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Potential Operation and Maintenance (O&M) Opportunities at the

Florida Department of Highway Safety and Motor Vehicles Neil Kirkman Building, Tallahassee, Florida

Submitted to the
University of Florida

by the
Monitoring Analysis Group

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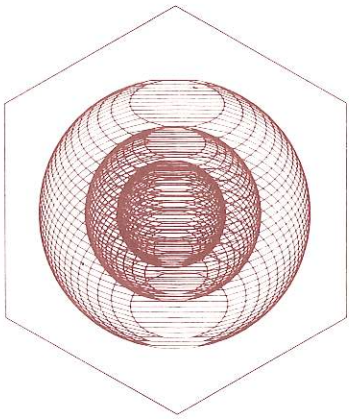

ENERGY SYSTEMS LABORATORY
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Texas A&M University System

Table of Contents

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EXECUTIVE SUMMARY

This report summarizes the results of a field trip by Aamer Athar, Dr. Mingsheng Liu of the Energy Systems Laboratory and Mr. Yorg Mager of the University of Florida for identification of O&M opportunities at the Neil Kirkman Building. Several O&M opportunities were investigated and savings were estimated.

By locking in the fan operation with the chiller all the AHUs could be turned off during the unoccupied hours. The potential annual savings are $33,000 (only includes fan power savings). It does not include chiller and pump electricity savings. Chillers could be operated in an optimized mode where they could be also shut off during the unoccupied hours.

Correcting the current air flow, based on the current load conditions, would remove most of the foot heaters. The potential savings are approximately $8,000/yr. Reseting the cold deck temperature based on outside air temperature and by keeping the chiller on during occupied hours would also save energy and cost.

POTENTIAL OPERATION AND MAINTENANCE (O&M) SAVINGS AT NEIL KIRKMAN BUILDING, TALLAHASSEE, FLORIDA

1. INTRODUCTION

O&M savings refers to energy savings due to improved operation and maintenance of building systems. The improved operation of the building systems can result in substantial energy savings, improve indoor thermal environment and indoor air quality in office buildings.

The Neil Kirkman Building consists of four multi-story wings - A, B, C and D. Three wings (A, B and C) are currently being monitored by the Energy Systems Laboratory (ESL). The B wing is composed of what was the original building built in 1953 with some additions in 1956 and 1959. C wing was originally constructed in 1959 contained three floors and a basement. Another floor was added in 1972. A-Wing contains four floors plus a basement was constructed in 1982. The areas per wing are as follows:

A-Wing:	182,028 square feet
B-Wing:	119,184 square feet
C-Wing	36,208 square feet

According to the audit report by Bosek, Gibson and Associates, Inc. the building peak occupancy is approximately 1,240 people. The majority of the employees occupy the building from 8:00 am to 5:00 p.m. Monday through Friday through out the year. Some areas in the building are occupied 24 hours per day.

The A-Wing contains five single duct variable air volume air handlers (inlet guide vanes) with terminal electrical re-heat. A common return air plenum is utilized. The chilled water supplied to the air handling units is produced by two 238 ton (total) Carrier centrifugal chillers. These chillers are located in the basement and normally only one chiller is required to satisfy the cooling load. Each chiller has its own cooling tower served with two speed fan motors. Heat is

supplied by electric duct heaters and except for the first floor the heaters are only used in the extreme winter conditions.

B- & C-Wings HVAC system consists of eighteen multi-zone air handling units of varying age, size and manufacturer. In addition, four pipe rooftop single zone air handling and two packaged rooftop air to air heat pumps serve the kitchen and dining areas. All of the multizone units have two-way chilled water and hot water valves. According to the building operators the hot deck of the multizone units are shutoff during the summer time and hot water supplied by the boilers is only used in the winter season.

Hot water for space heating is provided by two #2 fuel oil fired 60 BHP water tube boilers. Normal operation consists of one boiler operating while the other is in the standby mode. The chilled water is provided by two 150 ton centrifugal chillers. They are located in the basement of the B-Wing. During the summer months, both the chillers must operate the meet the cooling requirements.

The controls for the majority of the HVAC equipment are pneumatic and controlled by a Johnson Controls EMC system. It only provides on/off and monitoring capabilities. Duct static pressure could also be reset for some of the AHUs. A list of all the monitored points is given in Appendix D.

Domestic hot water requirements are met by electric hot water heaters located in the space that requires it. The kitchen has its own 100 gallon DHW heater.

Approximately all of the interior lighting is done by T-12 energy saving fluorescent lamps. There are some incandescent lamps. The building operating staff tried the energy saving electronic ballasts, but their usage was discontinued after some maintenance problems and due to short life span of these ballasts. All the fluorescent fixtures are now using the standard magnetic ballasts. Light levels were observed to be satisfactory for all the functional area. The control of the lighting systems is accomplished with wall mounted switches and in some cases passive

infrared sensors. Motion sensors to control lights are being used in restrooms and closed spaces. The maintenance staff seems to be satisfied with the performance of these motion sensors.

Historical Utility Data*

Month	Electricity Consumption kWh/mo.	Electricity Demand KW-mo.	#2 Fuel Oil Gal/mo.	Total Energy Cost ($/month)	ECI $/Sq. Ft.	EUI BTU/Sq. Ft.
Jan. 1993	797,400	1,717	2,856	61,677	0.162	8,170
Feb. 1993	743,400	1,629	4,311	60,336	0.158	8,215
Mar. 1993	738,000	1,513	972	55,065	0.144	6,954
Apr. 1993	761,400	1,609	0	55,705	0.146	6,810
May 1993	808,200	1,680	0	58,913	0.154	7,228
Jun. 1993	870,000	1,740	914	64,276	0.168	8,113
Jul. 1993	935,000	1,870	526	68,348	0.179	8,553
Aug. 1993	975,000	1,950	0	71,131	0.186	8,720
Sep. 1993	996,500	1,993	712	74,880	0.196	9,171
Oct. 1993	930,000	1,860	0	69,498	0.182	8,318
Nov. 1993	840,600	1,774	0	63,025	0.165	7,518
Dec. 1993	811,800	1,712	5,213	63,934	0.168	9,155
Total	**10,207,300**	**21,047**	**15,504**	**766,784**	**2.009**	**96,925**
Average	**850,608**	**1,753**	**1,292**	**63,899**	**0.167**	**8,077**

* ***This utility data is for the whole building which included D-Wing. D-Wing is not being monitored by ESL. This data is taken from the Audit report done by Bosek, Gibson and Associates, Inc.***

During 1993 the Neil Kirkman Building consumed 10,207,300 kWh of electrical energy, 21,047 kW of electrical demand and 15,504 gallons of #2 fuel oil at a total cost of $766,784.

2. Monitored Data by ESL

The Energy Systems Laboratory started to monitor three wings of Neil Kirkman building in October of 1995. Three loggers were installed, one each in Wings A, B and C. Calibrated sensors to collect hourly electricity, chilled water, hot water flow and energy were installed. Appendix A shows the channel table list and monitoring diagrams for all the three loggers. Tables 1 through 3 show monitored monthly energy consumption for the selective channels for A, B and C-Wings.

Table 1: Monthly Energy consumption for A-Wing

Month	Year	Total Elec. kWh/mo.	Chw Energy kBtu/mo.	Chiller Elec. kWh/mo.	AHUs Elec. kWh/mo.	Chw Pump Elec. kWh/mo.	MCC Elec. kWh/mo.	Lights 1st Fl Elec. kWh/mo.	Chiller Avg. kW/ton
10	95	276,865	641,608	43,703	36,112	7,195	23,192	16,686	0.81
11	95	239,814	409,880	28,776	34,748	6,966	16,744	14,781	0.84
12	95	237,999	339,677	21,424	36,713	5,747	13,397	16,396	0.75
1	96	262,465	377,825	28,062	35,737	7,281	17,709	16,444	0.89
2	96	240,527	384,550	24,322	36,257	4,444	14,511	15,557	0.75
3	96	254,391	408,418	28,763	38,627	5,712	15,115	16,238	0.84
4	96	249,890	482,696	35,934	37,026	5,616	16,021	16,134	0.89
5	96	269,500	685,962	46,901	42,935	5,379	17,421	16,310	0.82

Table 2: Monthly Energy consumption for B-Wing

Month	Year	Total Elec. kWh/mo.	Middle AHUs Elec. kWh/mo.	Back AHUs Elec. kWh/mo.	Front AHUs Elec. kWh/mo.	Total AHUs Elec. kWh/mo.
10	95	N/A	6,893	9,675	37,590	54,158
11	95	101,835	6,570	9,319	34,950	50,839
12	95	104,505	6,785	9,604	35,816	52,204
1	96	105,877	6,100	9,699	35,660	51,460
2	96	99,875	6,072	8,838	32,405	47,315
3	96	103,789	6,235	9,034	34,620	49,889
4	96	105,121	5,956	9,996	34,408	50,360
5	96	109,975	6,443	12,105	37,456	56,004

Table 3: Monthly Energy consumption for C-Wing

Month	Year	Total Elec. kWh/mo.	Hot Water Energy kBtu/mo.	Chiller Elec. kWh/mo.	MCC Elec. kWh/mo.	AHUs Elec. kWh/mo.	Chw Pump Elec. kWh/mo.
10	95	97,698	N/A	53,272	28,833	5,348	11,638
11	95	93,329	255,155	46,416	20,718	5,178	9,321
12	95	77,465	285,055	30,836	18,713	5,303	8,918
1	96	59,987	125,474	25,896	12,681	5,317	4,735
2	96	61,106	96,953	30,609	15,395	4,842	5,919
3	96	60,908	37,902	29,543	12,989	5,334	5,898
4	96	68,982	4,012	38,047	17,268	4,760	7,358
5	96	121,416	N/A	76,018	29,881	5,318	12,247

3. METHODOLOGY

The methodology used to explore the O&M opportunities is outlined below:

1. **ESL information base browse:** The ESL information base includes:
   (i) the ESL Data Base (EDB), which contains continuously measured hourly energy use and weather data. Whole building and submetered hourly consumption data for A, B & C-Wings from October 1995 to May 1996 is shown in Appendix F;
   (ii) the Energy Audit Report by Bosek, Gibson and Associates, Inc., which contains information about the building's Heating, Ventilation and Air Conditioning (HVAC) system, lighting, building envelope, occupancy and other relevant information;
   (iii) weekly inspection plots (IPNs), which give an updated performance of the building every week (Appendix C);
   (iv) the Monthly Energy Consumption Report (MECR), which presents an overview of monthly energy performance (Appendix B);

   Browsing this information base gives O&M staff a draft list of O&M candidates in the building.

2. Site visit/system examination: The purpose of the site visit includes:

(i) discussing potential O&M measures with maintenance personnel;

(ii) verifying information gathered from ESL database by a simple walk-through with the building operator;

(iii) examining the possibility/feasibility of potential O&M measures;

(iv) exploring new O&M measures; and

(v) collecting system information, such as cold deck and hot deck temperature schedules, air flow, and nighttime setback schedule as well as miscellaneous information from the EMCS such as EMCS measured energy performance.

3. Data quality check: Before using the monitored data to estimate O&M savings, the measured data is thoroughly checked against calculated indices like W/sq. ft. (for electricity consumption) or Btu/sq. ft. (for thermal energy consumption) for the same type of office buildings. This information is readily available in the Monthly Energy Consumption Reports. Another key factor is kW/ton for chillers and it is calculated and checked to see if it falls in a reasonable range (0.6 to 1.2 kW/ton).

4. O&M savings calculations: Savings are calculated for the suggested O&M measures using the submetered monitored data. The building energy use is optimized to consume minimum energy while the following conditions are satisfied:

i) room temperature should be unchanged;

ii) room relative humidity should be less than 60%;

iii) the air flow rate to each room should not change;

iv) the maximum CFM through the cold and hot decks and ducts should be less than their capacities or design values; and

v) there should be no extra implementation costs involved.

5. Feedback from facility personnel: Time did not permit us to get any feed back from the suggested O&Ms and discuss their implementation with the facility personnel.

6. Short-term test of optimized schedule and implementation. No short term tests could be performed for this building due to time constraints.

4. Field Visit

Dr. Liu Minsheng, Mr. Aamer Athar from Energy Systems Laboratory and Mr. Yorg Mager for the University of Florida made a trip to the Neil Kirkman building from April 10 to April 13. The group met with the facility personnel and toured the building for possible O&M opportunities. The following observations were made during this visit.

Chiller operation: Currently, the chillers operation is based on the average room temperature. When the average room temperature is lower than the set point (74°F), the chiller gets turned off. This operation sequence creates two problems: (1) higher space temperatures in few rooms; and (2) loss of moisture control since unconditioned outside air is sent to the room when the chiller is off.

AHU operation: Currently, all the AHUs are running continuously for 24 hours per day. The cold deck temperature was set at 55°F for the single duct units in A-Wing, and it ranged from 53°F to 58°F for the multi-zone units in the B & C Wings. Overcooled air is provided to some spaces in order to just barely cool the hot spots. Employees compensate for the over cooling by operating their personal electric foot heaters. This could explain the high W/sq. ft. (building only) for this wing (2.75 W/sq. ft. vs. 2.0 for B-Wing and 2.2 W/sq. ft. for C-Wing).

The hot water is turned off during summer months. Due to the chiller sequence, the current AHUs operation created two problems: (1) Sudden room temperature change due to that the supply air temperature can change from 55°F to 74°F after the chiller was turned off; and (2) moisture accumulation in the room. In fact, the A-Wing has been repainted last year due to the moisture damage on the exterior walls. Since the current operation sequencing is incapable of maintaining the suitable room thermal environment condition, the occupants have taken action to comfort themselves. It was found that a number of air diffusers have been disabled or changed. Consequently, the air balance is totally disrupted. Therefore, the right AHUs sequencing must be restored to maintain suitable room conditions.

Figures 1 to 5 (Appendix E) presents the measured AHU operation conditions. The results is also summarized in Table 4 (all this data was measured during the field visit). We noticed sudden cold air temperature change during the measurement. The measured average return air CO_2 level varied from 617 PPM to 1020 PPM. It appears that the overall outside intake was reasonable. However, we also measured CO_2 level of 1440 PPM in two rooms on the fourth floor (See Table 5). Combined with our observation and conversation with the facility personnel, it appears that air is being circulated in the core zone of the A-Wing and very little air is being supplied to the exterior zone.

Figures 6 to 17 (Appendix E) presents the measured results for AHUs in B-Wing. The outside air intake was slightly lower than required. Most of the mixing air dampers were in good condition. Indoor environmental complaints were noted from several rooms. These complaints could be solved by adjusting the mixing air dampers, which might be locked in a fixed position.

The operation, problem areas and O&M opportunities were discussed in detail with the facility personnel.

No data were available for the C wing because of some maintenance work being performed at that time.

Table 4: Data Collected for A and B Wings

A-Wing

Wing	AHU Type	Time	Floor	Return Air			Outside Air			Supply Air		
				CO_2 (PPM)	Supply Temp. °F	Air RH %	CO_2 (PPM)	Supply Temp. °F	Air RH %	Duct SP in	Supply Temp. °F	Air RH %
A	SDVAV		Basement	617	70.2	32	436	74.5	20	0.95	75.4	30
	SDVAV		First	753	70.1	30	410	54.0	33	1.30	76.6	30
	SDVAV		Second	810	75.0	29	440	54.0	37	1.10	58.2	48
	SDVAV		Third	1020	73.0	32	420	60.3	30	2.20	56.4	55
	SDVAV		Fourth	960	71.5	37	427	62.2	45	1.35	56.1	61

B-Wing

Wing	AHU Type	Time	Floor	Return Air			Cold Deck		Hot Deck		Supply Air		
				CO_2 (PPM)	Supply Temp. °F	Air RH %	Duct SP in	Supply Temp. °F	Duct SP in	Supply Temp. °F	Zones	Supply Temp. °F	Duct SP in
B	DDCV	1:30 pm	First-Front	1220	74.1	30	N/A	48.6	N/A	72.0	1	72.3	0.46
											2	72.0	0.52
											3	71.5	0.33
											4	63.6	0.75
											5	66.4	0.62
											6	72.5	0.35

B-Wing (cont.)

