



• August 15-18, 2010 • Dallas, Texas •
• Dallas Convention Center •



Integration of Advanced Metering System with EMCS

August 17, 2010

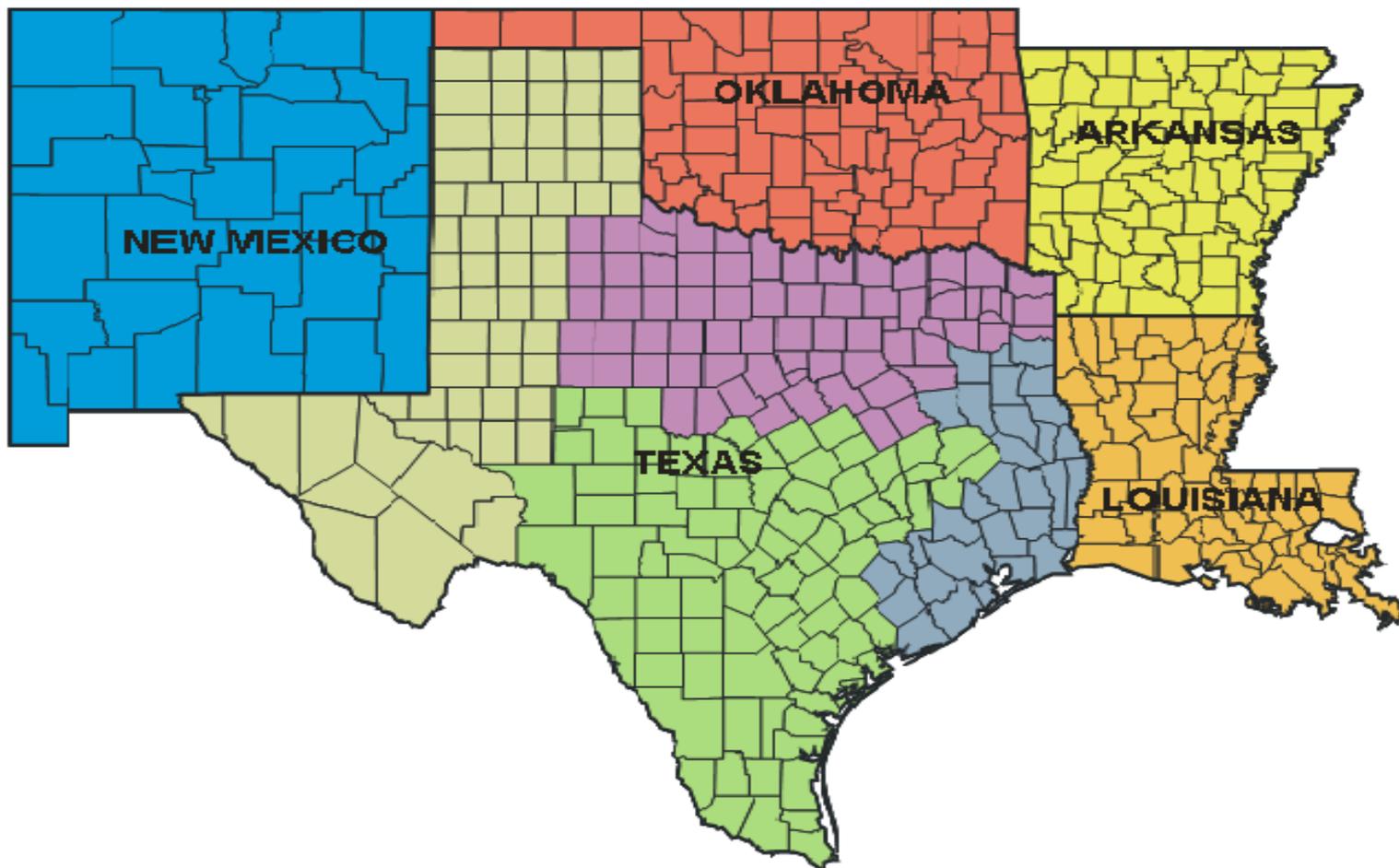


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Regional Energy Engineer

GSA

Greater Southwest Region

- 21 million gsf of Government-owned space
- Over 100 Federal Buildings, Courthouses & Border Stations in 5 states
- Electric deregulation only in TX



Advanced Metering/BAS System Chronology

2002 – Began concept phase of advanced metering system in response to the deregulation of the Texas electric market with hopes of getting better electric prices.

