect that had on space temperature

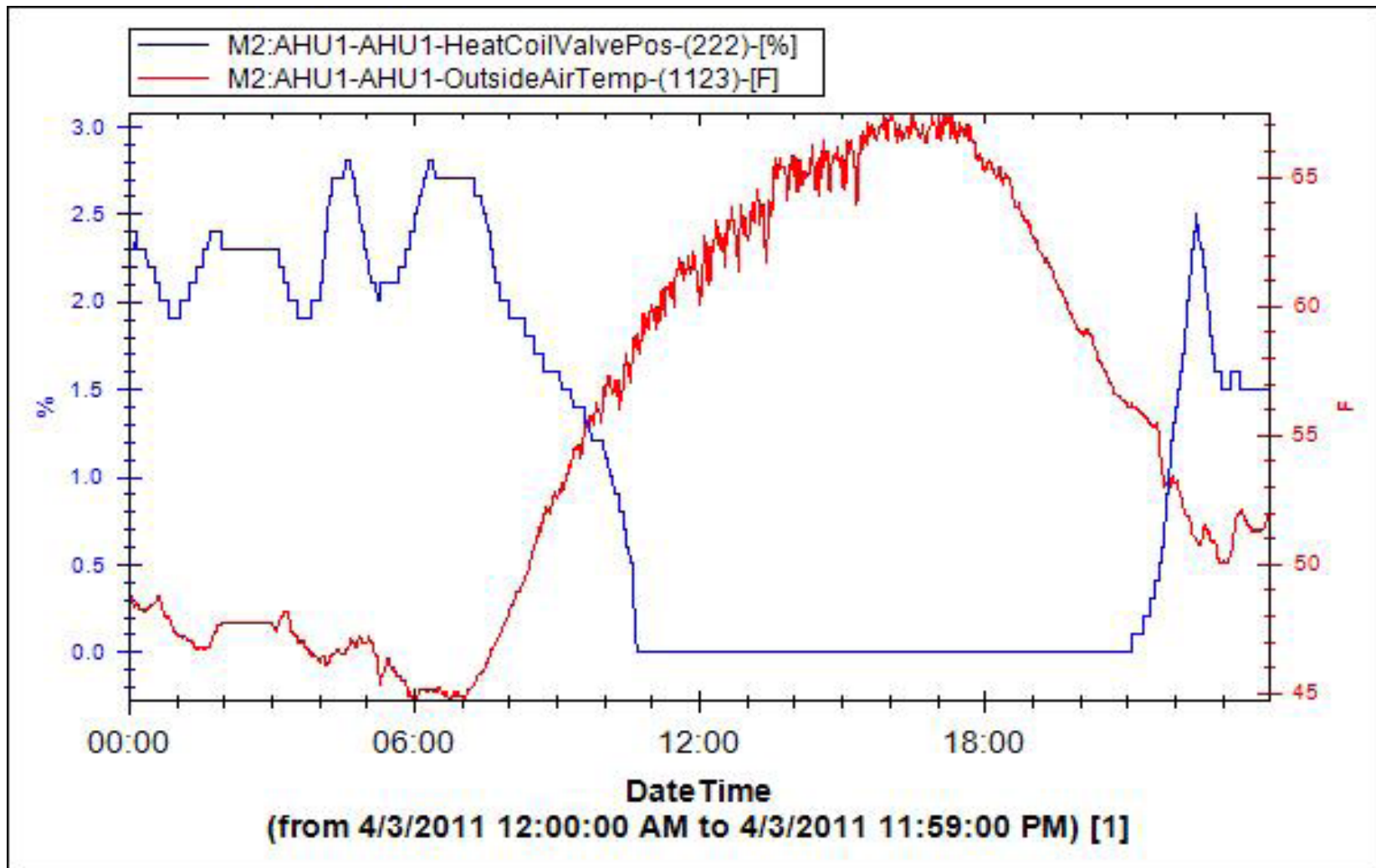


Group 4 Findings

System Response- Heating coil valves are only at appropriate times, however they fluctuate open/closed rapidly in small time increments.