Wing	AHU Type	Time	Floor	Return Air			Cold Deck		Hot Deck		Supply Air		
				CO_2 (PPM)	Supply Temp. °F	Air RH %	Duct SP in	Supply Temp. °F	Duct SP in	Supply Temp. °F	Zones	Supply Temp. °F	Duct SP in
B	DDCV	1:45 pm	First-Center	1200	74.0	29	0.45	51.8	0.25	68.7	1	68.4	0.12
											2	64.5	0.15
											3	67.8	0.16
											4	65.6	0.17
B	DDCV	2:00 pm	First-Back	1185	74.5	27	0.60	58.0	0.21	72.0	1	71.1	0.05
											2	71.5	0.15
											3	69.9	0.20
											4	67.2	0.19
B	DDCV	12:30 pm	Second-Front	1350	73.2	34	1.16	50.8	0.36	74.3	1	73.2	0.37
											2	70.1	0.93
											3	64.1	0.67
											4	70.1	0.37
											5	72.0	0.65
B	DDCV	1:00 pm	Second-Center	1040	73.0	30	0.22	60.0	0.50	73.6	1	71.8	0.23
											2	68.4	0.10
											3	70.0	0.06
											4	61.7	0.37
B	DDCV	1:15 pm	Second-Back	779	73.8	25	0.20	59.2	0.30	75.1	East	54.8	0.16
B											West	56.0	0.18
	DDCV	2:45 pm	Third-Front	1379	76.9	30	0.08	55.2	0.40	73.9	1	56.5	0.28
											2	58.4	0.28
											3	55.8	0.17
											4	55.0	0.31

B-wing (cont.)

Wing	AHU Type	Time	Floor	Return Air			Cold Deck		Hot Deck		Supply Air		
				CO_2 (PPM)	Supply Temp. °F	Air RH %	Duct SP in	Supply Temp. °F	Duct SP in	Supply Temp. °F	Zones	Supply Temp. °F	Duct SP in
											5	69.8	0.23
											6	57.8	0.35
											7	59.7	0.22
B	DDCV	3:15 pm	Third-Center	1220	72.9	31	0.40	54.4	0.30	73.5	1	73.0	0.10
											2	69.2	0.11
											3	53.8	0.18
											4	70.5	0.15
											5	54.5	0.22
B	DDCV	3:30 pm	Third-Back	967	74.3	27	0.37	55.7	0.90	71.5	East	71.1	0.08
											West	63.4	0.16
B	DDCV	10:30 am	Fourth-Front	950	75.2	31	0.20	57.5	1.13	99.0	1	62.2	0.26
											2	66.0	0.26
											3	62.6	0.26
											4	65.3	0.26
B	DDCV	11:00 am	Fourth-Center	960	72.0	33	0.36	53.5	0.40	77.3	1	67.2	0.24
											2	55.5	0.16
											3	53.5	0.17
											4	63.8	0.32
											5	66.9	0.10
B	DDCV	11:30 am	Fourth-Back	930	73.5	30	1.05	53.5	0.30	75.8	West	74.0	0.26
											Central	69.2	0.35
											East	61.3	0.20

* *SDVAV* - *Single Duct Variable Air Volume*

* *DDCV* - *Double Duct Constant Volume*

CO_2 was also measured in several areas of A, B and C-Wings. Table 5 shows the space temperatures and CO_2 readings in the selected areas.

Table 5: CO_2 Measurement and Space Temperature Readings

Wing	Location	CO_2 Reading (PPM)	Space Temperature (F)
A	Rm. 410	1440	74.3
	Rm. 432	1400	77.8
B	Rm. B431 Front	1160	73.2
	Rm. B413 Middle	1000	69.5
	Rm. B412 Middle	1120	72.5
	Rms. B462-466 Back	1110	72.2
	Corridor B Front (4th Fl.)	1175	73.5
	Corridor Middle (4th Fl.)	1020	71.0
	Corridor Back (4th Fl.)	1070	71.0
C	Rm. C314	1200	74.0
	Corridor (3rd Fl.)	1075	73.8
	Rm. C309	1134	74.2
	Rm. C-302	1170	74.1
	Rm. C404	980	72.8
	Rm. C407	1050	78.5
	Rm. C408	1050	75.9
	Rm. C413	930	74.0
	Rm. C414	930	74.0
	Corridor (4th Fl.)	900	73.5

5. O&M Opportunities

The optimized O&M operation should improve the indoor conditions in this building. The potential energy savings can only be placed in the second priority.

To improve the building thermal conditions, we suggest:

1. Lock in the fan operation with the chiller operation during unoccupied hours. If all the AHUs were turned off during the unoccupied hours, the potential annual savings are approximately $33,000 [1] which only includes fan power savings. It does not include chiller and pump electricity savings. Chiller could be operated in an optimized mode, where it could be shut off during the unoccupied hours. Chiller operation should be controlled through the EMCS rather then controlling it by the average space temperature. This measure would save energy and cost but savings calculations are not possible at this time.
2. Install area A/C units for specific areas requiring cooling so that major HVAC units can be turned off during unoccupied hours.
3. Correct the current air flow based on the current load conditions. This will remove the most of the foot heaters. The potential savings are approximately $8,000/yr. [2].
4. Reset cold deck temperature based on outside air temperature and keep chiller on during occupied hours. This measure would save energy and cost but savings calculations are not possible at this time.

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[1] This saving number is based on the following assumptions:
a) Total electricity consumed by the AHUs is approximately 128 kW
b) AHUs could be turned of 10 hr./day on the weekdays and 16 hr./day on the weekends
c) Unit cost used to calculate the cost savings is $0.0602/kWh

[2] This saving number is based on an assumption that approximately 90 kW electricity is used by the foot heaters at an average of 5 hr. per day on weekdays.