2004 – Completed pilot project in 7 buildings in D/FW area.
Included electric meters, gas meters, **plus approximately 30 EMCS (BAS) points per building**, and a central server in the Ft. Worth Federal Building

2005, 2006 – Expanded system to 67 buildings using two contractors, working simultaneously in the five states

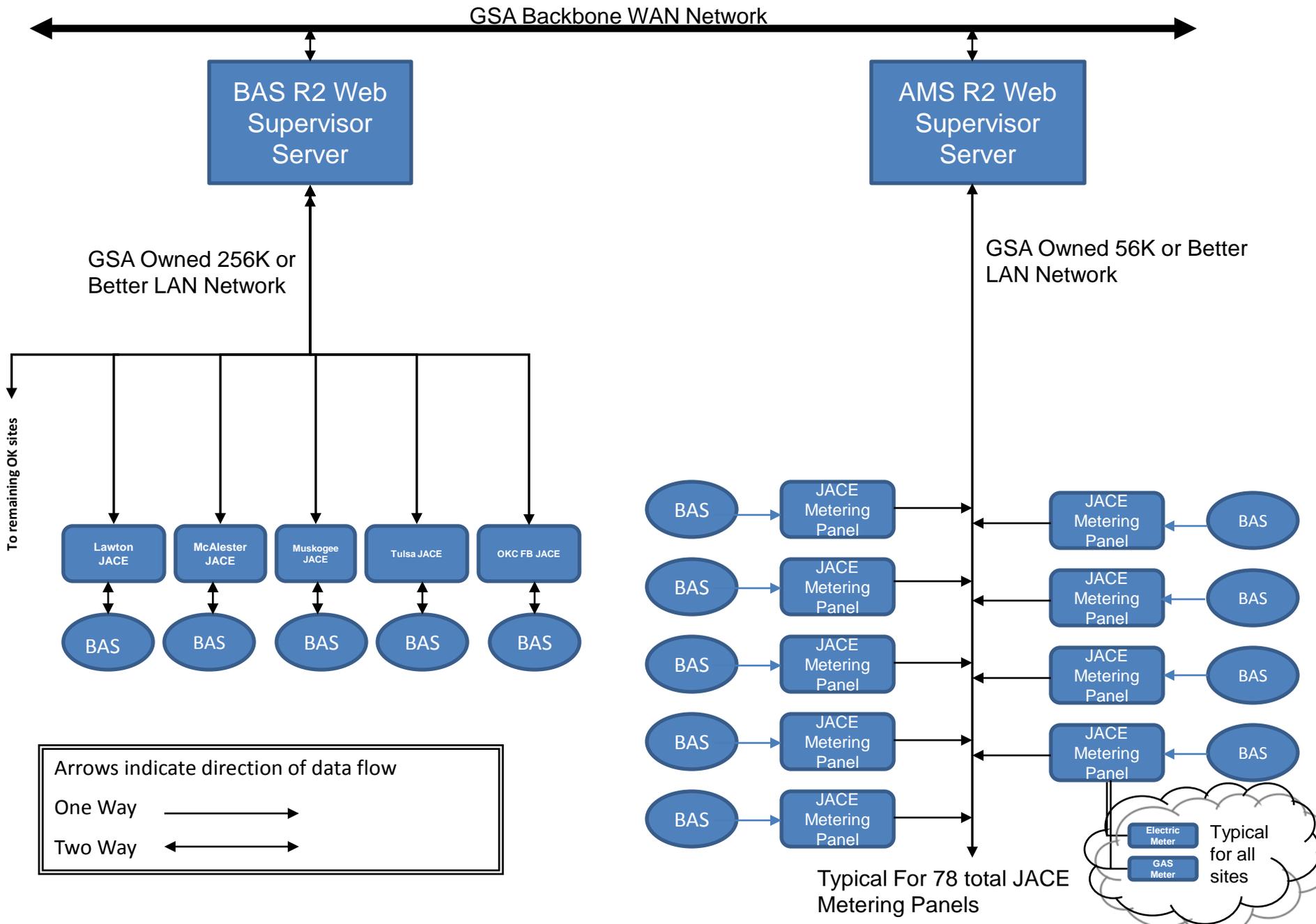
2007 – Added 2nd server devoted to data (SQL)

2008 – Expanded system to 78 buildings
– Hired full-time contract “Energy Metering Analyst” to analyze data & act upon it