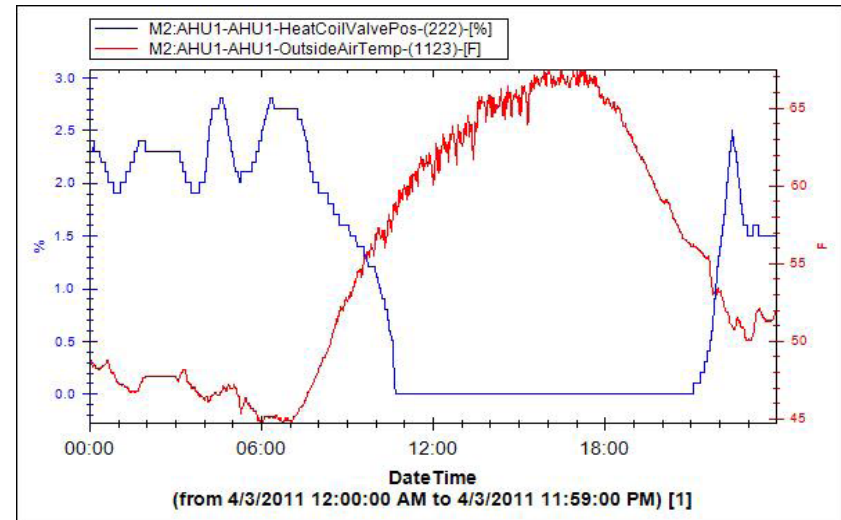
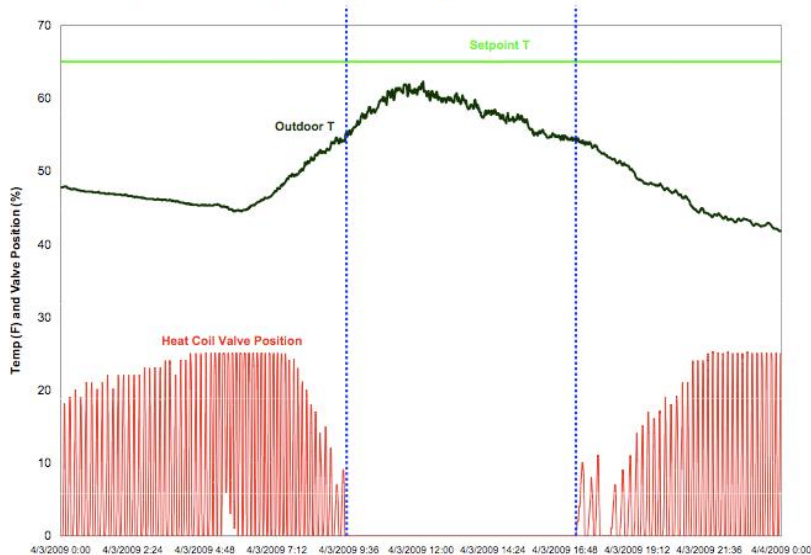


Group 4 Findings



Group 4 Findings

System Response- Heating coil valves are only at appropriate times, however they fluctuate open/closed rapidly in small time increments.

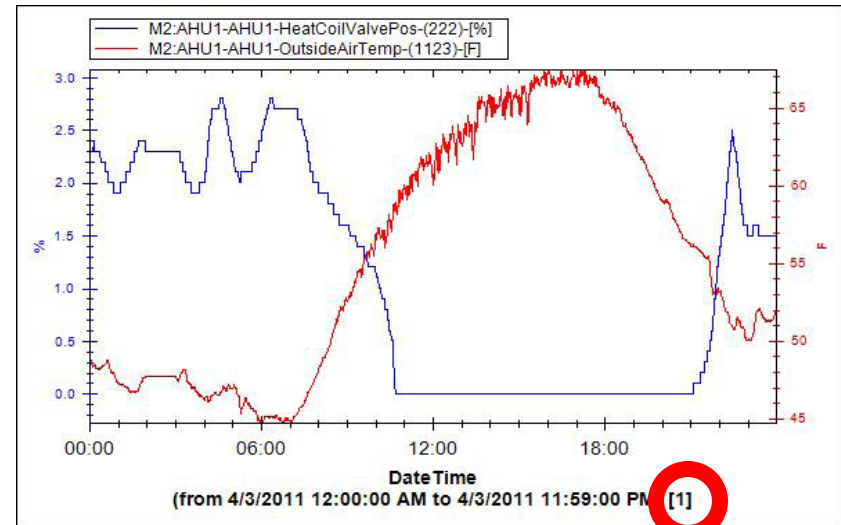
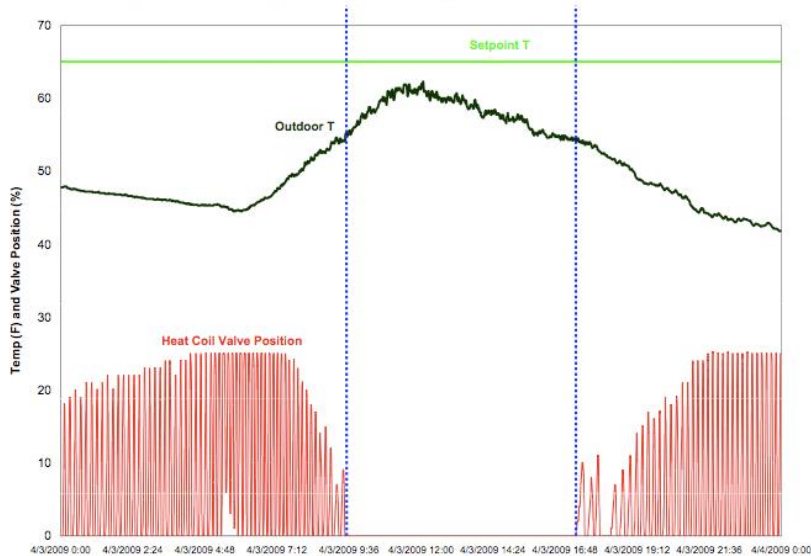


Heating coil valve's opening and closing fluctuated much more in 2009 than in 2010.