APPENDIX A

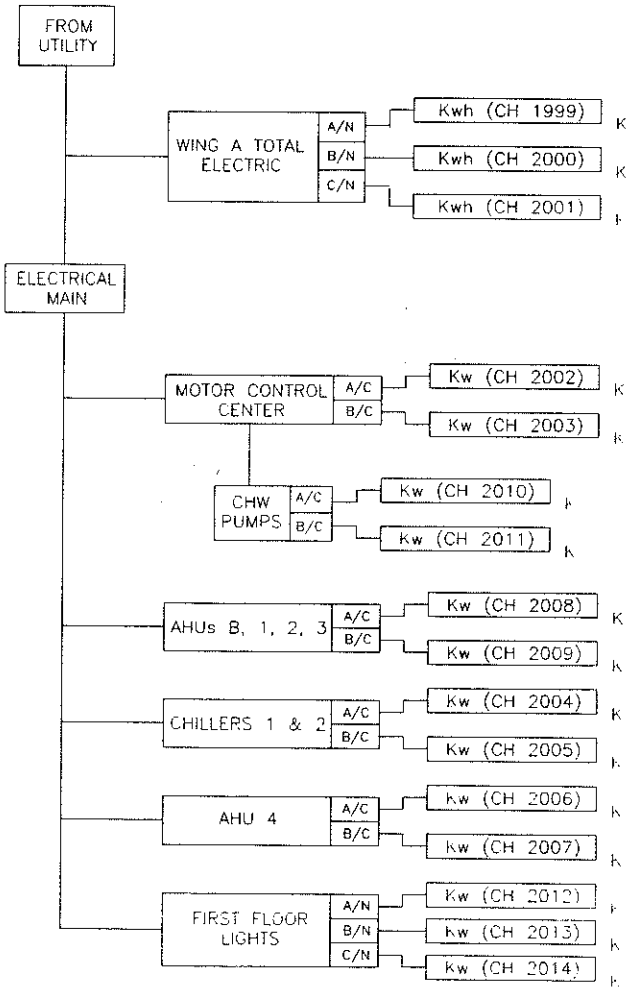
Monitoring Diagram and Channel Tables

NEIL KIRKMAN BUILDING (WING A) ELECTRICAL MONITORING DIAGRAM

LEGEND

K=KWH CHANNEL
A=ANALOG CHANNEL
D=DIGITAL CHANNEL

WING A

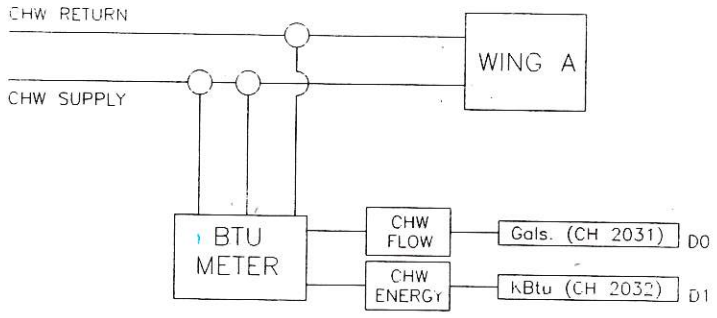


NEIL KIRKMAN BUILDING/WING A – SITE 922

NEIL KIRKMAN BUILDING (WING A) THERMAL MONITORING DIAGRAM

LEGEND
K=kWH CHANNEL
A=ANALOG CHANNEL
D=DIGITAL CHANNEL

WING A



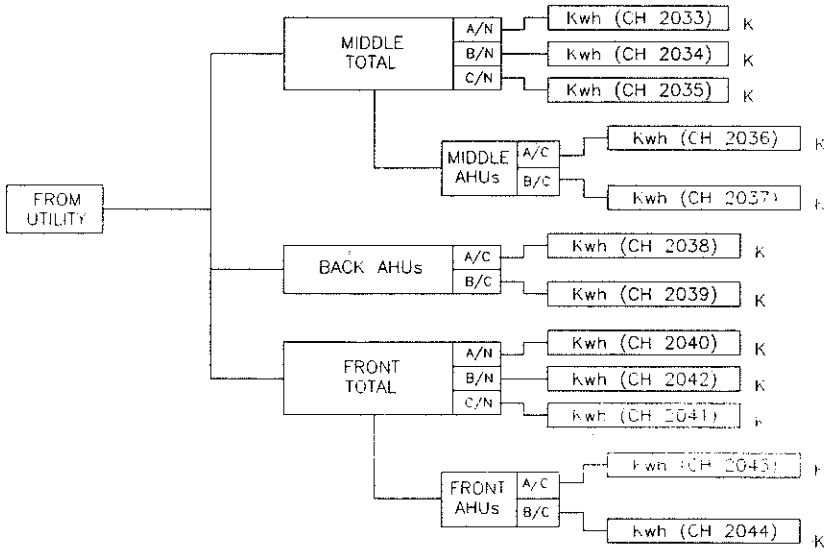
NEIL KIRKMAN BUILDING/WING A – SITE 922

NEIL KIRKMAN BUILDING (WING B)
ELECTRICAL MONITORING DIAGRAM

LEGEND

K=KWH CHANNEL
A=ANALOG CHANNEL
D=DIGITAL CHANNEL

WING B

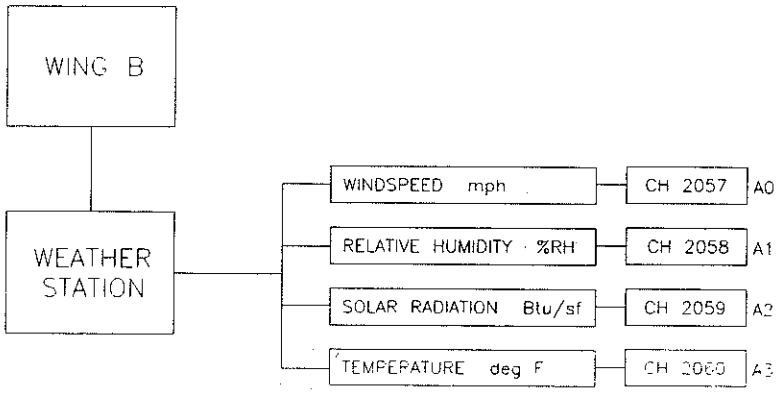


NEIL KIRKMAN BUILDING/WING B – SITE 923

NEIL KIRKMAN BUILDING (WING B)
WEATHER STATION DIAGRAM

LEGEND
K=KWH CHANNEL
A=ANALOG CHANNEL
D=DIGITAL CHANNEL

WING B

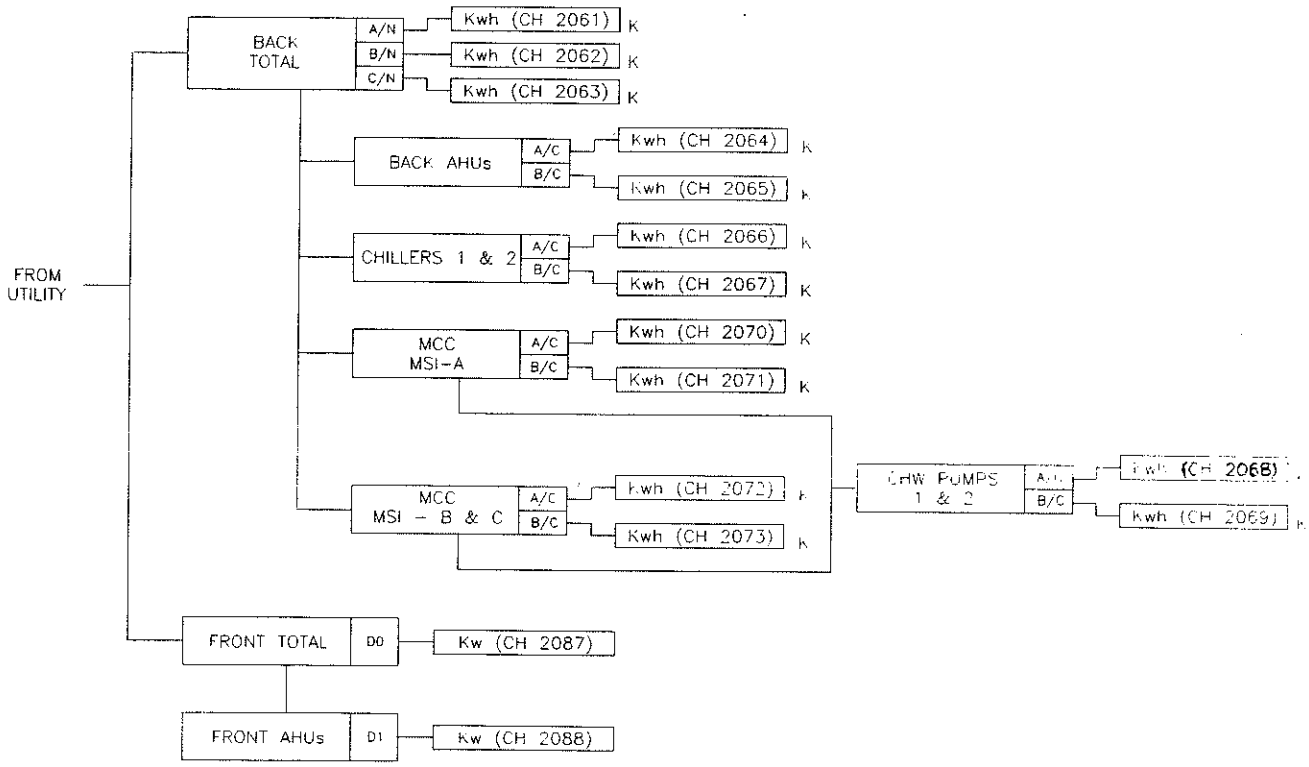


NEIL KIRKMAN BUILDING (WING C)
ELECTRICAL MONITORING DIAGRAM

LEGEND

K=KWH CHANNEL
A=ANALOG CHANNEL
D=DIGITAL CHANNEL

WING C

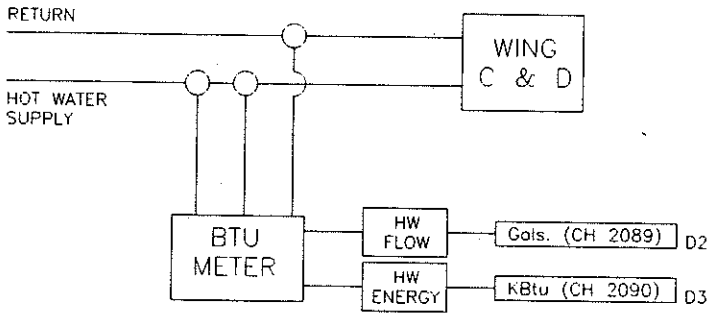


NEIL KIRKMAN BUILDING/WING C – SITE 924

NEIL KIRKMAN BUILDING (WING C)
THERMAL MONITORING DIAGRAMS

LEGEND
K=KWH CHANNEL
A=ANALOG CHANNEL
D=DIGITAL CHANNEL

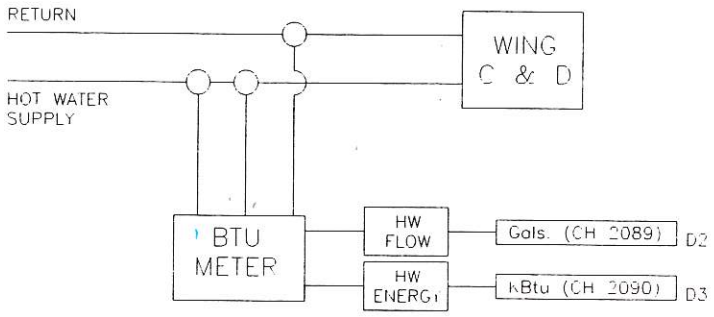
WING C



NEIL KIRKMAN BUILDING (WING C)
THERMAL MONITORING DIAGRAMS

LEGEND
K=KWH CHANNEL
A=ANALOG CHANNEL
D=DIGITAL CHANNEL

WING C



Chid	cp	Description		Start	Interval
1999	1	A WING TOTAL A	(power, A1N1/A1N1)	1995-09-30 00:00	60
2000	2	A WING TOTAL B	(power, B1N1/B1N1)	1995-09-30 00:00	60
2001	3	A WING TOTAL C	(power, C1N1/C1N1)	1995-09-30 00:00	60
2002	4	MCC A	(power, A1C1/A1C1)	1995-09-30 00:00	60
2003	5	MCC B	(power, B1C1/B1C1)	1995-09-30 00:00	60
2004	6	CHILLERS A	(power, A1C1/A1C1)	1995-09-30 00:00	60
2005	7	CHILLERS B	(power, B1C1/B1C1)	1995-09-30 00:00	60
2006	8	AHU 4 A	(power, A1C1/A1C1)	1995-09-30 00:00	60
2007	9	AHU 4 B	(power, B1C1/B1C1)	1995-09-30 00:00	60
2008	10	AHUS B,1,2,3 PHA	(power, A1C1/A1C1)	1995-09-30 00:00	60
2009	11	AHUS B,1,2,3 PHB	(power, B1C1/B1C1)	1995-09-30 00:00	60
2010	12	CHW PUMPS A	(power, A1C1/A1C1)	1995-09-30 00:00	60
2011	13	CHW PUMPS B	(power, B1C1/B1C1)	1995-09-30 00:00	60
2012	14	LIGHTS 1ST FL A	(power, A1N1/A1N1)	1995-09-30 00:00	60
2013	15	LIGHTS 1ST FL B	(power, B1N1/B1N1)	1995-09-30 00:00	60
2014	16	LIGHTS 1ST FL C	(power, C1N1/C1N1)	1995-09-30 00:00	60
2015	17	A WING TOTAL A	(kva, A1N1/A1N1)	1995-09-30 00:00	60
2016	18	A WING TOTAL B	(kva, B1N1/B1N1)	1995-09-30 00:00	60
2017	19	A WING TOTAL C	(kva, C1N1/C1N1)	1995-09-30 00:00	60
2018	20	MCC A	(kva, A1C1/A1C1)	1995-09-30 00:00	60
2019	21	MCC B	(kva, B1C1/B1C1)	1995-09-30 00:00	60
2020	22	CHILLERS A	(kva, A1C1/A1C1)	1995-09-30 00:00	60
2021	23	CHILLERS B	(kva, B1C1/B1C1)	1995-09-30 00:00	60
2022	24	AHU 4 A	(kva, A1C1/A1C1)	1995-09-30 00:00	60
2023	25	AHU 4 B	(kva, B1C1/B1C1)	1995-09-30 00:00	60
2024	26	AHUS B,1,2,3 PHA	(kva, A1C1/A1C1)	1995-09-30 00:00	60
2025	27	AHUS B,1,2,3 PHB	(kva, B1C1/B1C1)	1995-09-30 00:00	60
2026	28	CHW PUMPS A	(kva, A1C1/A1C1)	1995-09-30 00:00	60
2027	29	CHW PUMPS B	(kva, B1C1/B1C1)	1995-09-30 00:00	60
2028	30	LIGHTS 1ST FL A	(kva, A1N1/A1N1)	1995-09-30 00:00	60
2029	31	LIGHTS 1ST FL B	(kva, B1N1/B1N1)	1995-09-30 00:00	60
2030	32	LIGHTS 1ST FL C	(kva, C1N1/C1N1)	1995-09-30 00:00	60
2031	33	CILLER FLOW		1996-03-27 14:00	60
2032	34	CHLLER BTUS		1996-03-27 14:00	60

Chid	cp	Description	Start	Interval
2033	1	B MIDDLE TOTAL A (power, A1N1/A1N1)	1995-09-30 00:00	60
2034	2	B MIDDLE TOTAL B (power, B1N1/B1N1)	1995-09-30 00:00	60
2035	3	B MIDDLE TOTAL C (power, C1N1/C1N1)	1995-09-30 00:00	60
2036	4	B MIDDLE AHUS A (power, A1C1/A1C1)	1995-09-30 00:00	60
2037	5	B MIDDLE AHUS B (power, B1C1/B1C1)	1995-09-30 00:00	60
2038	6	B BACK AHUS A (power, A1C1/A1C1)	1995-09-30 00:00	60
2039	7	B BACK AHUS B (power, B1C1/B1C1)	1995-09-30 00:00	60
2040	8	B FRONT TOTAL A (power, A1N1/A1N1)	1995-09-30 00:00	60
2041	9	B FRONT TOTAL C (power, C1N1/C1N1)	1995-09-30 00:00	60
2042	10	B FRONT TOTAL B (power, B1N1/B1N1)	1995-09-30 00:00	60
2043	11	B FRONT AHUS A (power, A1C1/A1C1)	1995-09-30 00:00	60
2044	12	B FRONT AHUS B (power, B1C1/B1C1)	1995-09-30 00:00	60
2045	13	B MIDDLE TOTAL A (kva, A1N1/A1N1)	1995-09-30 00:00	60
2046	14	B MIDDLE TOTAL B (kva, B1N1/B1N1)	1995-09-30 00:00	60
2047	15	B MIDDLE TOTAL C (kva, C1N1/C1N1)	1995-09-30 00:00	60
2048	16	B MIDDLE AHUS A (kva, A1C1/A1C1)	1995-09-30 00:00	60
2049	17	B MIDDLE AHUS B (kva, B1C1/B1C1)	1995-09-30 00:00	60
2050	18	B BACK AHUS A (kva, A1C1/A1C1)	1995-09-30 00:00	60
2051	19	B BACK AHUS B (kva, B1C1/B1C1)	1995-09-30 00:00	60
2052	20	B FRONT TOTAL A (kva, A1N1/A1N1)	1995-09-30 00:00	60
2053	21	B FRONT TOTAL C (kva, C1N1/C1N1)	1995-09-30 00:00	60
2054	22	B FRONT TOTAL B (kva, B1N1/B1N1)	1995-09-30 00:00	60
2055	23	B FRONT AHUS A (kva, A1C1/A1C1)	1995-09-30 00:00	60
2056	24	B FRONT AHUS B (kva, B1C1/B1C1)	1995-09-30 00:00	60
2057	25	WIND SPEED	1995-09-30 00:00	60
2058	26	REL HUMIDITY	1995-09-30 00:00	60
2059	27	SOLAR RADIATION	1995-09-30 00:00	60
2060	28	OUT AIR TEMP	1995-09-30 00:00	60

Chid	cp	Description	Start	Interval
2061	1	C BACK TOTAL A (power, A1N1/A1N1)	1995-09-30 00:00	60
2062	2	C BACK TOTAL B (power, B1N1/B1N1)	1995-09-30 00:00	60
2063	3	C BACK TOTAL C (power, C1N1/C1N1)	1995-09-30 00:00	60
2064	4	C BACK AHUS A (power, A1C1/A1C1)	1995-09-30 00:00	60
2065	5	C BACK AHUS B (power, B1C1/B1C1)	1995-09-30 00:00	60
2066	6	CHILLERS A (power, A1C1/A1C1)	1995-09-30 00:00	60
2067	7	CHILLERS B (power, B1C1/B1C1)	1995-09-30 00:00	60
2068	8	CHW PUMPS A (power, A1C1/A1C1)	1995-09-30 00:00	60
2069	9	CHW PUMPS B (power, B1C1/B1C1)	1995-09-30 00:00	60
2070	10	MCC MS1-A A (power, A1C1/A1C1)	1995-09-30 00:00	60
2071	11	MCC MS1-A B (power, B1C1/B1C1)	1995-09-30 00:00	60
2072	12	MCC MS1-B&C A (power, A1C1/A1C1)	1995-09-30 00:00	60
2073	13	MCC MS1-B&C B (power, B1C1/B1C1)	1995-09-30 00:00	60
2074	14	C BACK TOTAL A (kva, A1N1/A1N1)	1995-09-30 00:00	60
2075	15	C BACK TOTAL B (kva, B1N1/B1N1)	1995-09-30 00:00	60
2076	16	C BACK TOTAL C (kva, C1N1/C1N1)	1995-09-30 00:00	60
2077	17	C BACK AHUS A (kva, A1C1/A1C1)	1995-09-30 00:00	60
2078	18	C BACK AHUS B (kva, B1C1/B1C1)	1995-09-30 00:00	60
2079	19	CHILLERS A (kva, A1C1/A1C1)	1995-09-30 00:00	60
2080	20	CHILLERS B (kva, B1C1/B1C1)	1995-09-30 00:00	60
2081	21	CHW PUMPS A (kva, A1C1/A1C1)	1995-09-30 00:00	60
2082	22	CHW PUMPS B (kva, B1C1/B1C1)	1995-09-30 00:00	60
2083	23	MCC MS1-A A (kva, A1C1/A1C1)	1995-09-30 00:00	60
2084	24	MCC MS1-A B (kva, B1C1/B1C1)	1995-09-30 00:00	60
2085	25	MCC MS1-B&C A (kva, A1C1/A1C1)	1995-09-30 00:00	60
2086	26	MCC MS1-B&C B (kva, B1C1/B1C1)	1995-09-30 00:00	60
2087	27	C FRONT TOTAL	1995-09-30 00:00	60
2088	28	C FRONT AHUS	1995-09-30 00:00	60
2089	29	C HOT WATER FLOW	1996-03-27 14:00	60
2090	30	C HOT WATER BTUS	1996-03-27 14:00	60

APPENDIX B

Monthly Energy Consumption Reports for A, B & C-Wings for April 1996

Neil Kirkman Building A-Wing

Florida Dept. of Highway and Motor Veh.
162,028 square feet

Site Contact	Metering Contact
Dr. S. A. Sherif	Aamer Athar
Associate Professor	053D WERC
Dept. Mechanical Engineering	Texas A&M University
University of Florida	College Station, TX 77843-3123
Gainesville	(409)–845–9213
FL 32611	

Summary of Energy Consumption

	Measured Use	% hours reported	Unit Cost	Estimated Cost
Electricity	249682 kWh	100	$0.06020	$15031
Peak 60 Minute Demand	618 kW	100	$7.20	$4449
Chilled Water	483.0 MMBtu	100	$5.000	$2415

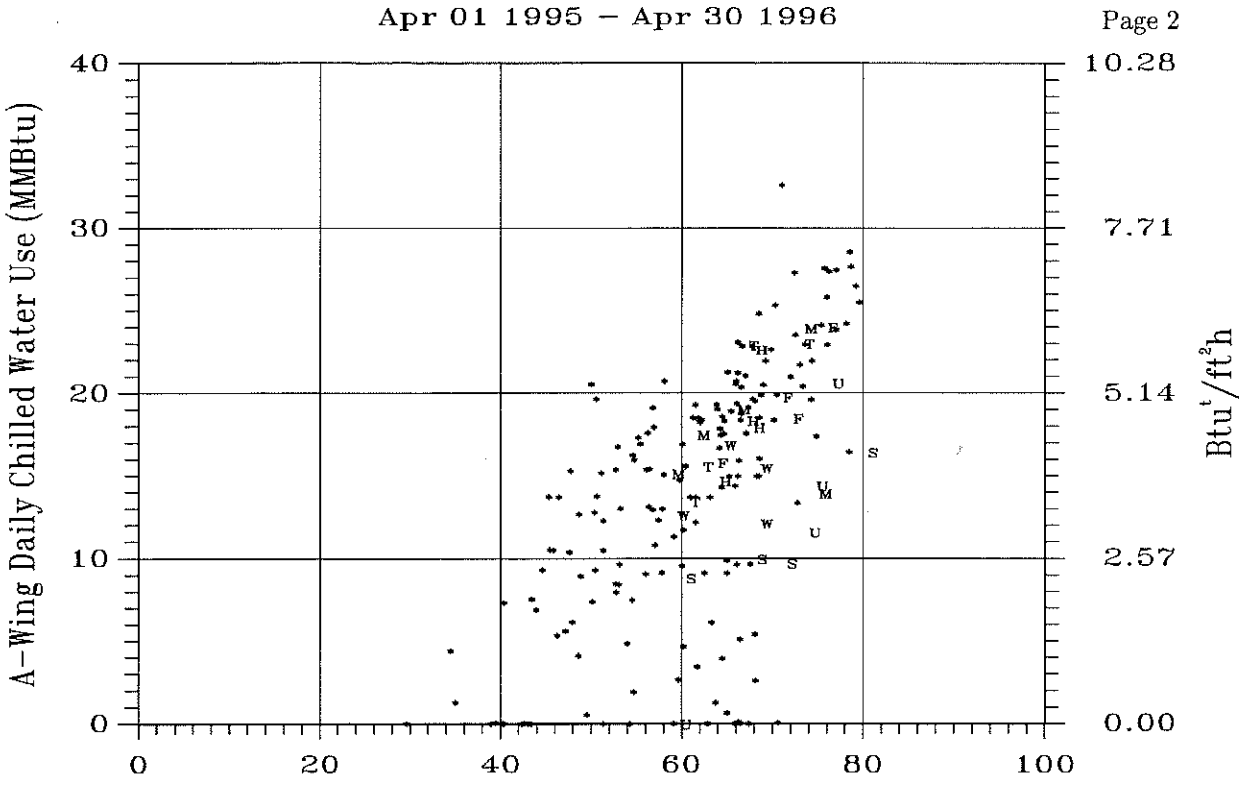
Peak 60 minute demand was recorded at 1600 Thursday 4/25/96.
There were 720 hours in this month.

Monthly Retrofit Savings

	Measured Savings	Audit Estimated Savings
Monthly Total		
Total to Date*		

*Measured savings include construction period. Audit estimated savings do not.

Comments



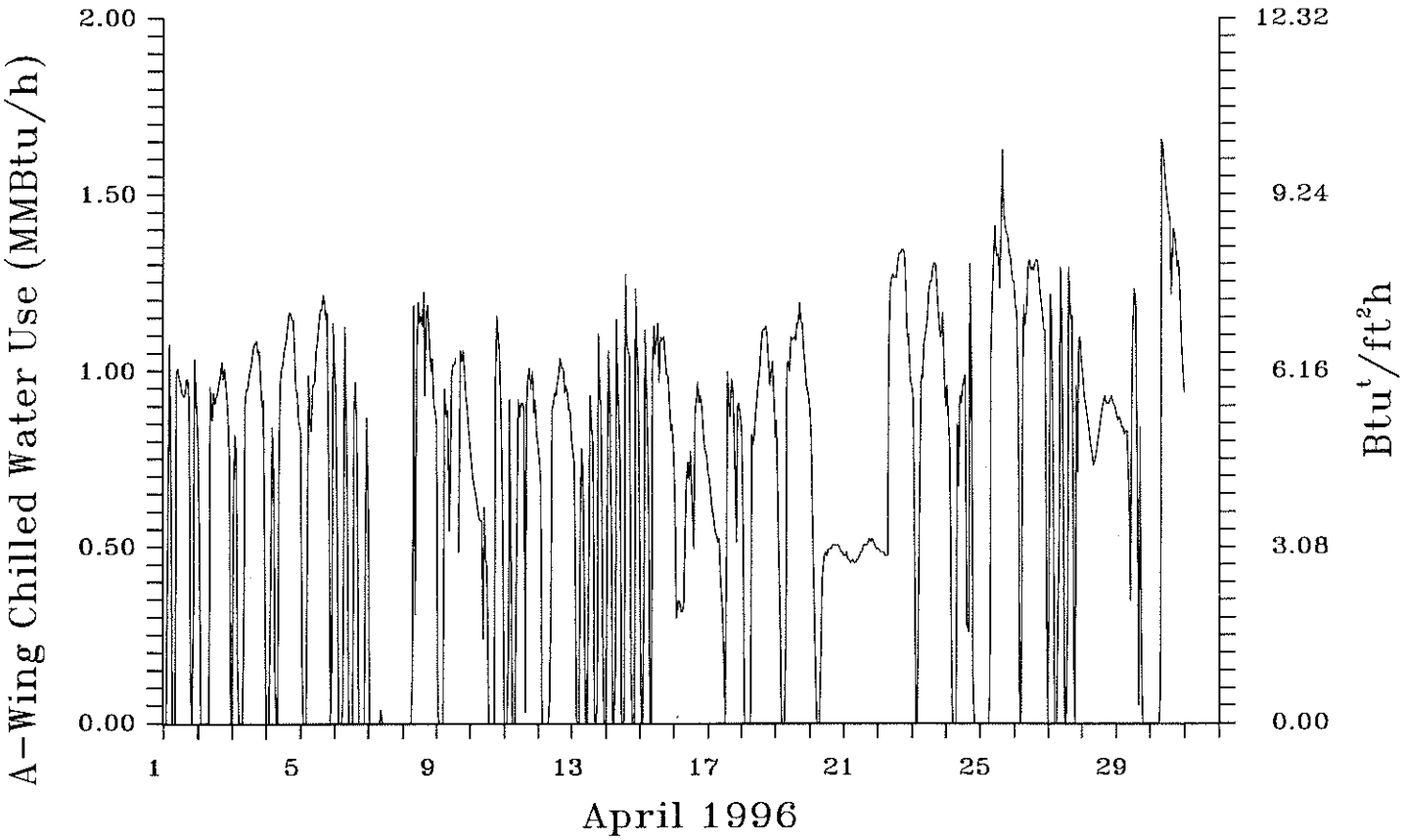
Data points for the current month are shown as letters.
Monday through Sunday are represented as M,T,W,H,F,S,U.