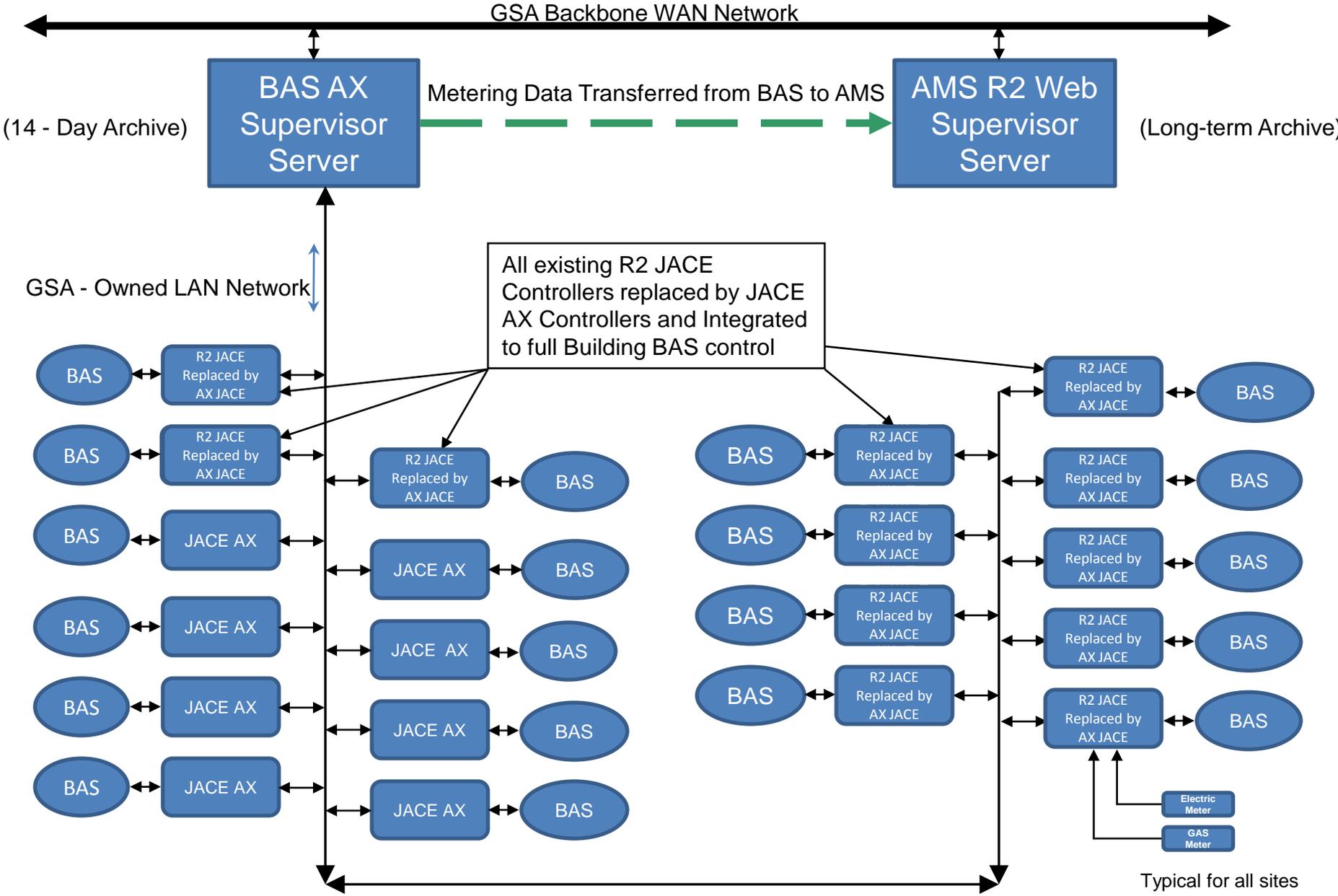
2009 – Completed Pilot project for 5 buildings in Oklahoma:
•Integrated BAS with AMS
•Converted BAS to BACnet (open protocol)
•Brought BAS onto the GSA Network
•Added two additional servers for BAS Integration

2010 – Currently expanding BAS/AMS Integration & BACnet conversion to remaining 73 bldgs.

GSA Region 7 AMS/BAS Architecture Schematic (Current)



GSA Region 7 AMS/BAS Architecture Schematic (Proposed Final)