The heating coils are working at 2% now rather than the 20% shown in 2009 graphs..

Group 4 Findings

System Response- Heating coil valves are only at appropriate times, however they fluctuate open/closed rapidly in small time increments.

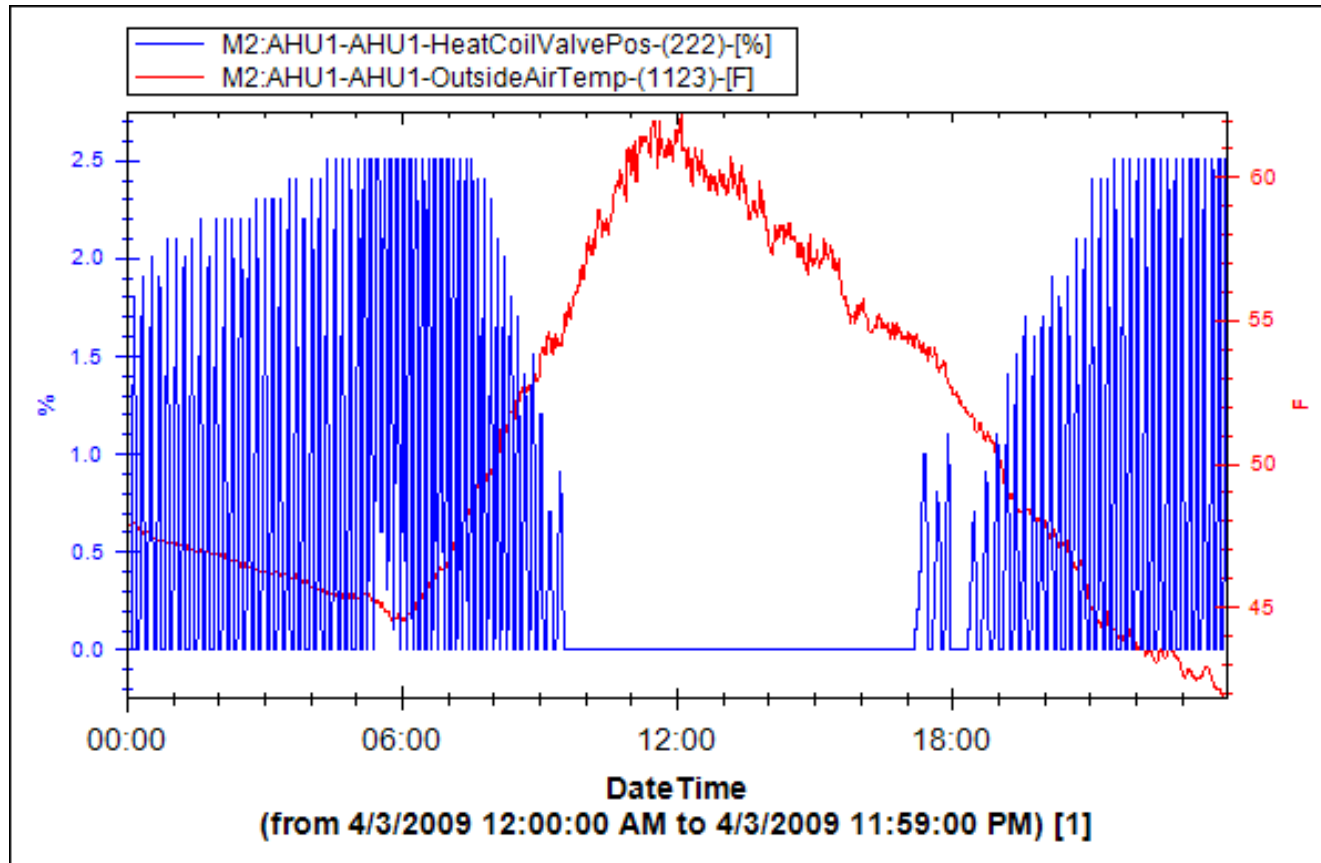


Notice appropriate interval

Heating coil valve's opening and closing fluctuated much more in 2009 than in 2010.