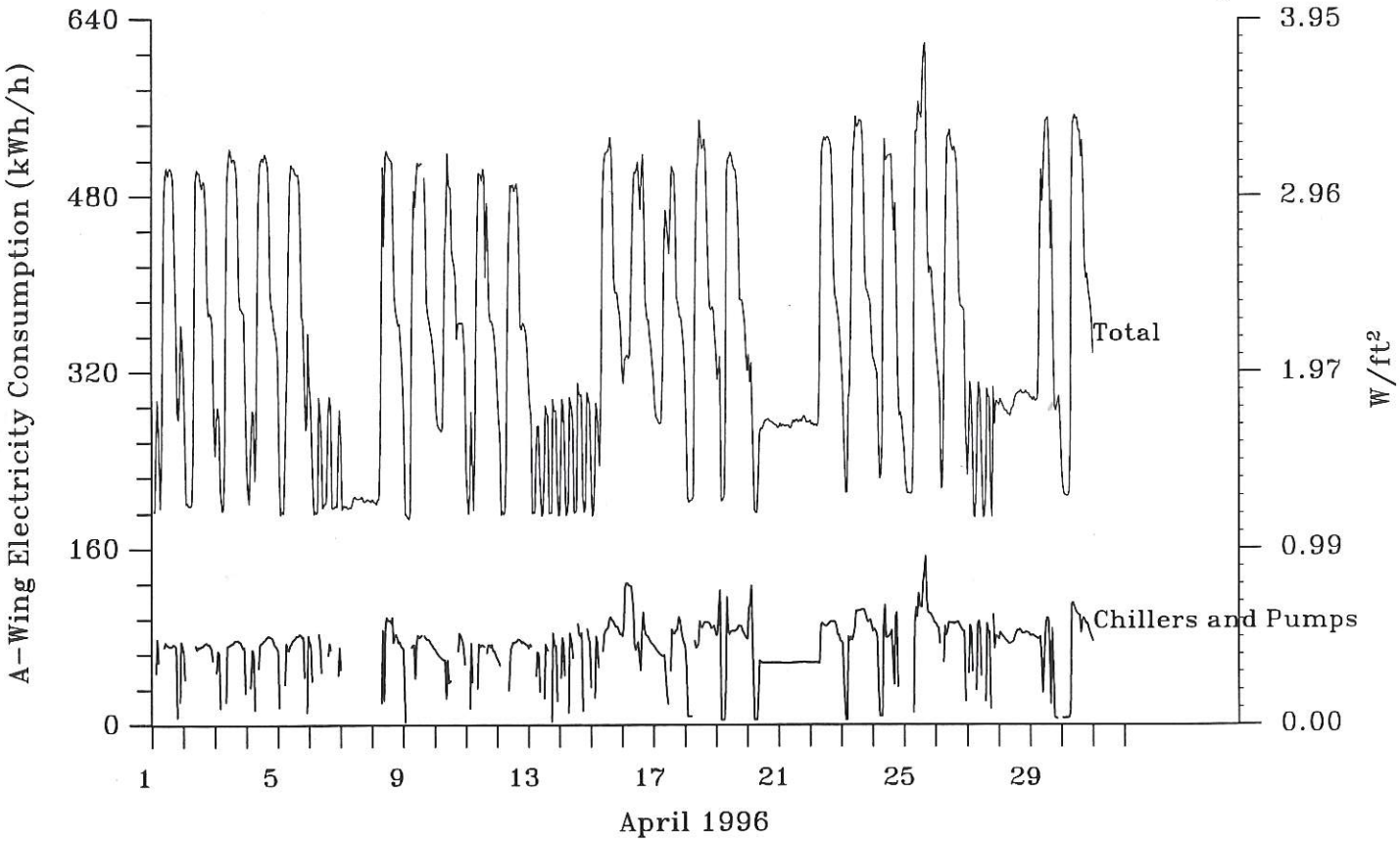
Points from this month last year are shown as +.
All other points are shown as *.

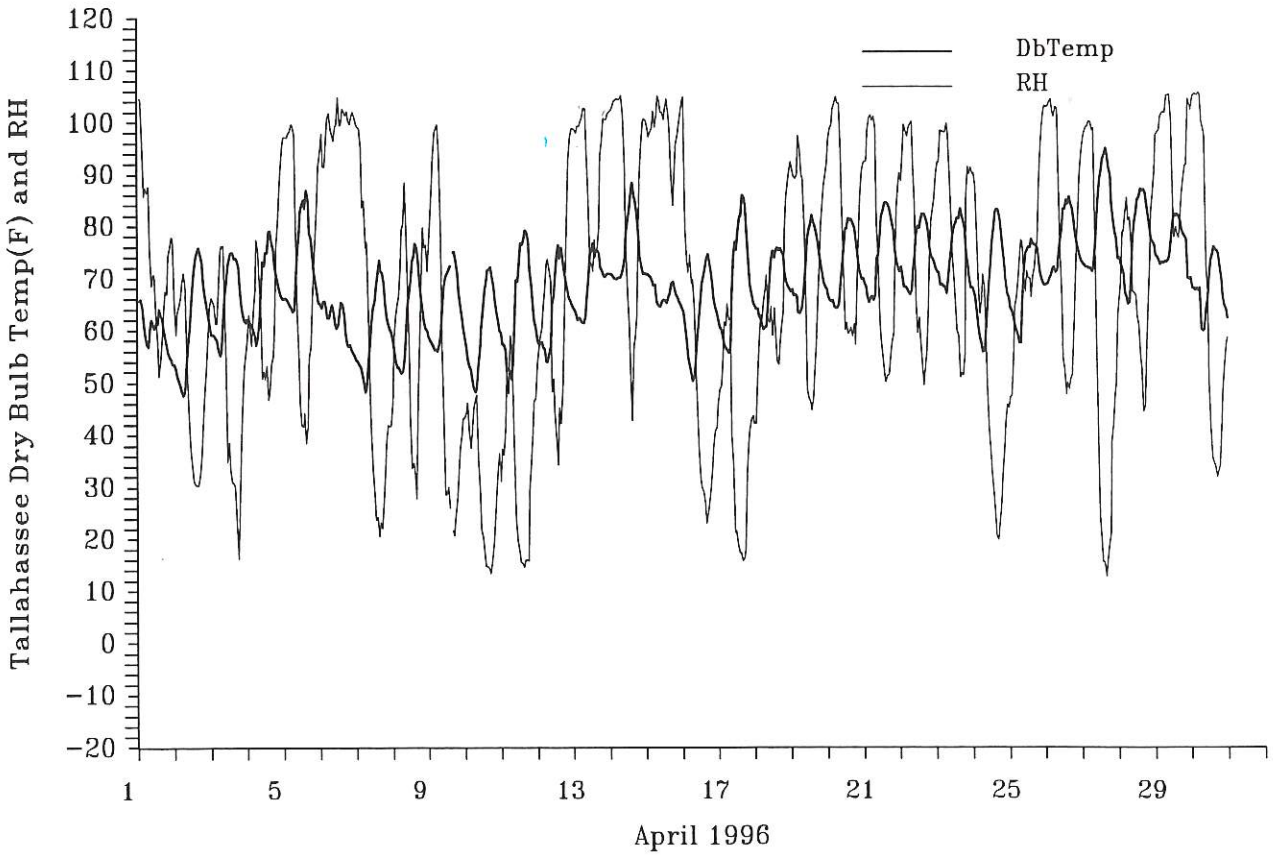
Neil Kirkman Building A-Wing - Florida Dept. of Highway and Motor Veh. - April 1996

Monthly Energy Consumption Report©

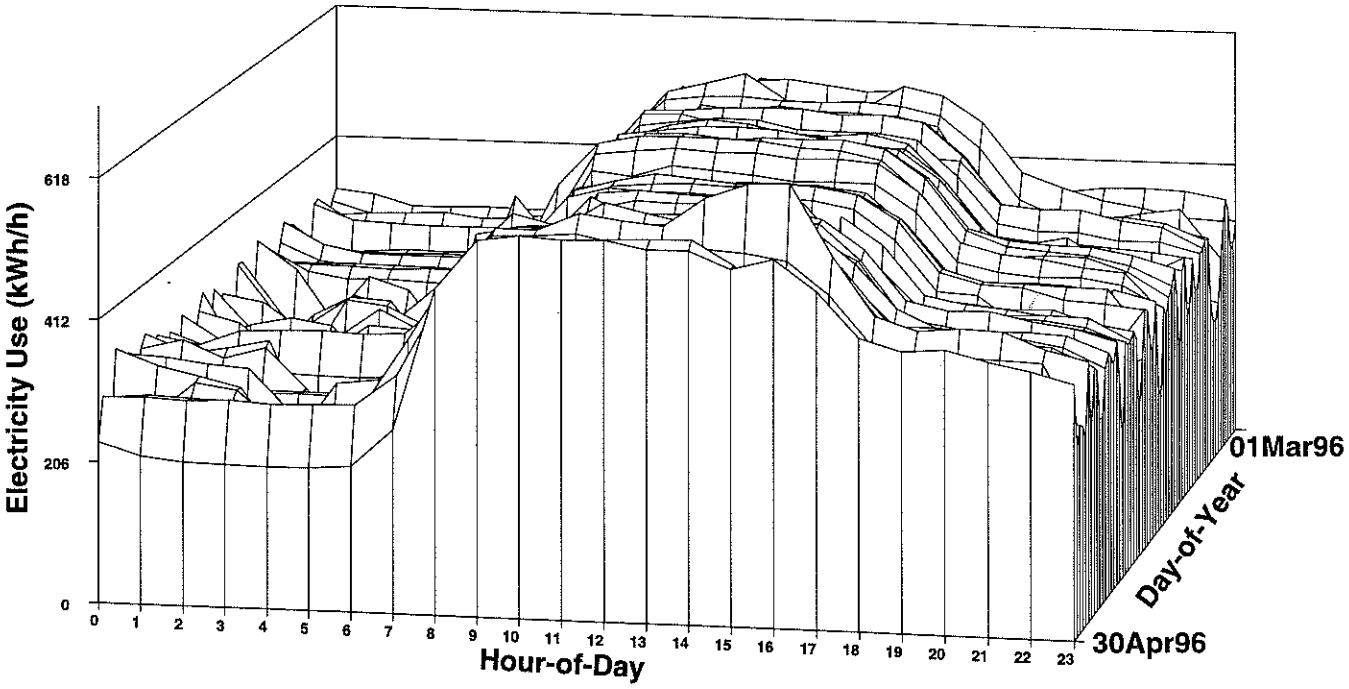
Version 2.2


A-Wing Chilled Water Use (MMBtu/h)
2.00
1.50
1.00
0.50
0.00
12.32
9.24
6.16
3.08
0.00
Btu^t/ft^{2}h
1
5
9
13
17
21
25
29
April 1996

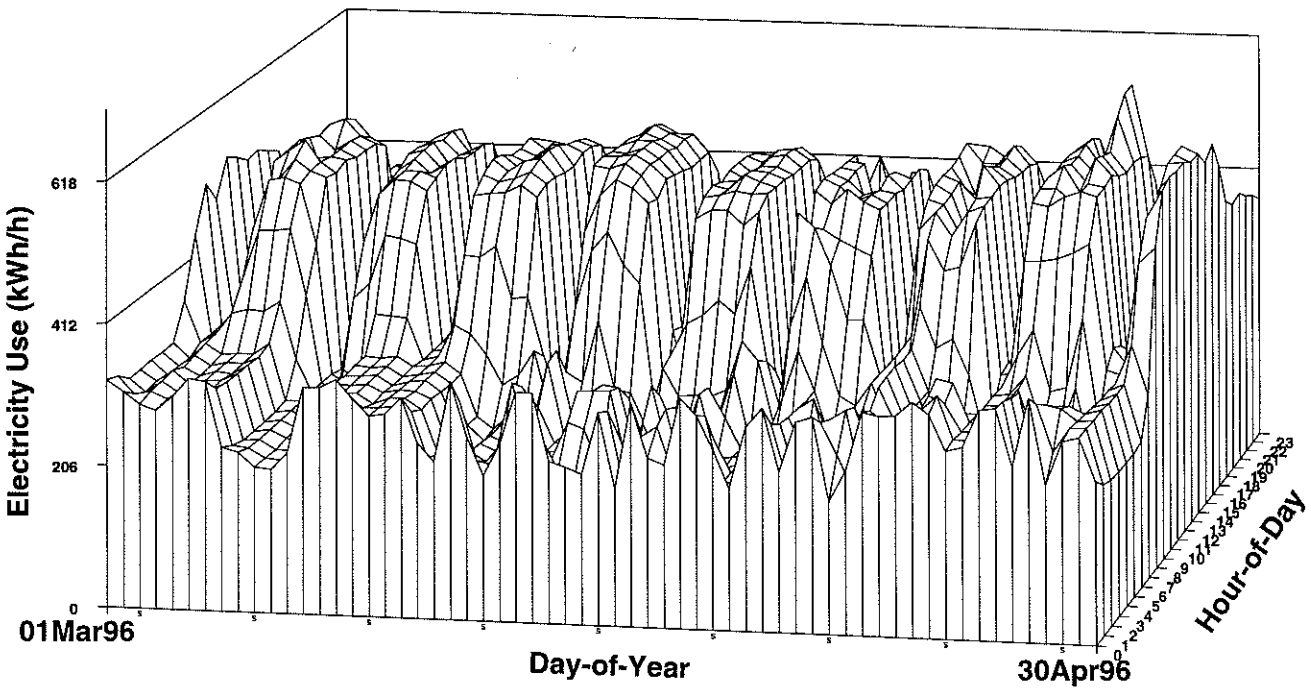

A-Wing Electricity Consumption (kWh/h)
640
480
320
160
0
3.95
2.96
1.97
0.99
0.00
W/ft²
Total
Chillers and Pumps
1
5
9
13
17
21
25
29
April 1996


Tallahassee Dry Bulb Temp(F) and RH
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
DbTemp
RH
1
5
9
13
17
21
25
29
April 1996

Whole–Building Electric



Whole–Building Electric



Sundays are marked with an "S"

Neil Kirkman Building B-Wing

Florida Dept. of Highway and Motor Veh.
119,184 square feet

Site Contact	Metering Contact
Dr. S. A. Sherif	Aamer Athar
Associate Professor	053D WERC
Dept. Mechanical Engineering	Texas A&M University
University of Florida	College Station, TX 77843-3123
Gainesville	(409)-845-9213
FL 32611	

Summary of Energy Consumption

	Measured Use	% hours reported	Unit Cost	Estimated Cost
Electricity	104985 kWh	100	$0.06020	$6320
Peak 60 Minute Demand	250 kW	100	$7.20	$1796