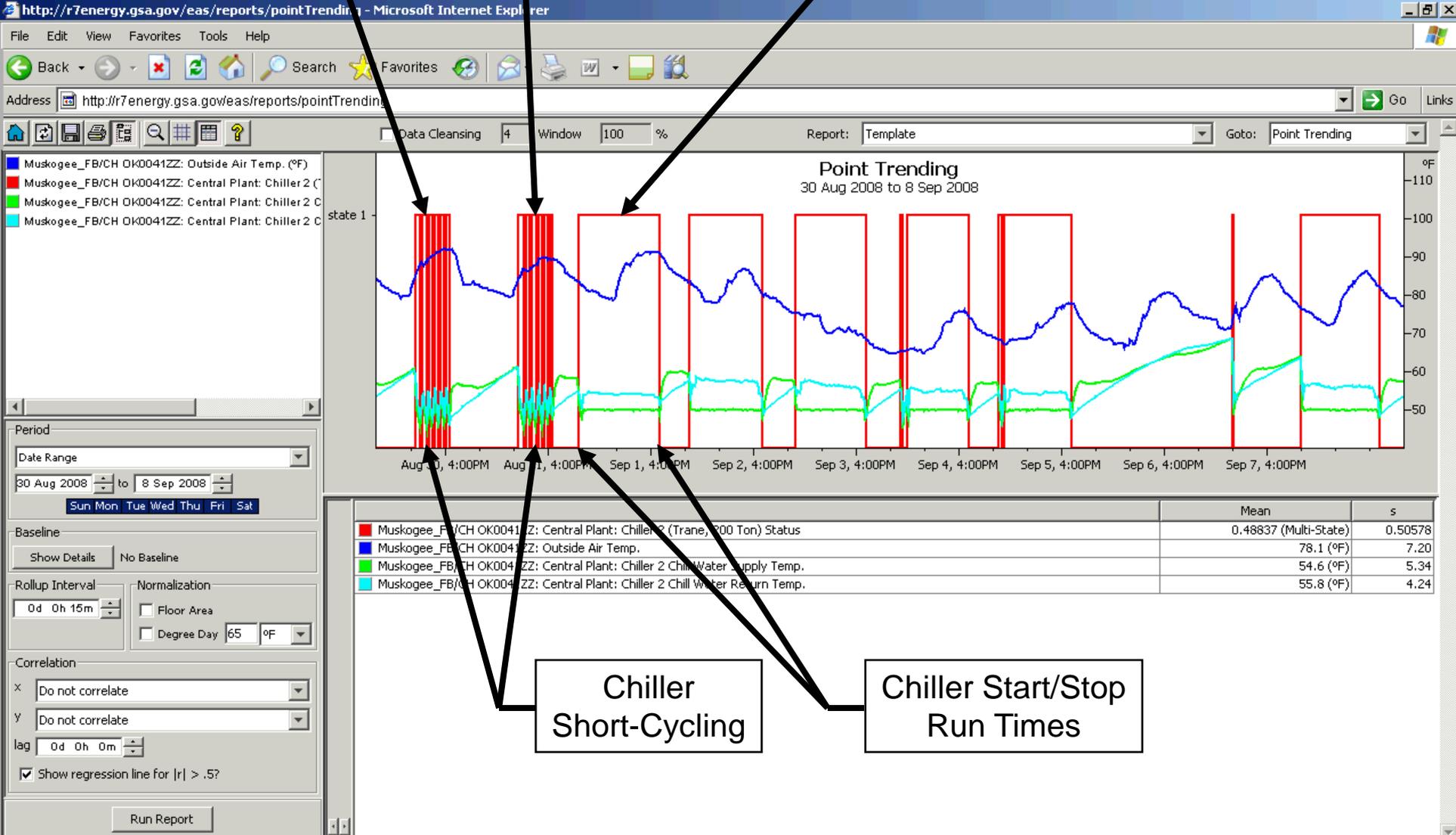


Advanced Metering System

Saturday Chiller Operation

Sunday Chiller Operation

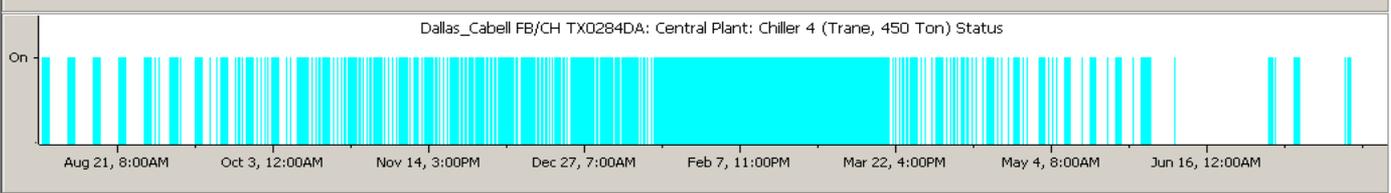
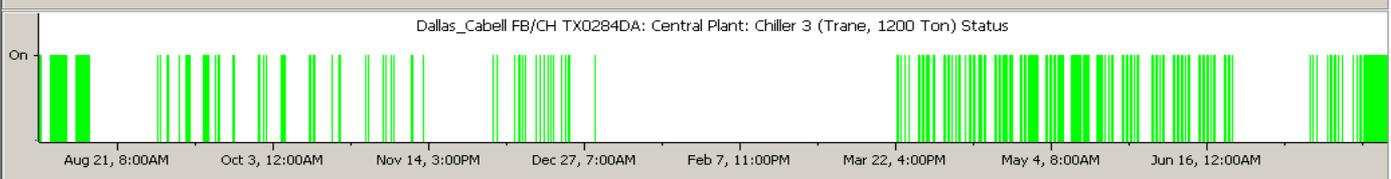
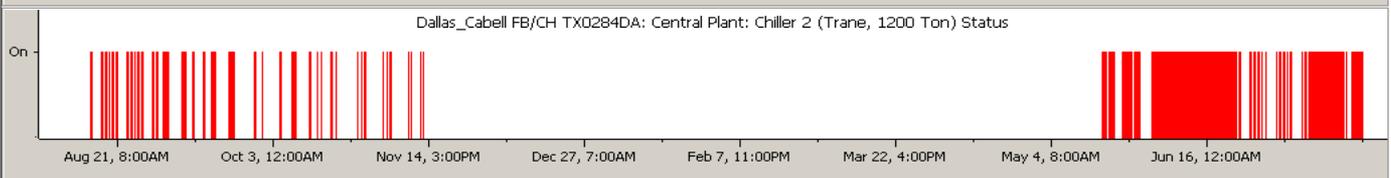
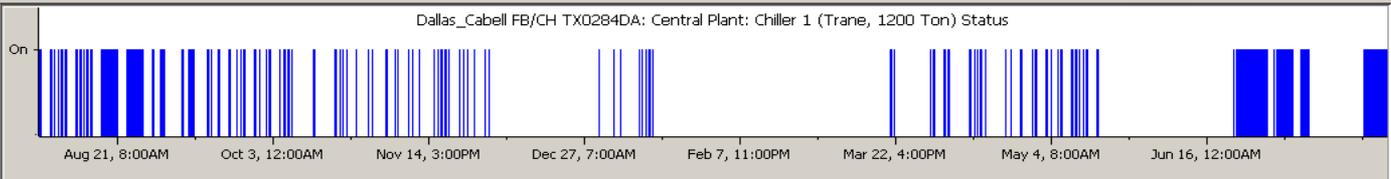
Holiday Chiller Operation



Chiller Short-Cycling

Chiller Start/Stop Run Times

- Dallas_Cabell FB/CH TX0284DA: Centra



Equipment	Runtime (Hours)	Runtime %	# of Cycles
■ Dallas_Cabell FB/CH TX0284DA: Central Plant: Chiller 1 (Trane, 1200 Ton) Status	1,811	20.7%	140
■ Dallas_Cabell FB/CH TX0284DA: Central Plant: Chiller 2 (Trane, 1200 Ton) Status	1,885	21.5%	86
■ Dallas_Cabell FB/CH TX0284DA: Central Plant: Chiller 3 (Trane, 1200 Ton) Status	2,075	23.7%	144
■ Dallas_Cabell FB/CH TX0284DA: Central Plant: Chiller 4 (Trane, 450 Ton) Status	4,786	54.6%	174

Period

Date Range

31 Jul 2009 to 30 Jul 2010

Run Report

http://r7energy.gsa.gov/eas/reports/entRanking?reportName=All_Buildings_Last_7_Days_kWh&publi - Windows Internet Explorer pro

http://r7energy.gsa.gov/eas/reports/entRanking?reportName=All_Buildings_Last_7_Days_kWh&public=true

Live Search

Page Tools

Data Cleansing 4 Window 100 % Report: All Buildings, Last 7 Days, kWh Goto: Enterprise Ranking

Enterprise Ranking

23 Jul 2010 to 29 Jul 2010

Site	Value (kWh/ft²)
Dallas_207 Houston TX0057ZZ	0.74243
Dallas_Centre Phase 5 TX0302ZZ	0.29855
Fort Worth_USCH TX0075ZZ	0.29041
Dallas_Cabell FB/CH TX0284DA	0.09742
Fort Worth_Federal Ctr TX0800FW	0.05727
Fort Worth_Fritz Lanham TX0224ZZ	0.02127