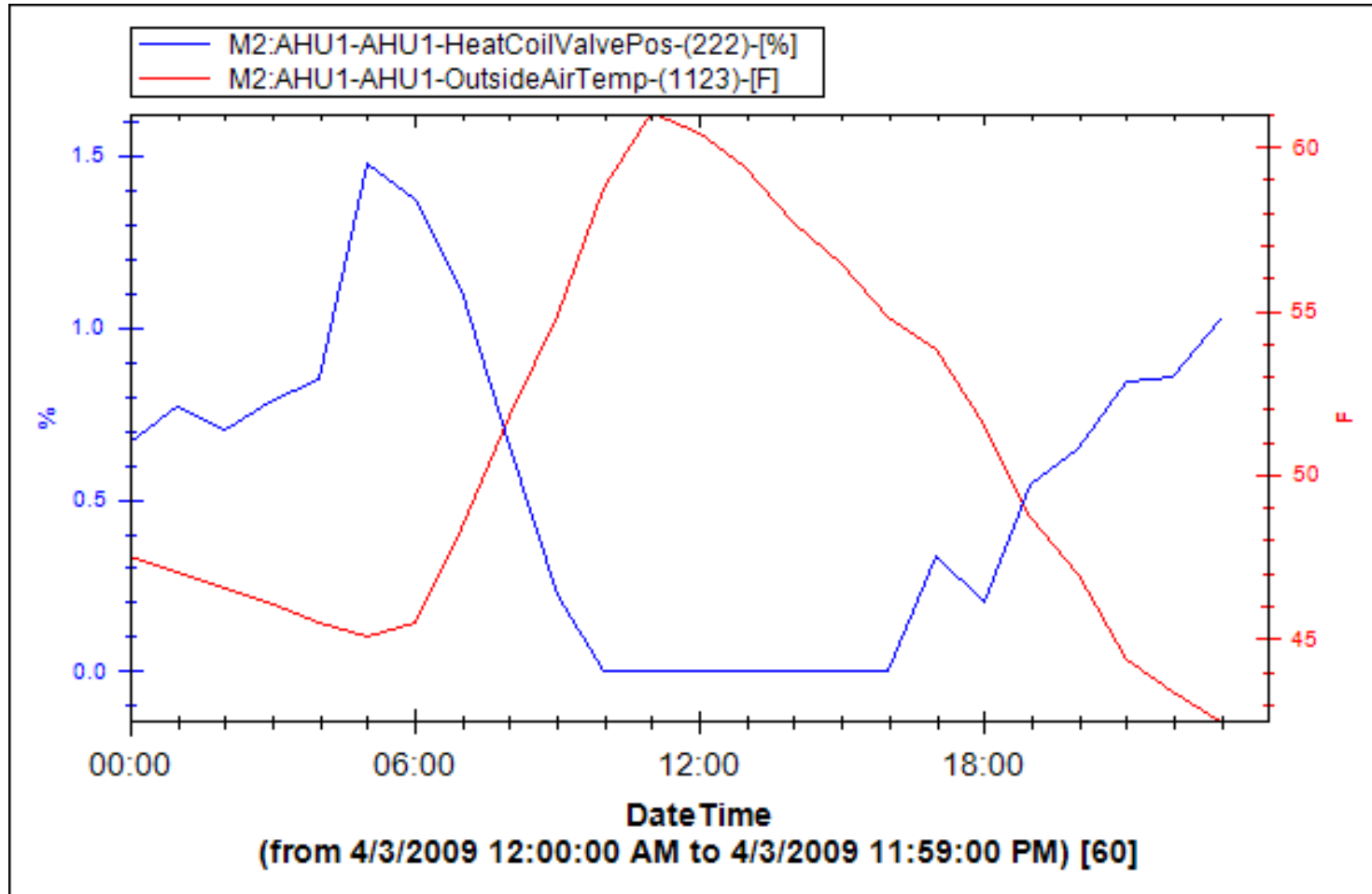
The heating coils are working at 2% now rather than the 20% shown in 2009 graphs..