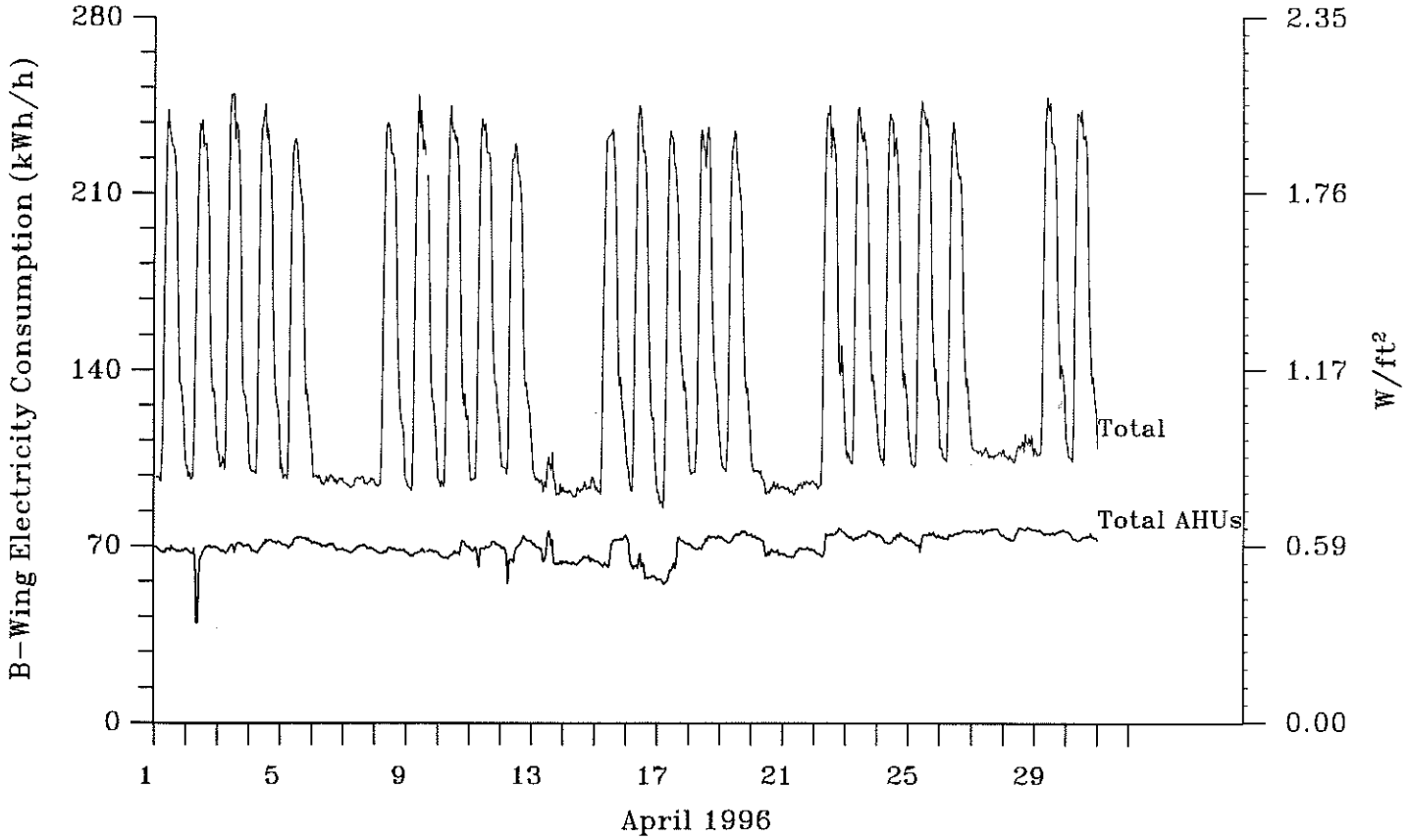
Peak 60 minute demand was recorded at 1200 Wednesday 4/3/96.
There were 720 hours in this month.

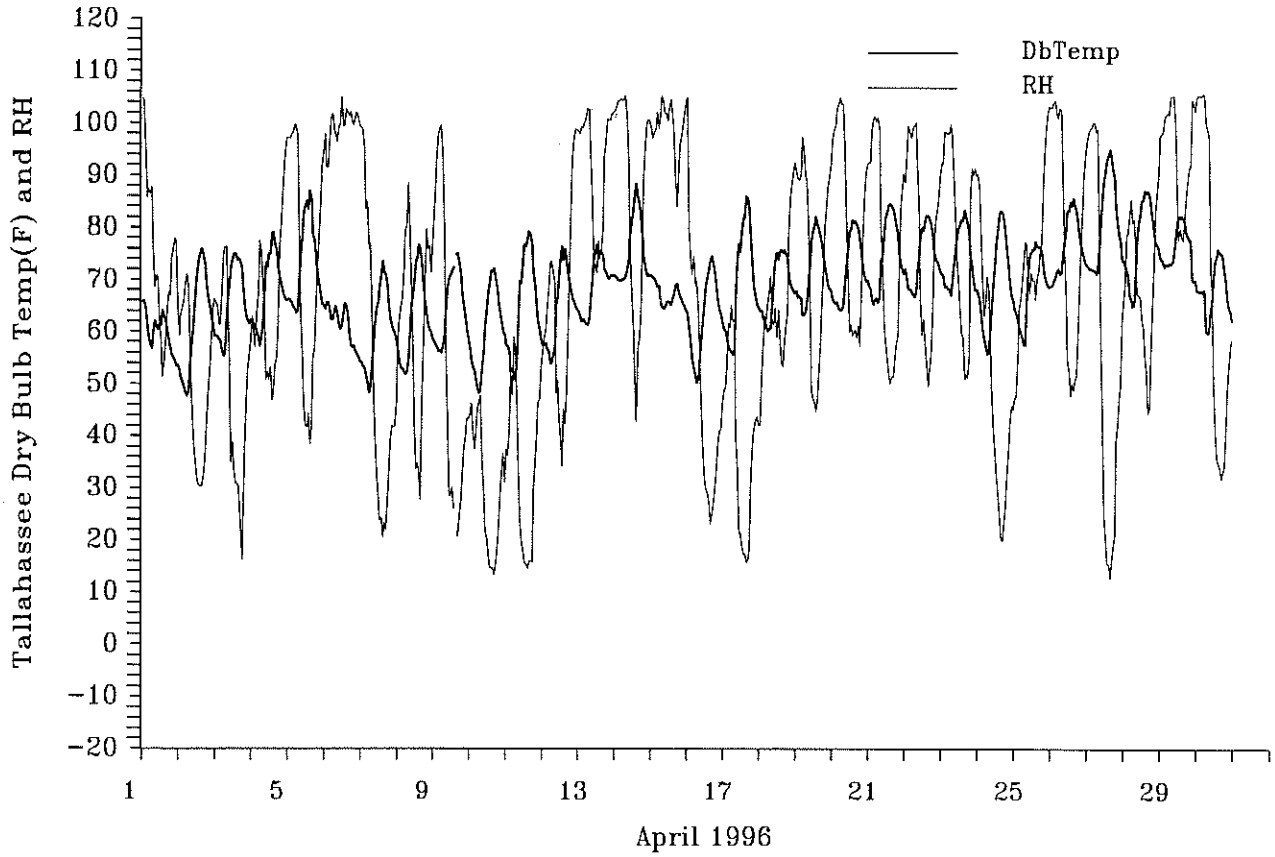
Monthly Retrofit Savings

	Measured Savings	Audit Estimated Savings
Monthly Total		
Total to Date*		

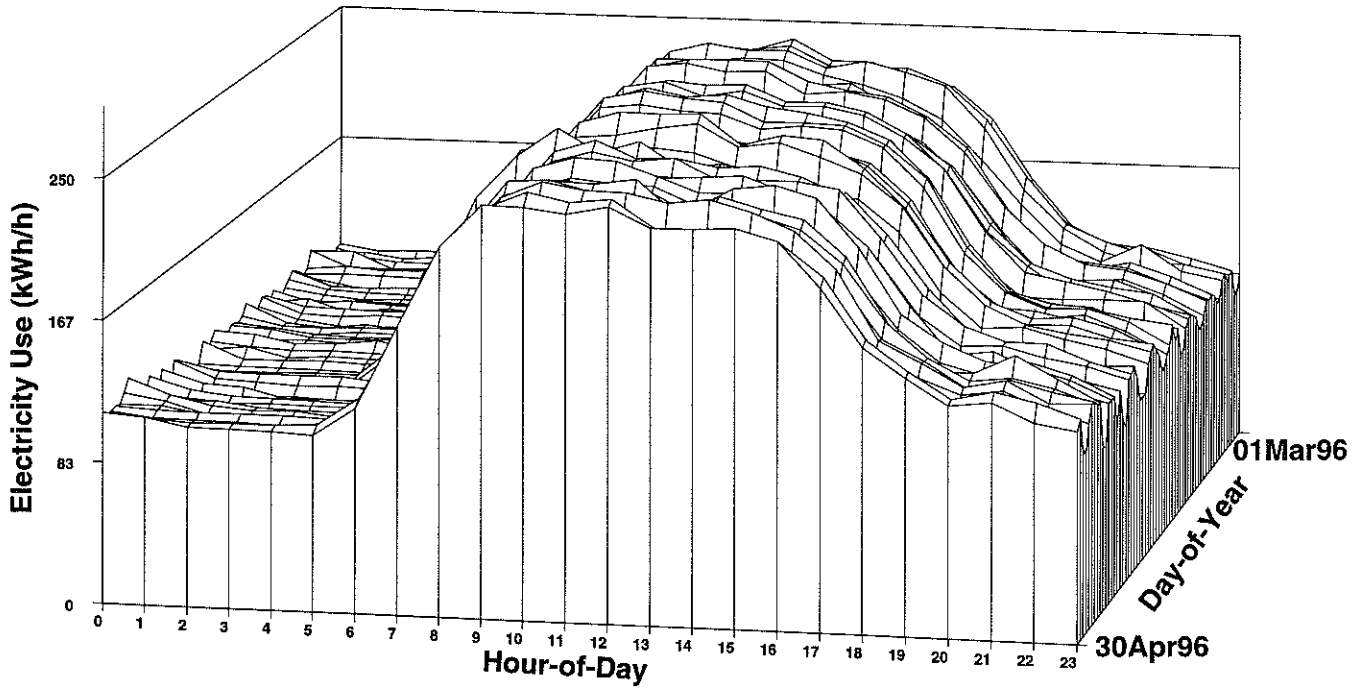
*Measured savings include construction period. Audit estimated savings do not.

Comments

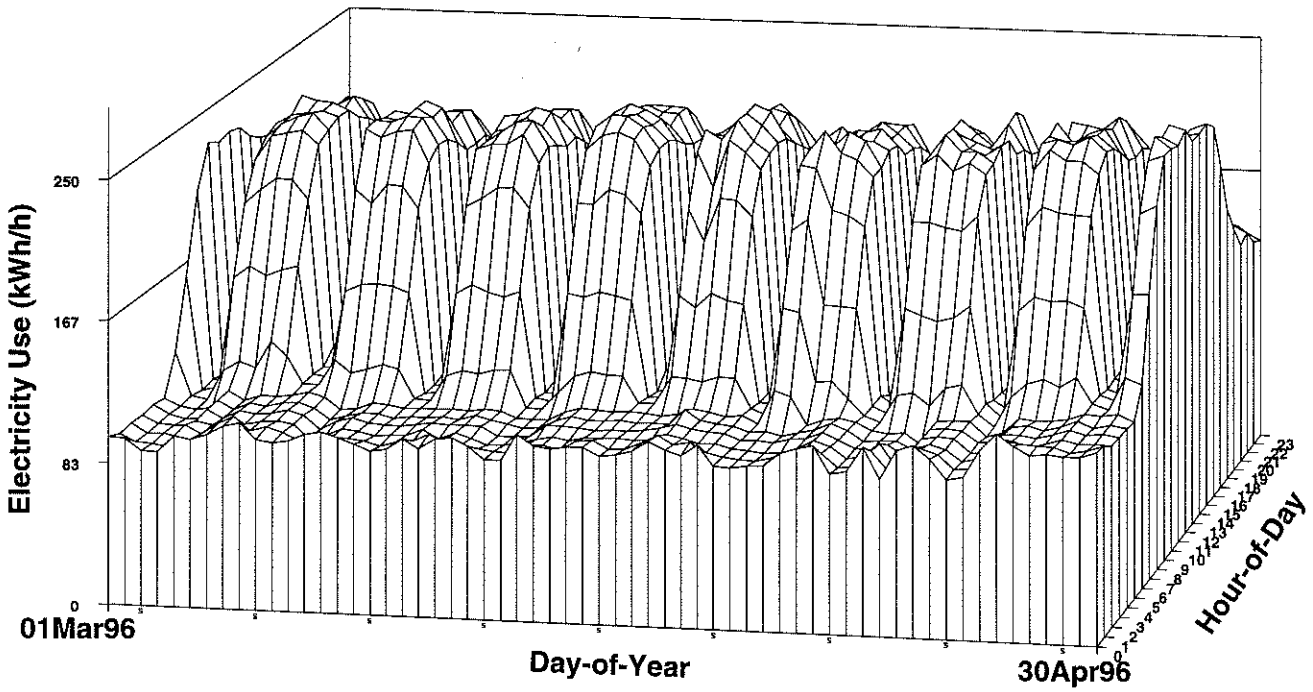

B−Wing Electricity Consumption (kWh/h)
W/ft²
280
210
140
70
0
2.35
1.76
1.17
0.59
0.00
Total
Total AHUs
1
5
9
13
17
21
25
29
April 1996


Tallahassee Dry Bulb Temp(F) and RH
120
110
100
90
80
70
60
50
40
30
20
10
0
−10
−20
DbTemp
RH
1
5
9
13
17
21
25
29
April 1996

Whole–Building Electric



Whole–Building Electric



Sundays are marked with an "S"

Neil Kirkman Building C-Wing

Florida Dept. of Highway and Motor Veh.
36,208 square feet

Site Contact	Metering Contact
Dr. S. A. Sherif	Aamer Athar
Associate Professor	053D WERC
Dept. Mechanical Engineering	Texas A&M University
University of Florida	College Station, TX 77843-3123
Gainesville	(409)–845–9213
FL 32611	

Summary of Energy Consumption

	Measured Use	% hours reported	Unit Cost	Estimated Cost
Electricity	68973 kWh	100	$0.06020	$4152
Peak 60 Minute Demand	316 kW	100	$7.20	$2273
Hot Water	4.0 MMBtu	100	$4.480	$18

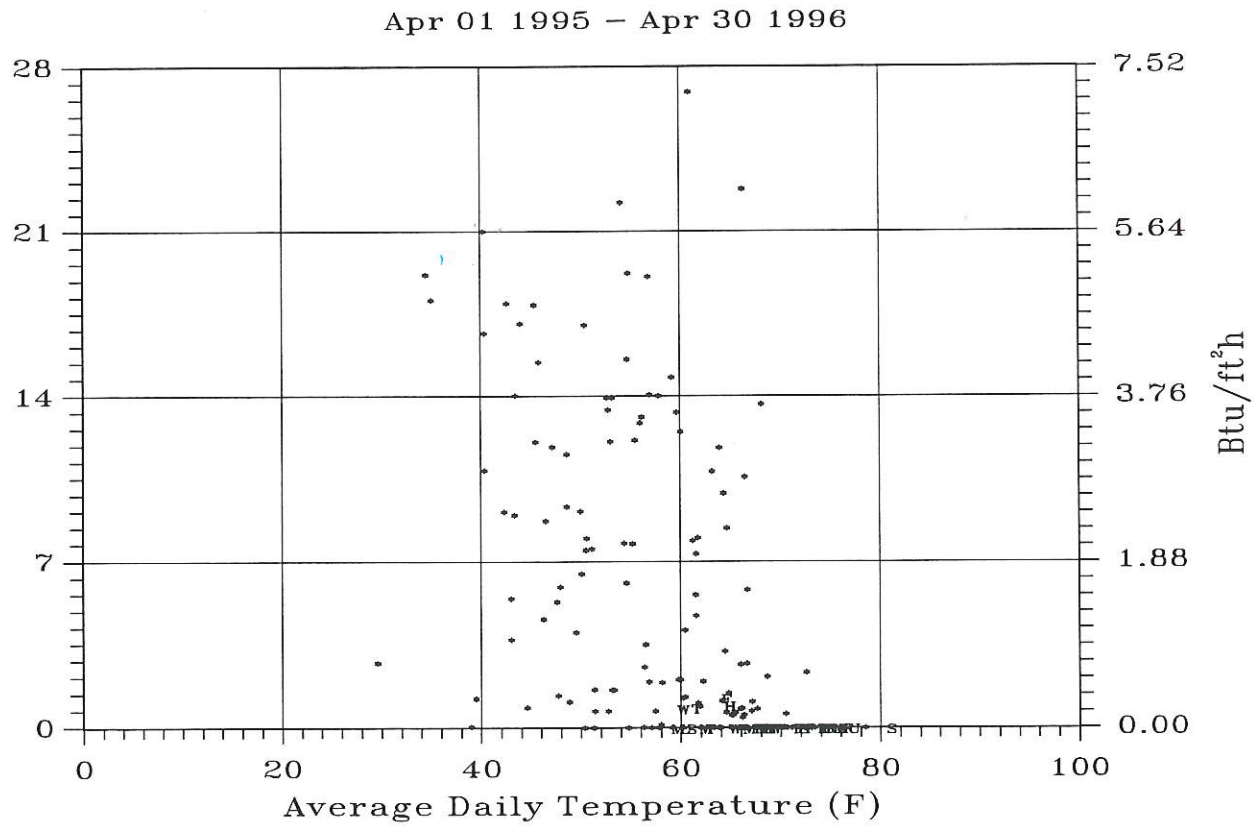
Peak 60 minute demand was recorded at 1600 Monday 4/29/96.
There were 720 hours in this month.