Ranking

Order: Highest

Result Size: 10

Data Point: Electric Consumption

Period: last7Days

23 Jul 2010 to 29 Jul 2010

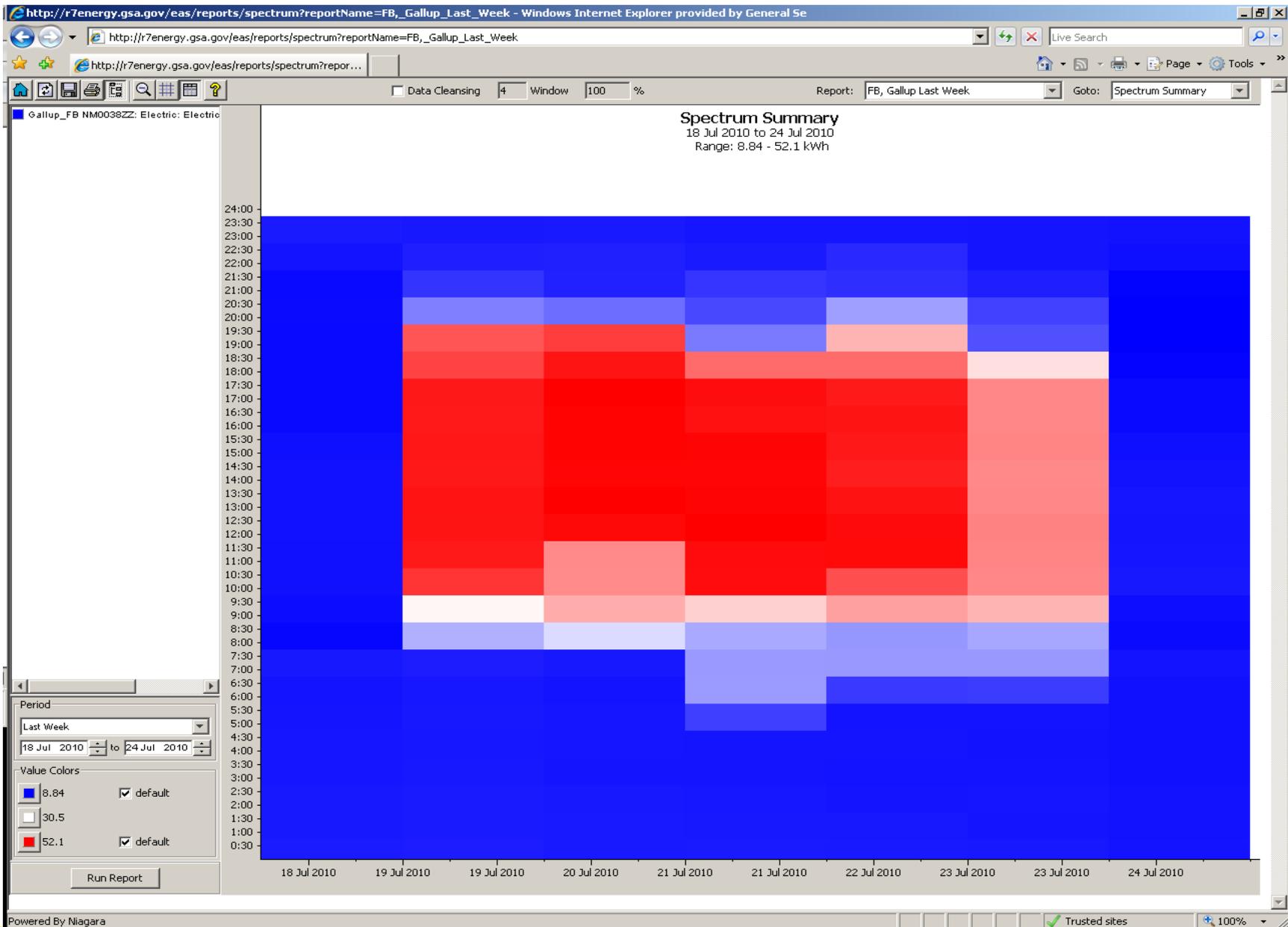
Sun Mon Tue Wed Thu Fri Sat

Normalization

Floor Area

Degree Day 65 °F

Run Report



Region 7 BAS Main Page

DALLAS / FORT WORTH - Windows Internet Explorer provided by General Services Administration

http://p07r7s-engp01/stations/GSA7_EMCS/region7/dallas_fw.html

File Edit View Favorites Tools Help

DALLAS / FORT WORTH

GSA

6/30/10 : 4:27 PM

- Amarillo
- Dallas ▶
- Farmers Branch
- Fort Worth ▶
- Lubbock
- Midland
- San Angelo

Greater Southwest Region 7 Building Automation System

NEW MEXICO

OKLAHOMA

DALLAS / FT WORTH

ARK / LA / TEX

TEXAS / NM BORDER

SOUTH CENTRAL TEXAS

http://p07r7s-engp01/stations/GSA7_EMCS/region7/sct.html

Local intranet 100%

Shreveport U.S. District Courthouse & Federal Building Building No. LA0098ZZ

Building kWh = 1279

Building kW Demand = 91.6



Outdoor Temperature = 68.2

Outdoor Humidity = 74.1

[Hotlink to Utility Metering Point Trending](#)