Importance of Graphing Intervals



Valve cycling problem

Importance of Graphing Intervals

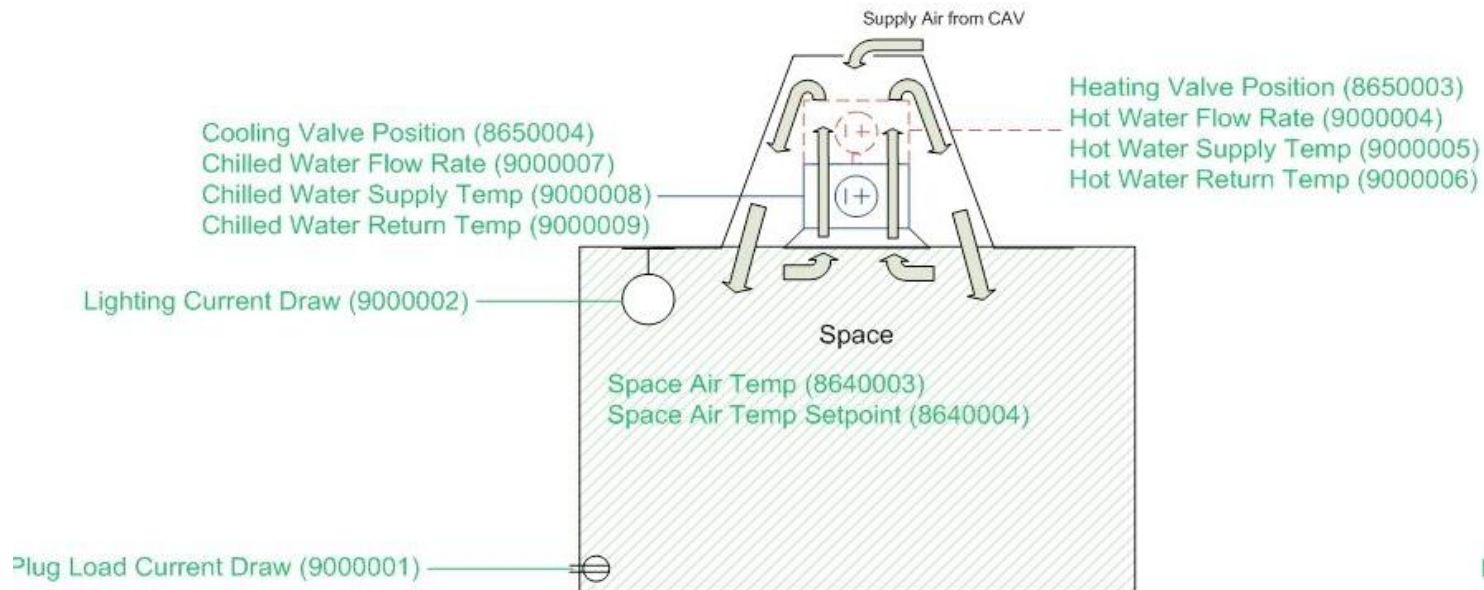


Problem Solved?!

Query 3

- Analyze assigned representative office

Representative office with active beams
(e.g., 371, 393)



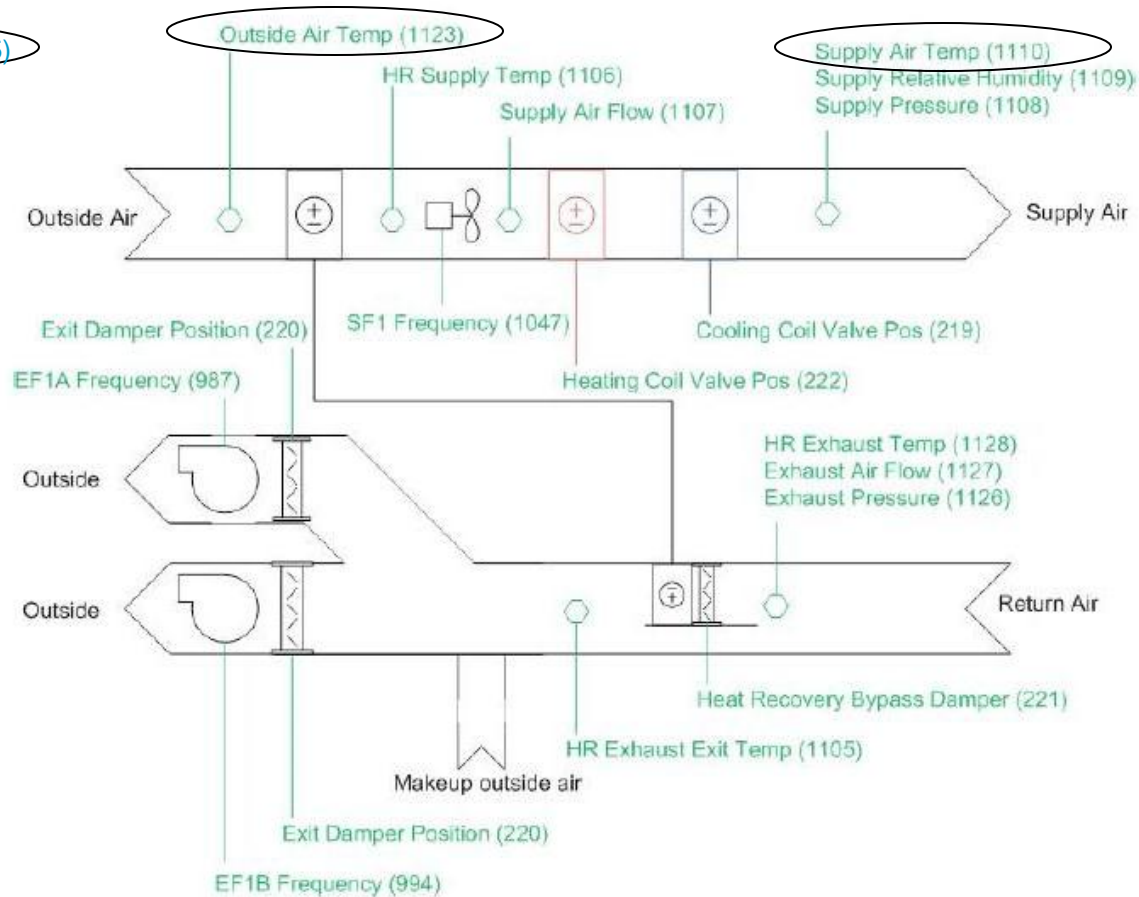
Query 3

- Small set of graphs
- Combine several points per graph
- Use each point at least once
- Utilize each graph type at least once
 - Time Series
 - Scatter Plot
 - Carpet Plot
- Add status bands
- Assign traffic signal
- Provide rationales and lessons