Monthly Retrofit Savings

	Measured Savings	Audit Estimated Savings
Monthly Total		
Total to Date*		

*Measured savings include construction period. Audit estimated savings do not.

Comments



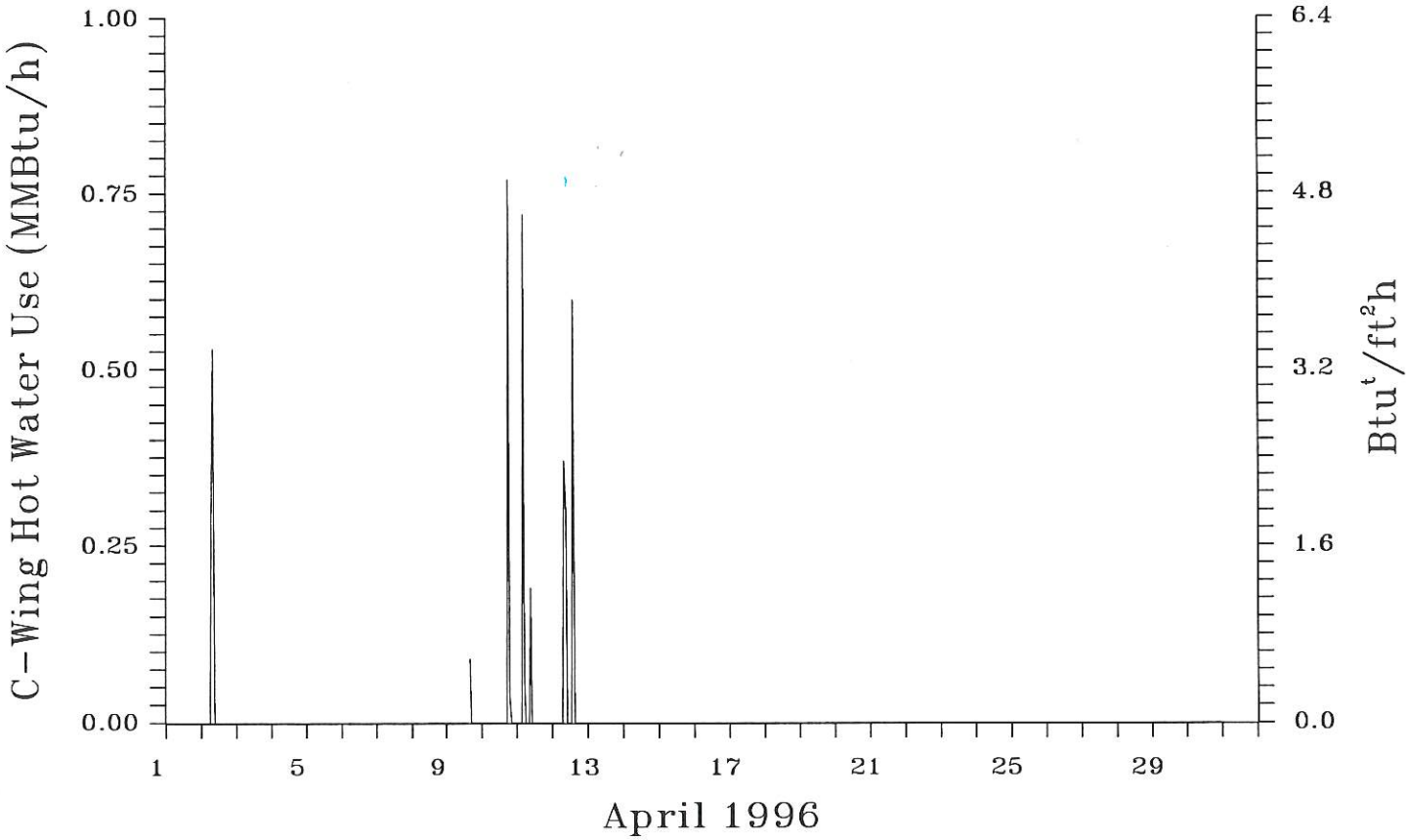
Data points for the current month are shown as letters.
Monday through Sunday are represented as M,T,W,H,F,S,U.

Points from this month last year are shown as +.
All other points are shown as *.

Neil Kirkman Building C-Wing - Florida Dept. of Highway and Motor Veh. - April 1996

Monthly Energy Consumption Report©

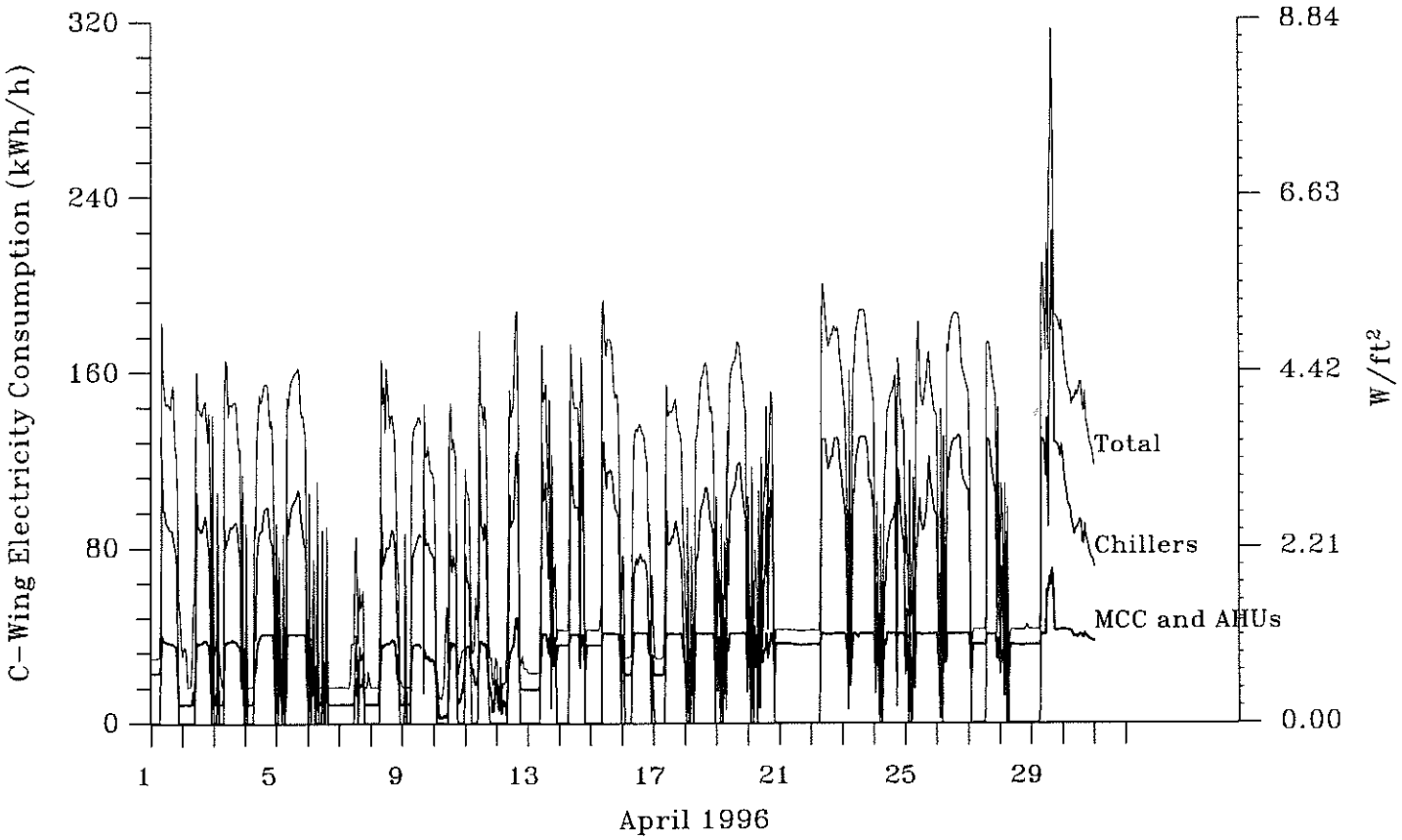
Version 2.2

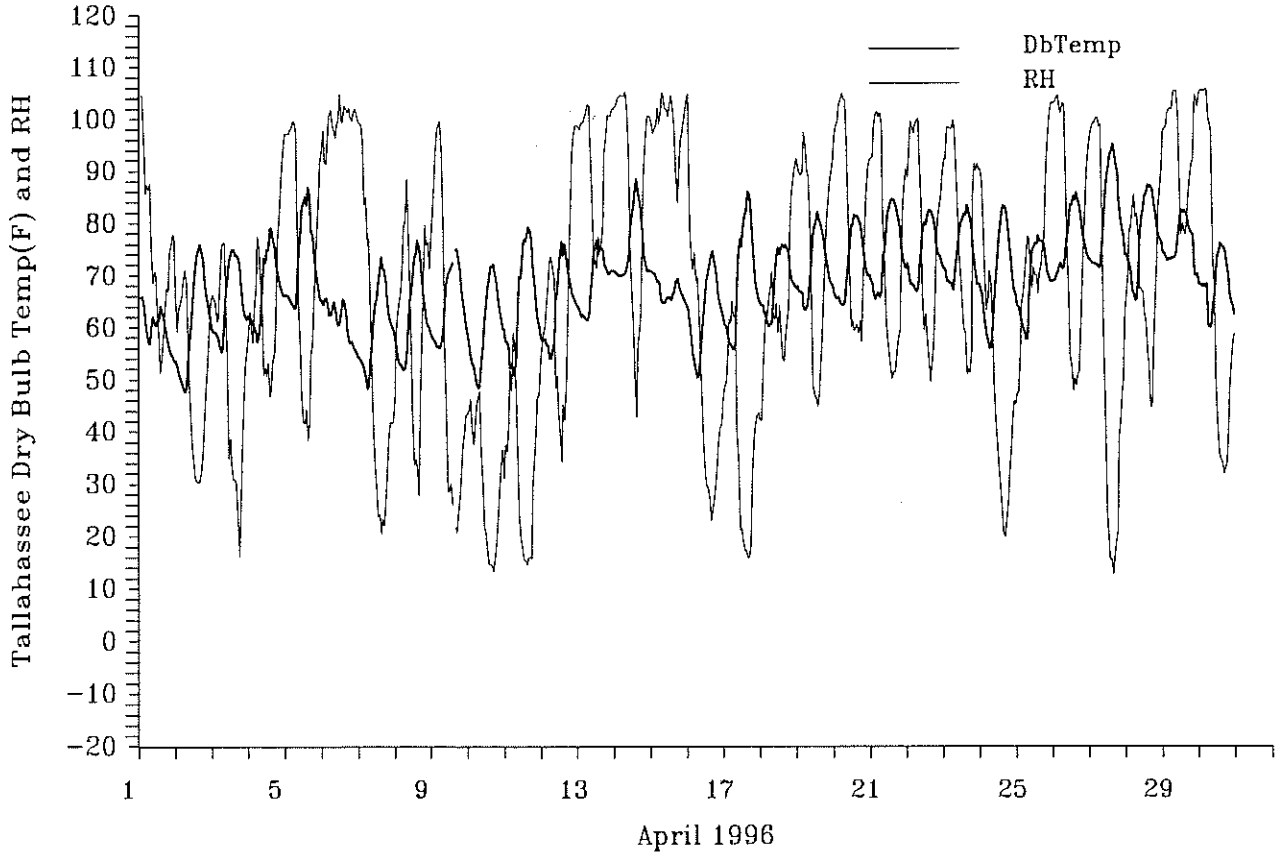


Neil Kirkman Building C-Wing - Florida Dept. of Highway and Motor Veh. - April 1996

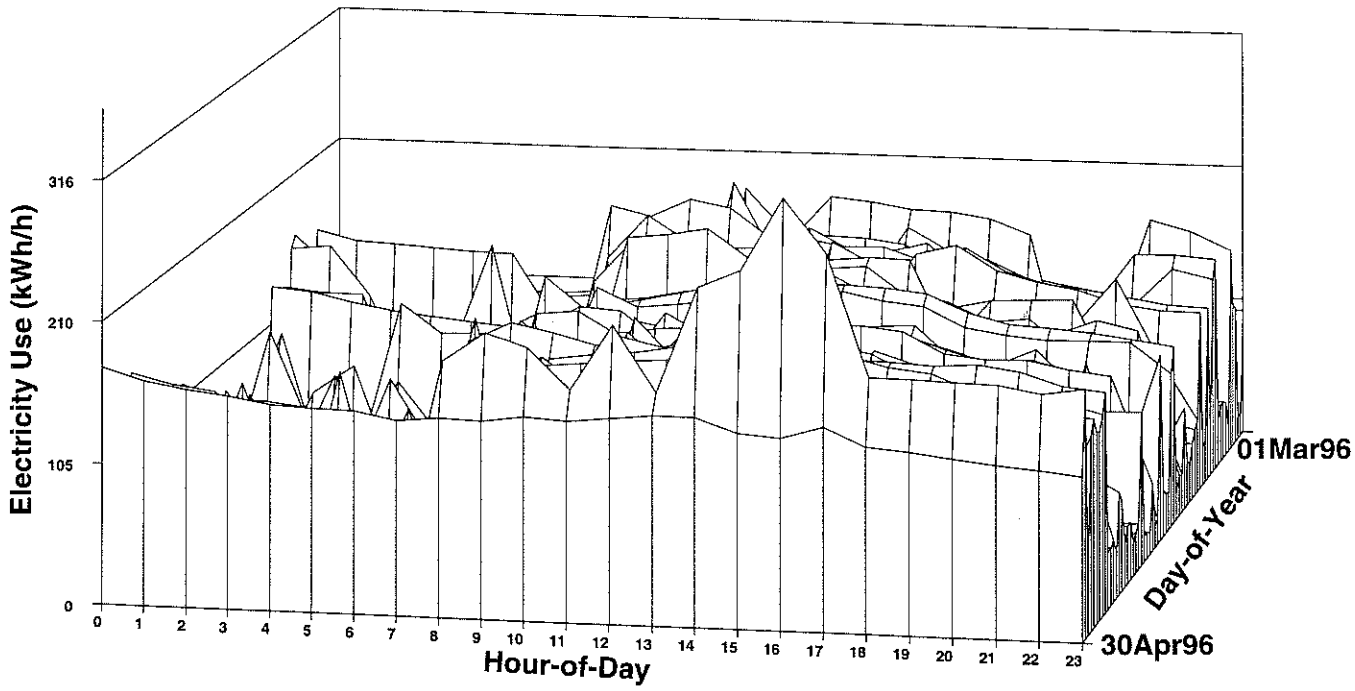
Monthly Energy Consumption Report©

Version 2.2

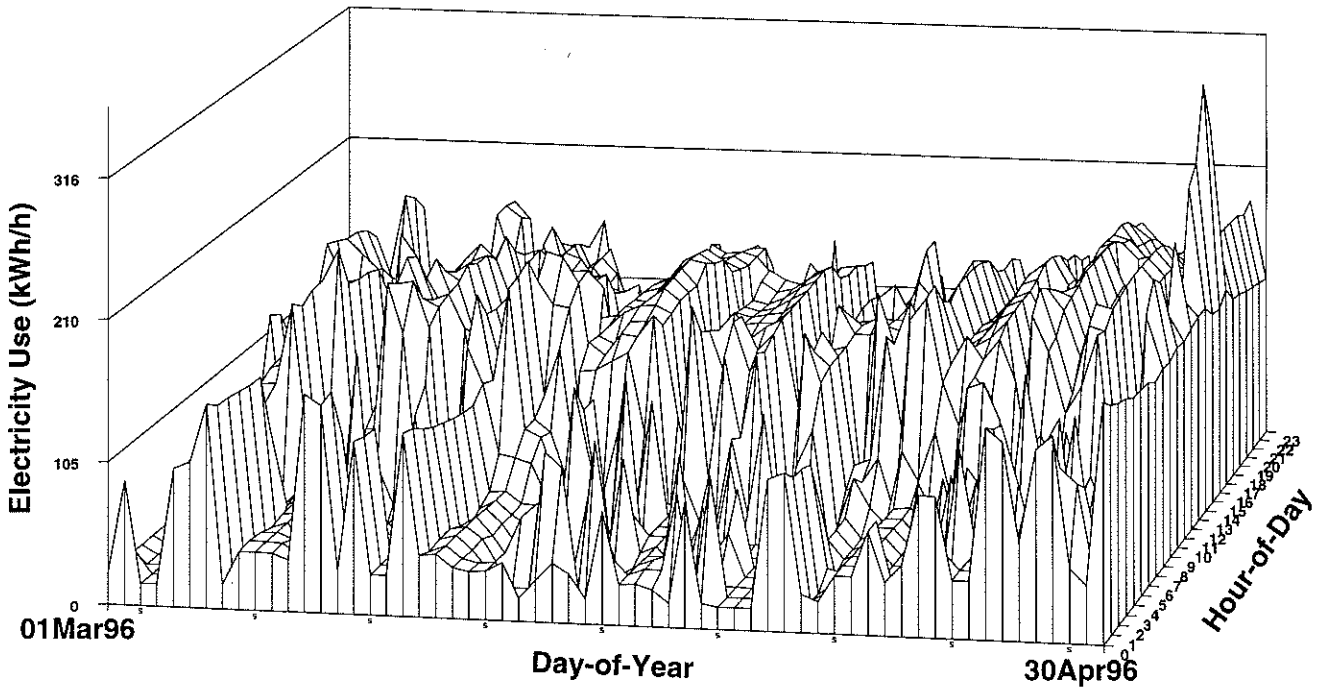

C-Wing Electricity Consumption (kWh/h)
320
240
160
80
0
8.84
6.63
4.42
2.21
0.00
W/ft²
Total
Chillers
MCC and AHUs
1
5
9
13
17
21
25
29
April 1996