Shreveport U.S. Courthouse 1st Floor

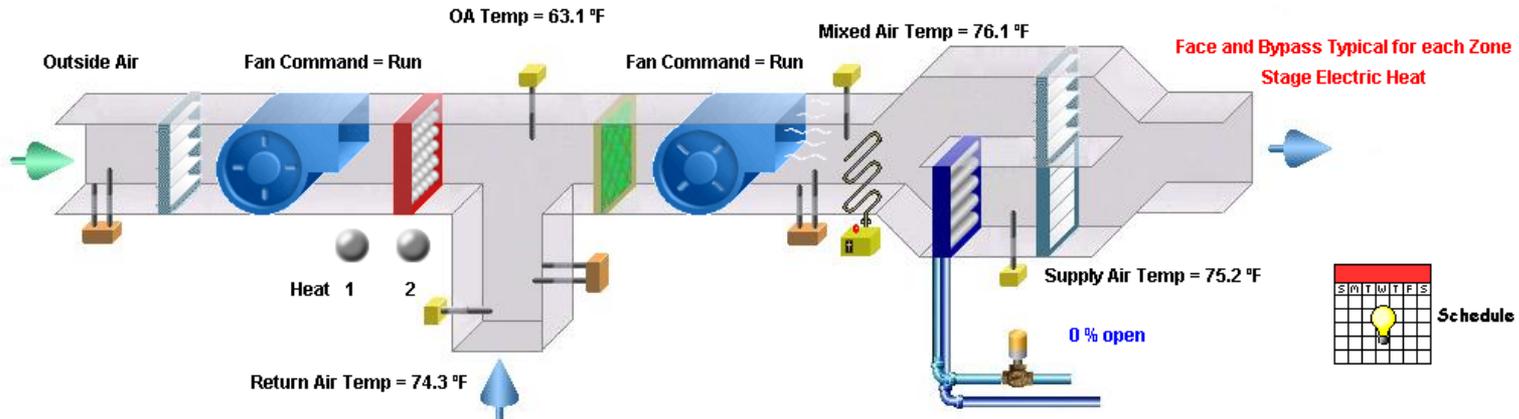
02-Oct-09 8:29 AM CDT

54.9 °F Outside Air Temp

AHU -6

Supply Air Setpoint 55.0 °F
Fan Command Ovrd Run

OAF and OA Damper Interlock w/Supply Fan



Space	Setpoint	Temperature	Cooling	1 Heat	2
Rm 16	72.0 °F	73.6 °F	0 %	<input checked="" type="radio"/>	<input type="radio"/>
SC Foyer	72.0 °F	72.3 °F	59 %	<input type="radio"/>	<input type="radio"/>
SC Reception	72.0 °F	75.4 °F	100 %	<input type="radio"/>	<input type="radio"/>
Rm 14	72.0 °F	74.0 °F	100 %	<input type="radio"/>	<input type="radio"/>

Space	Setpoint	Temperature	Cooling	1 Heat	2
Link Educ. 1/2	72.0 °F	72.3 °F	0 %	<input type="radio"/>	<input type="radio"/>
Rm 10	72.0 °F	72.9 °F	0 %	<input type="radio"/>	<input type="radio"/>
Rm 11	72.0 °F	73.2 °F	14 %	<input type="radio"/>	<input type="radio"/>
Pre Elem	68.0 °F	76.5 °F	100 %	<input type="radio"/>	<input type="radio"/>

Shreveport U.S. Courthouse

1st Floor

30-Jul-10 7:35 AM CDT

Outside Air Temperature 84.9 °F

[Home](#) | [Floor Plans](#) | [Summary](#) | [Alarms](#) | [Histories](#)

1st Floor Southwest	AHU-1		72 °F	73.0 °F	1st Floor Southeast	RTU-1		72 °F	70.9 °F
1st Floor Southwest	AHU-2		71 °F	72.4 °F	1st Floor Southeast	RTU-2		72 °F	72 °F
1st Floor Southeast	AHU-3		70 °F	71.1 °F	1st Floor Northeast	RTU-3		70 °F	71 °F
1st Floor Southeast	AHU-4		71 °F	71.7 °F					
1st Floor Southwest	AHU-5		70 °F	71.7 °F	1st Floor Room A04	Split A04		68 °F	68 °F
1st Floor Southeast	AHU-6		71 °F	72.4 °F	1st Floor Room A10	Split A10		72 °F	72 °F
1st Floor West	AHU-7		71 °F	72.4 °F	1st Floor Phone Room	Split B04		68 °F	69 °F
1st Floor East	AHU-8		70 °F	71.7 °F	1st Floor West	Split D02		72 °F	72 °F
1st Floor East	AHU-10		70 °F	71 °F	1st Floor East	Split D30		72 °F	72 °F
1st Floor West	AHU-11		69 °F	71 °F	1st Floor West	Split D36		70 °F	73 °F
1st Floor Northwest	AHU-12		70 °F	71 °F					
1st Floor Northeast	AHU-13		71 °F	73 °F					
1st Floor Northwest	AHU-15		71 °F	72 °F					