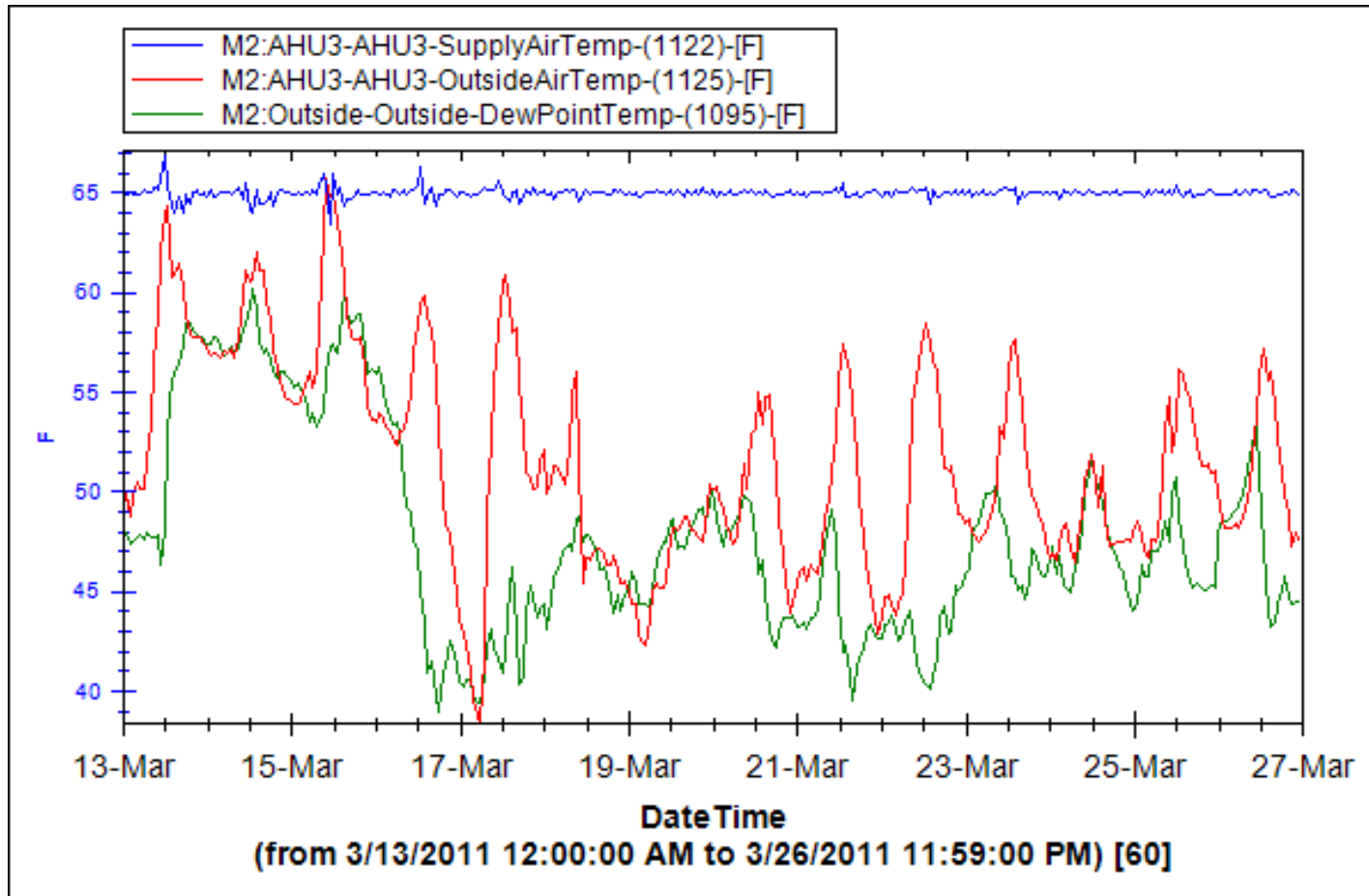
AHU 3 Example

AHU (e.g. AHU R1)