Tallahassee Dry Bulb Temp(F) and RH
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
DbTemp
RH
1
5
9
13
17
21
25
29
April 1996

Whole–Building Electric



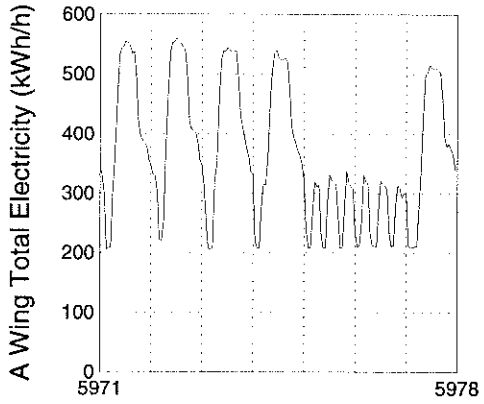
Whole–Building Electric



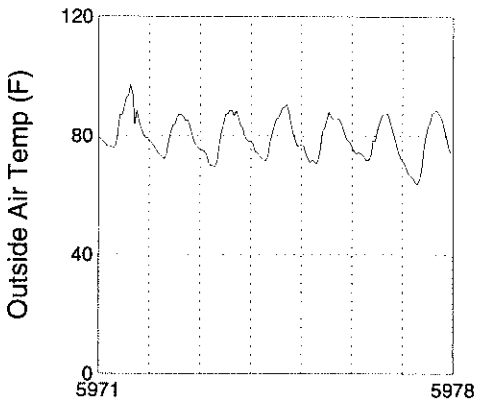
Sundays are marked with an "S"

APPENDIX C

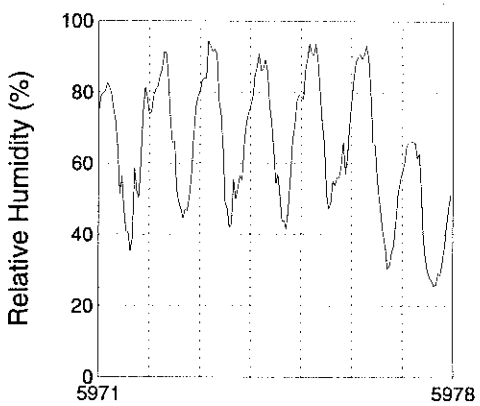
Weekly Data Plots from May 7 to May 27, 1996



Site 922 Beginning 05-07-1996



Site 922 Beginning 05-07-1996



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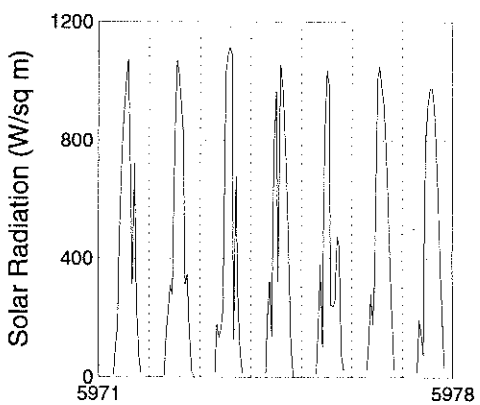

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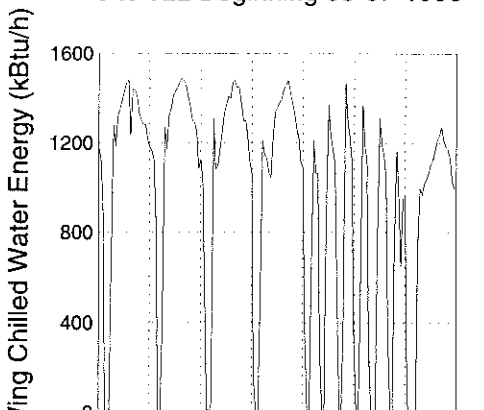

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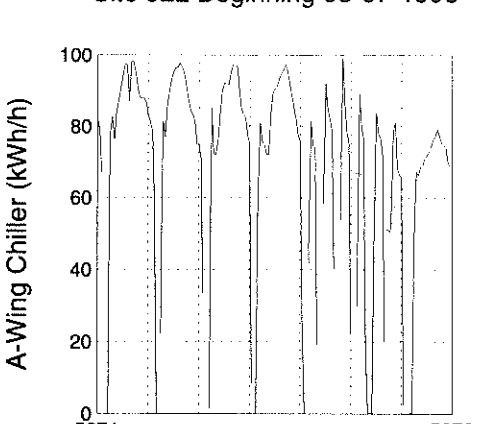

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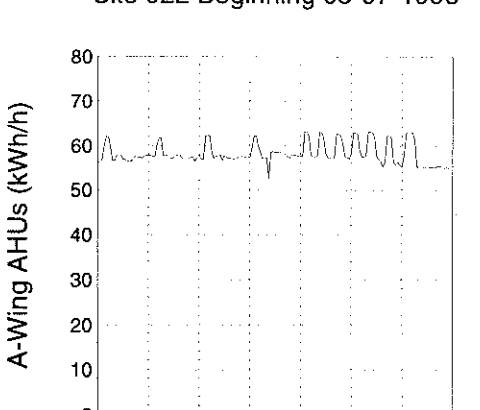

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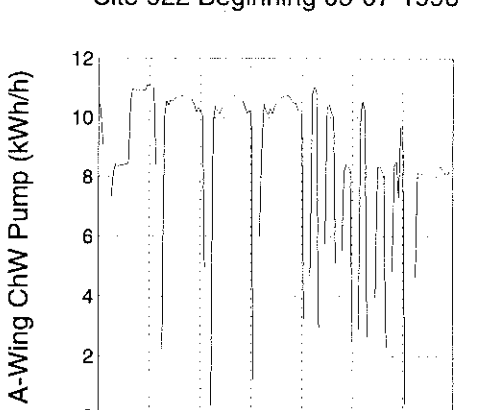

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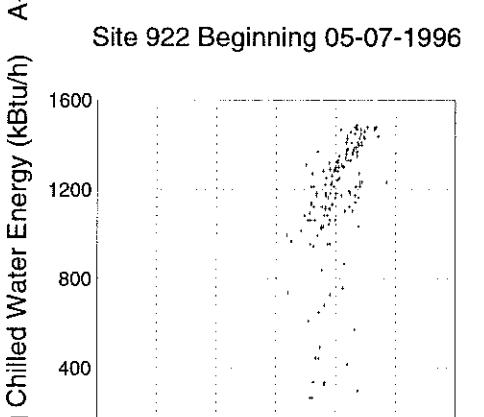
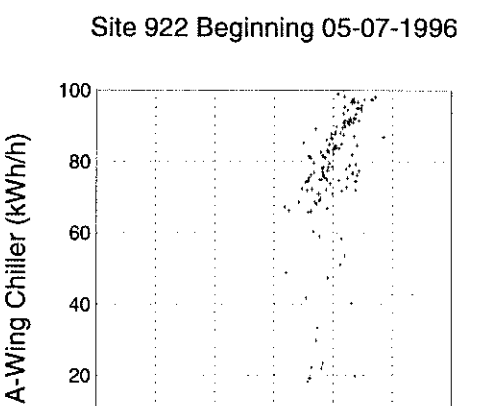
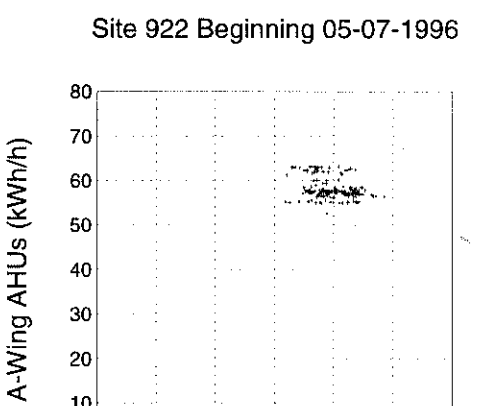
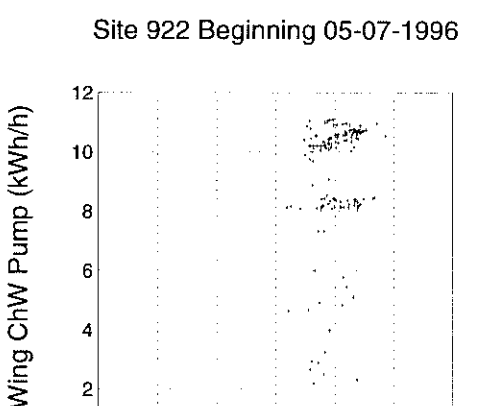
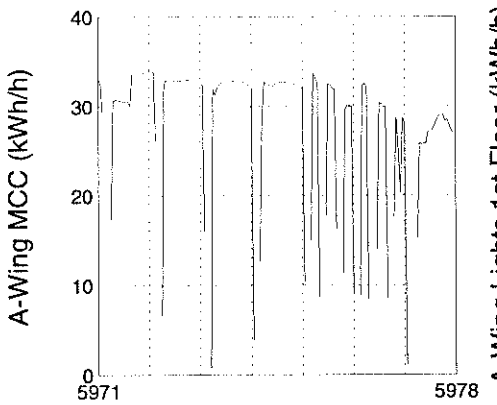
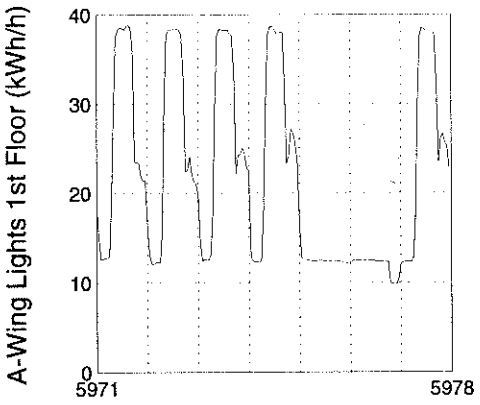


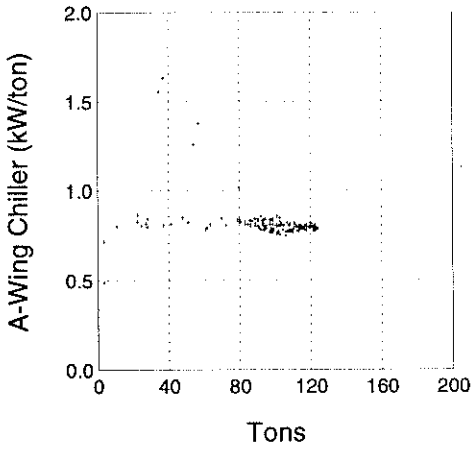


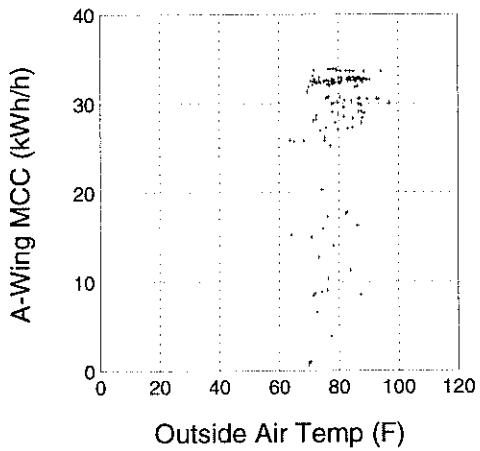


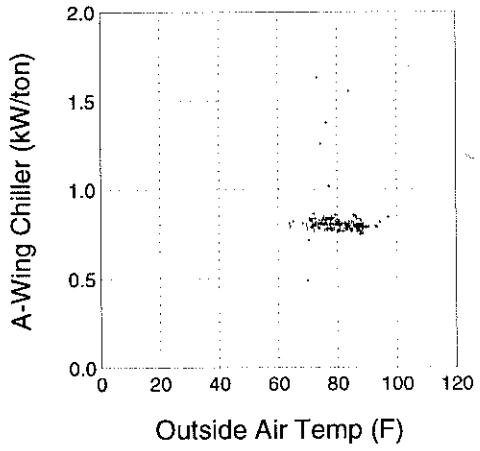


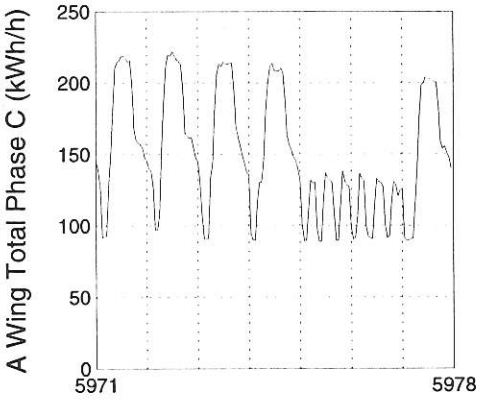

A-Wing MCC (kWh/h)
40
30
20
10
0
5971
5978
Site 922 Beginning 05-07-1996


A-Wing Lights 1st Floor (kWh/h)
40
30
20
10
0
5971
5978
Site 922 Beginning 05-07-1996


A-Wing Chiller (kW/ton)
2.0
1.5
1.0
0.5
0.0
0
40
80
120
160
200
Tons


A-Wing MCC (kWh/h)
40
30
20
10
0
0
20
40
60
80
100
120
Outside Air Temp (F)


A-Wing Chiller (kW/ton)
2.0
1.5
1.0
0.5
0.0
0
20
40
60
80
100
120
Outside Air Temp (F)



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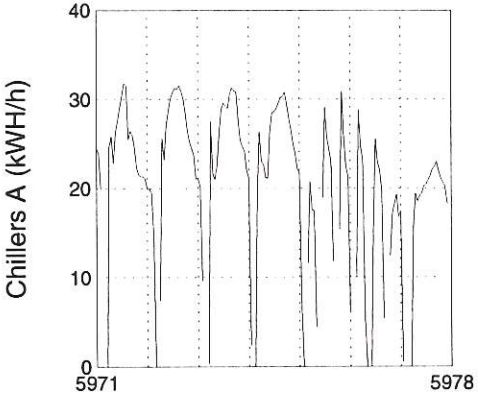

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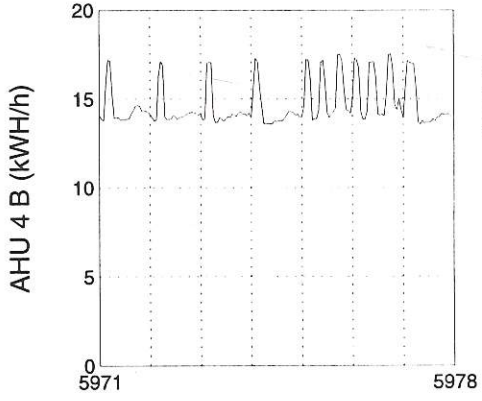

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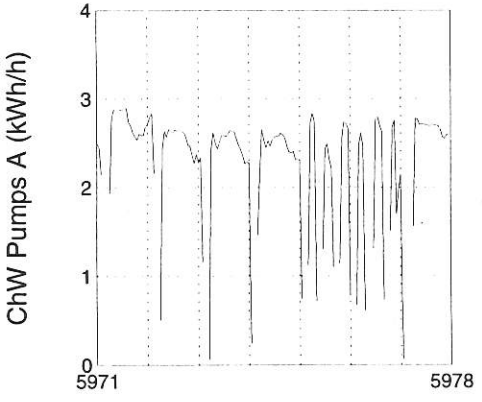