Multizone Air Handler Summary

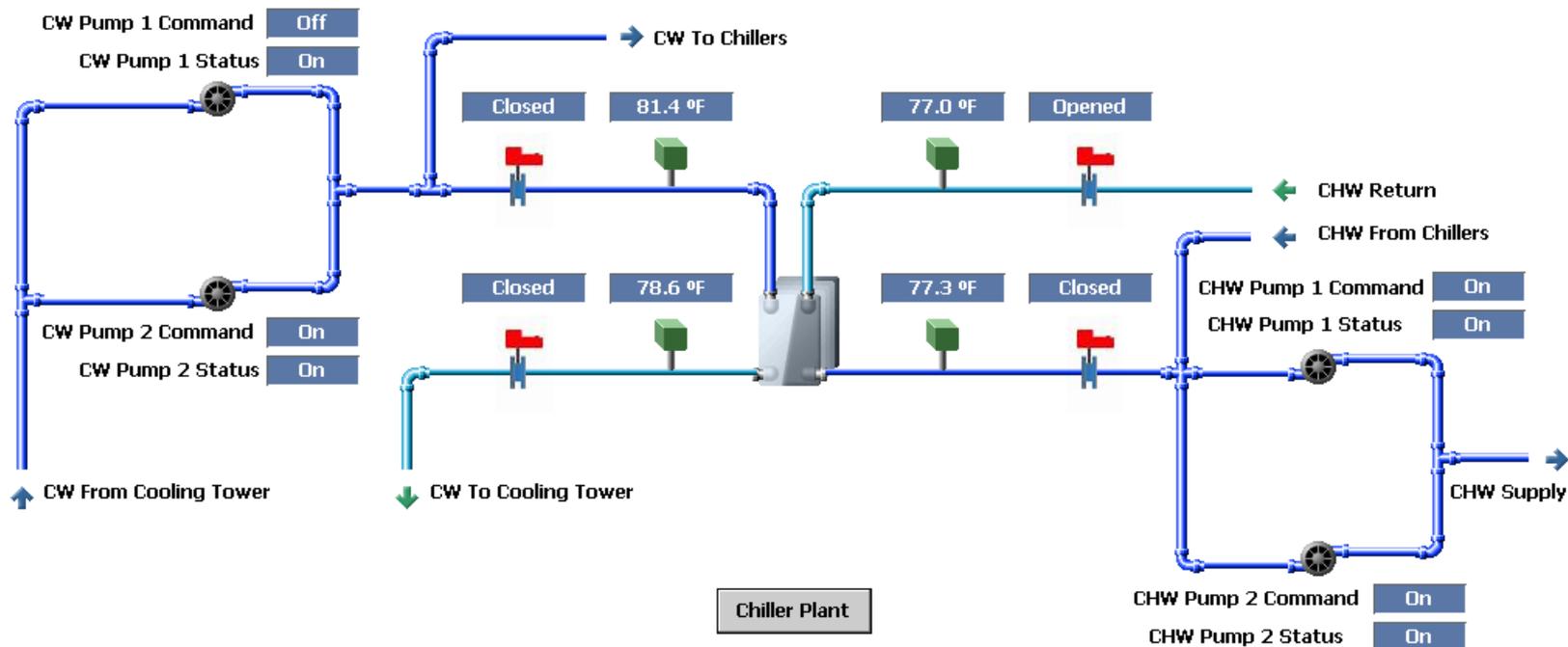
Closet Split System Summary

Heat Exchanger

30-Jul-10 7:39 AM CDT

Outside Air Temperature 85.4 °F

Home | Floor Plans | Summary | Alarms | Histories



Free Cooling	Off	Outside Air Temp	85.0 °F	CHW Valves Control	Closed
Chiller System Enable	Chiller	Outside Air Humidity	61.6 %RH	CTW Valves Control	Closed
Outside Air Enthalpy	38.3 BTU/lb	Outside Air Dewpoint	70.3 °F		

Best Practices/ Lessons Learned

- Advanced Metering – Don't just meter gas and electric – add EMCS points
 - Will yield MUCH more Energy Savings
- Hire (or direct) someone to Analyze and act on the data
 - The data won't save energy without action!
- Think Big: Integrate Advanced Metering & EMCS Systems
 - 1st Step towards achieving “Smart Buildings”
 - Plan for entire inventory of buildings
- Plan for Uniformity and Standardization of Graphics Pages
- Convert EMCS Systems to BACnet or Another Open Protocol
 - Achieve continuity and save on repairs

QUESTIONS?



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