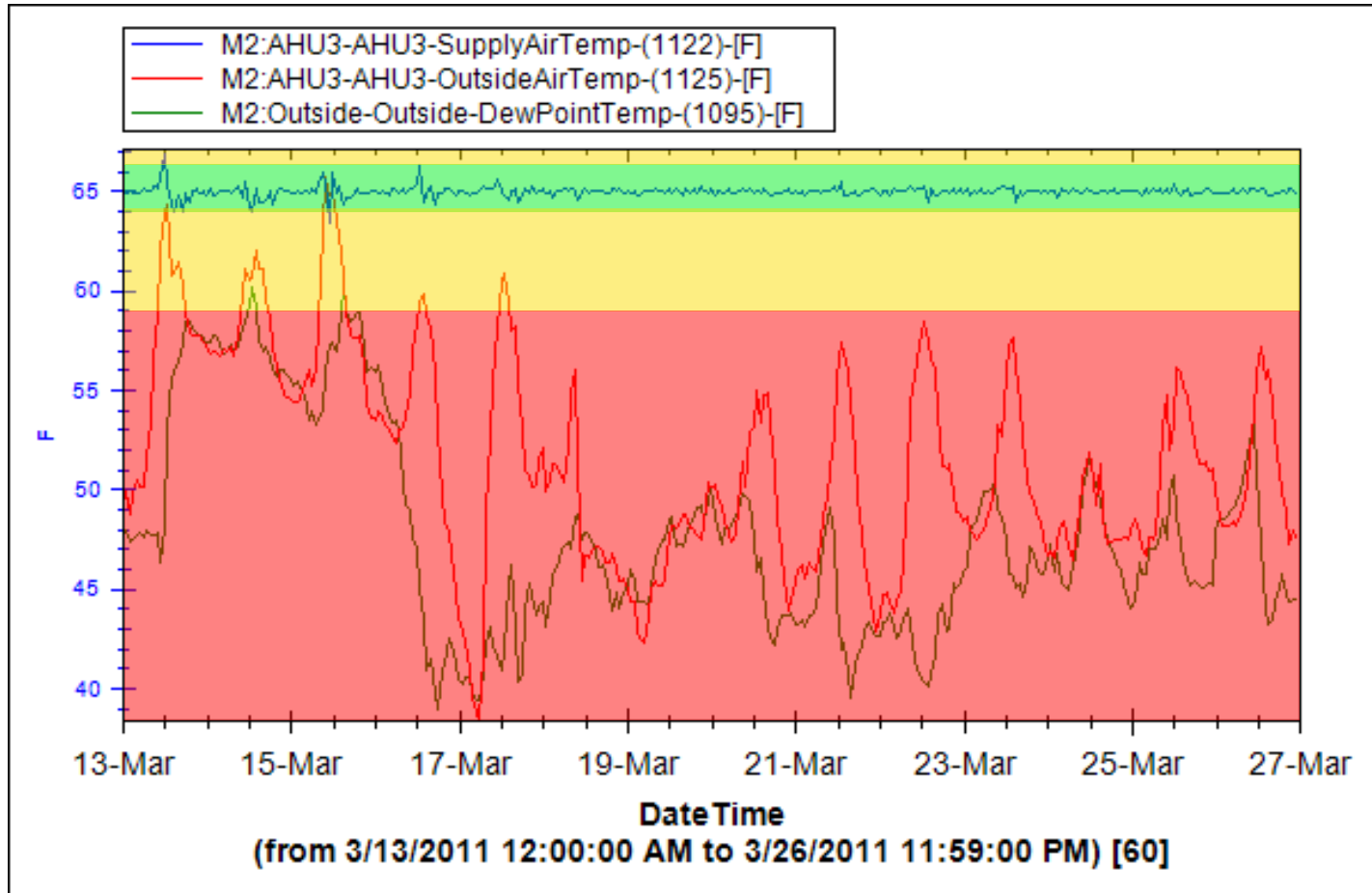
DewPoint Temp (1095)



Plot in SEE IT



Add Status Bands




Add to Wiki and Annotate

Article Discussion Edit History Move Watch

AHU 3

AHU 3 Initial Analysis

[edit]



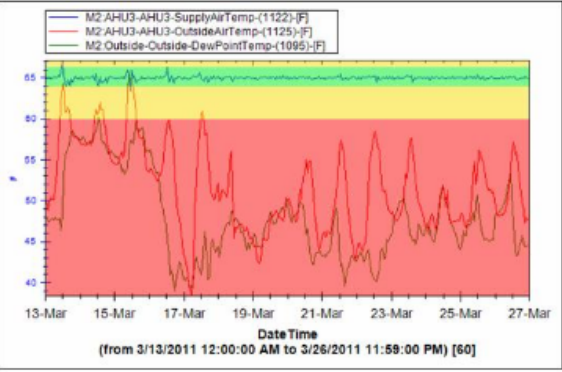
SUPPLY AIR TEMPERATURE

[EDIT]

We compared the supply air temperature against the outdoor air temperature and the dewpoint temperature. We chose the points since the supply air temperature is supposed to enter morning warmup from 2 am to 6am if the daytime outdoor air temperature does not exceed 68 F. The supply air temperature is also supposed to be higher than the dewpoint temperature at all times.

The supply air temperature is set to 65 F (unless it is morning warmup mode). Morning warmup mode allows the temperature to drift up to 69 F. Our functional band was selected around the 65 F supply air temperature, with a degree above and below. Since there is no other set deadband indicated, we believe anything above or below 1 F shows inconsistency. Since the dewpoint reached as high as 60 F, we decided anything lower than that should be marked as red due to the implications on condensation and building material integrity.

The graph type was selected so we could look at individual time periods when considering the morning warmup mode option.



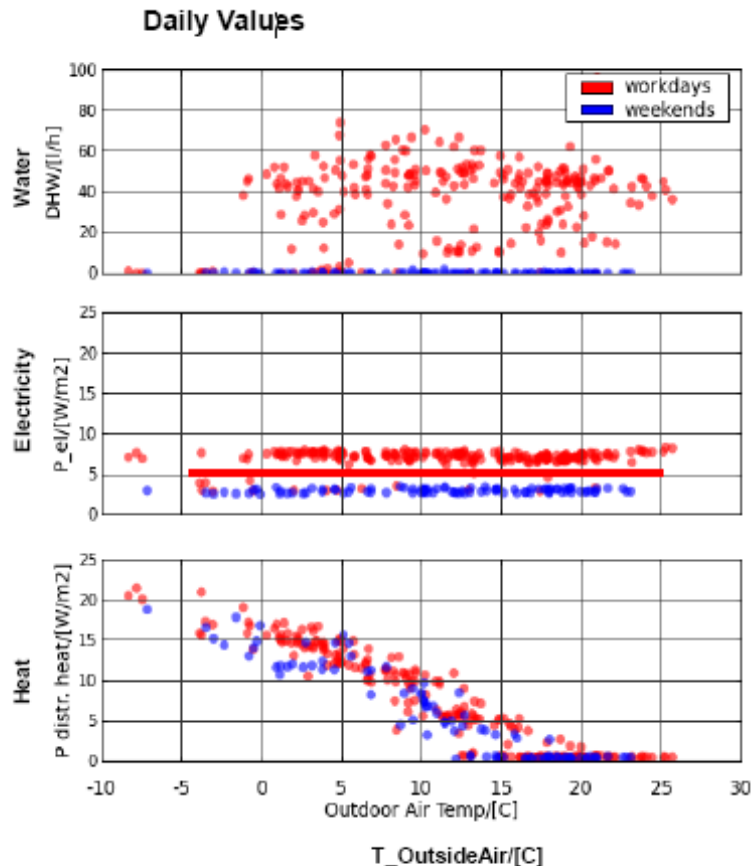
M2-AHU3-AHU3-SupplyAirTemp-(1122)-[F]
 M2-AHU3-AHU3-OutsideAirTemp-(1125)-[F]
 M2-Outside-Outside-DewPointTemp-(1095)-[F]

Date Time
(from 3/13/2011 12:00:00 AM to 3/26/2011 11:59:00 PM) [60]

We have chosen to assign this system a green status. The supply air temperature stays within one degree of the setpoint and is never closer than 5 F from the dewpoint temperature. Since the daytime temperatures never exceeded 68 F, morning warmup mode would be allowed to occur throughout the entire two weeks. However, the outdoor temperature was cooler than the supply temperature so we would not expect the temperature to drift upwards.

Bread crumbs: [Main Page](#) > [Y2E2DataManual](#) > [Miscellaneous](#) > [Air Systems](#) > [AHU 3](#)

Scatter Plot Overview



Heat varies with outdoor air temp

Water and electricity do not

Scatter plot Consumption

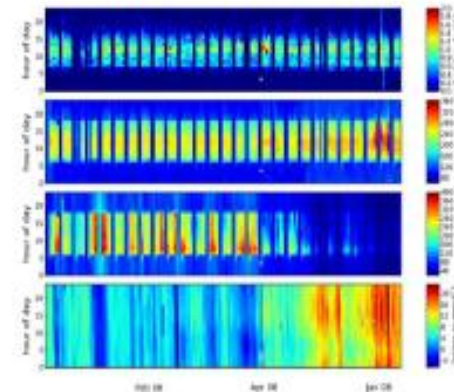
- Identify characteristics and simple control strategies (signatures)
- Daily values
- Grouped by workday / weekend
- Show correlations among parameters
- Note that scatter plot shows causality



Courtesy of BuildingEQ

Carpet Plot Overview

- Identify anomalous or suspect values
- Identify patterns such as start stop times, set-point changes, occupancy schedules etc.
- Display large data sets
- More useful when viewed in parallel with other similar charts



4/9/2010

CEE243

19

Carpet Plot Example