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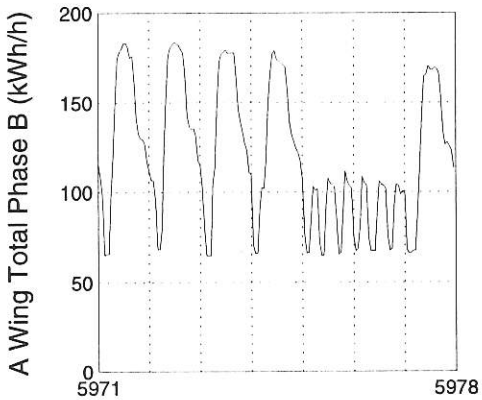

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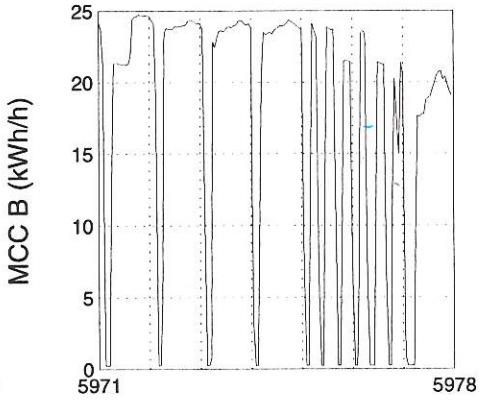

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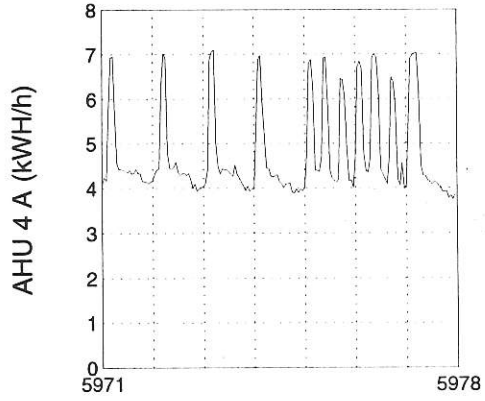

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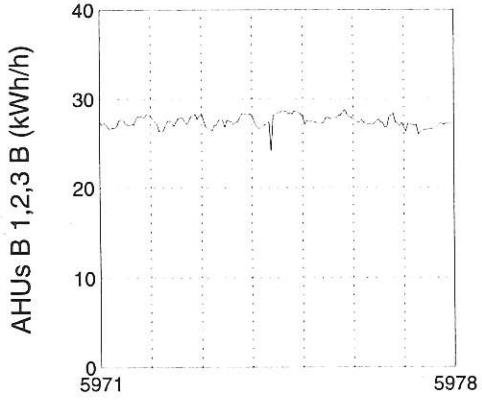

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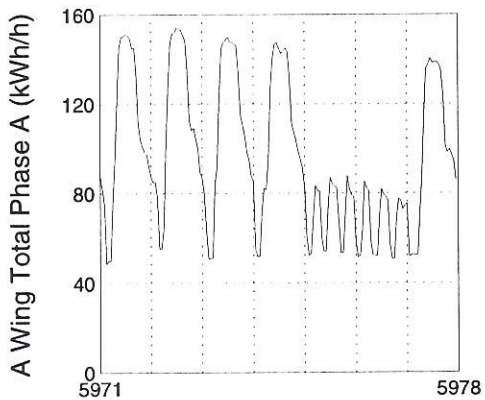

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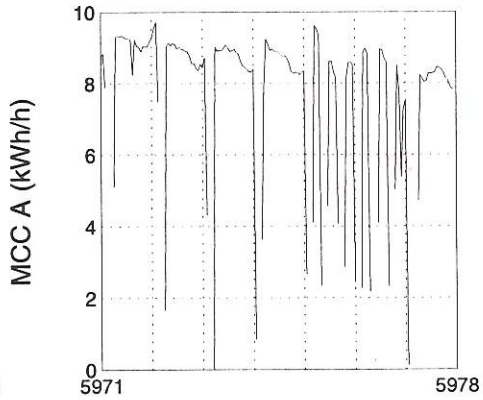

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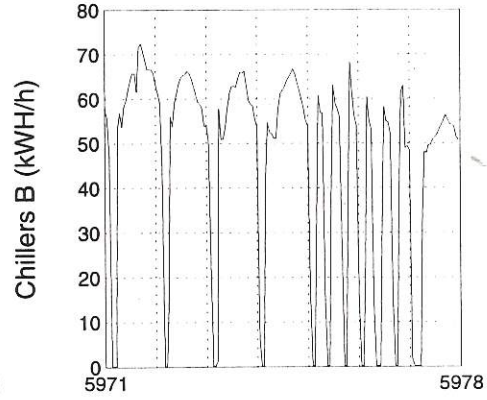

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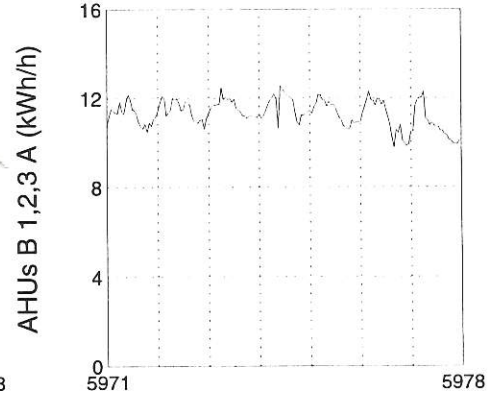

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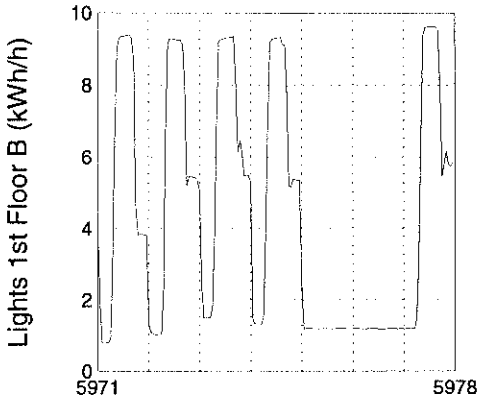

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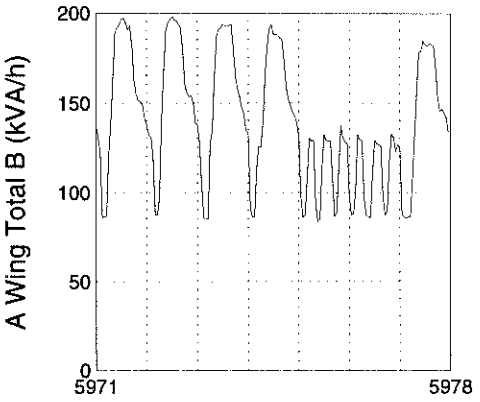

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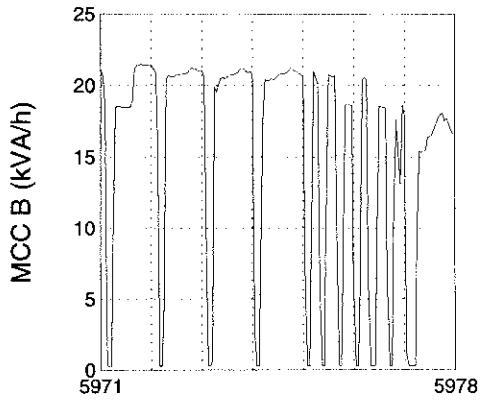

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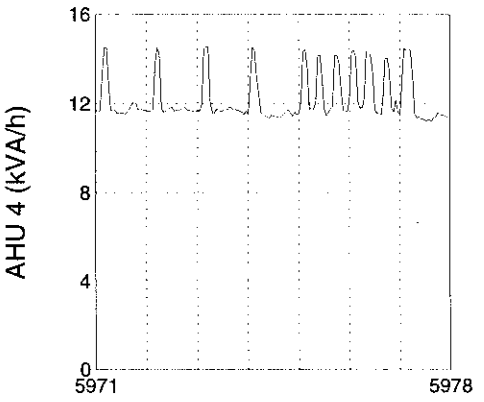

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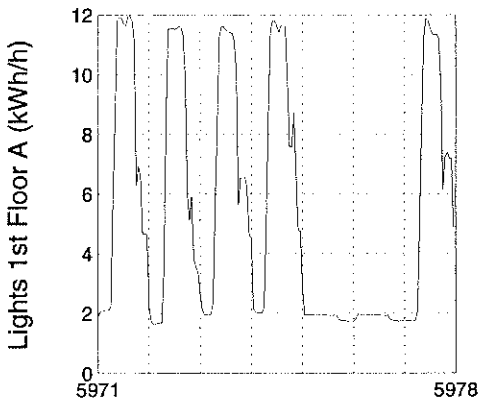

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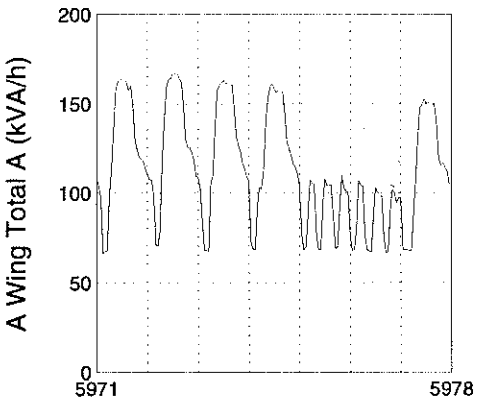

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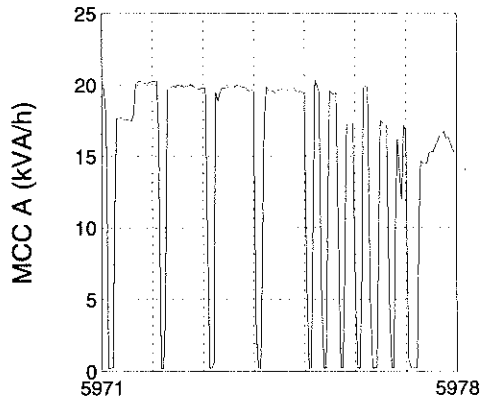

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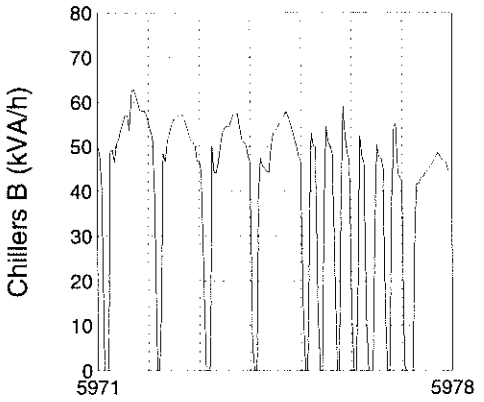

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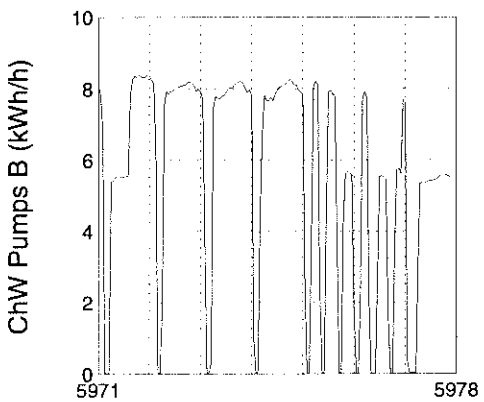

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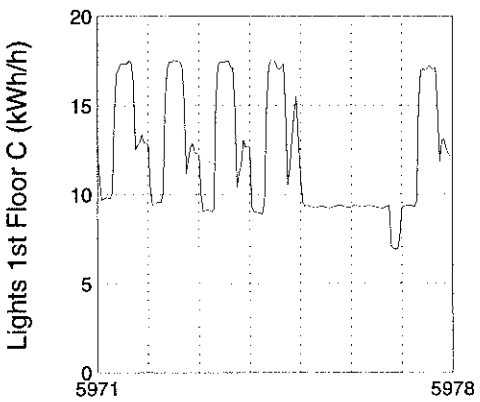

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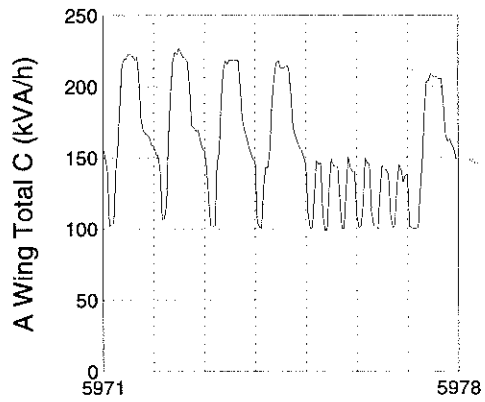

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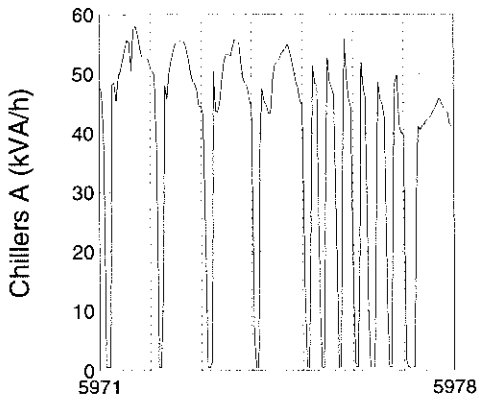

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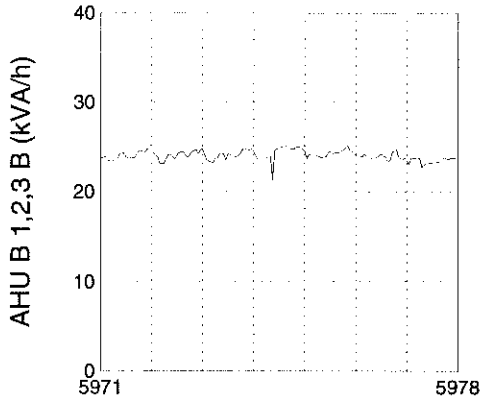

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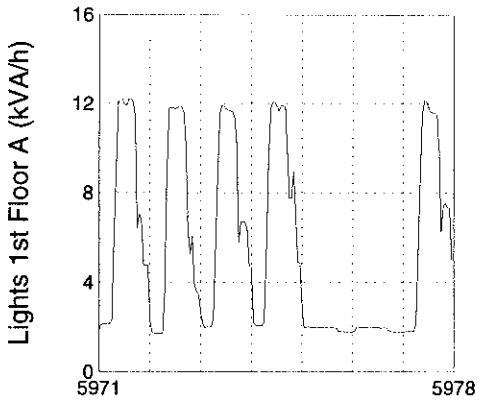

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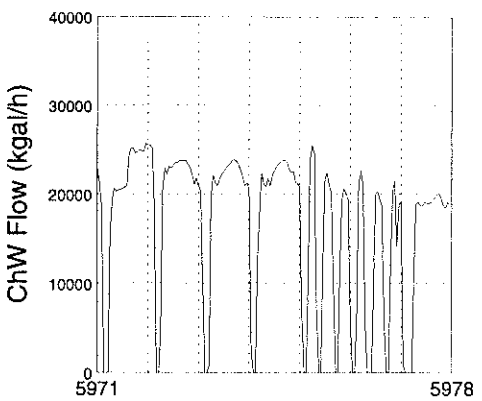

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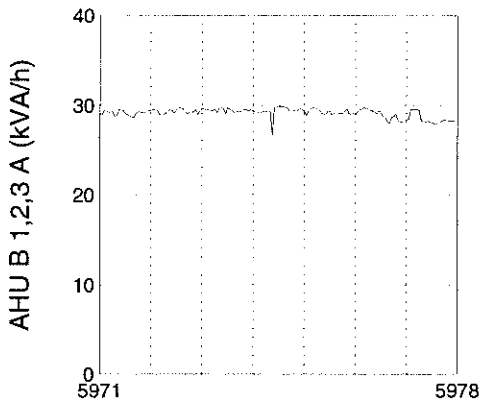

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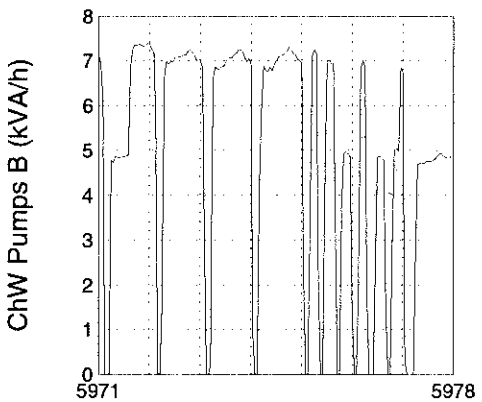

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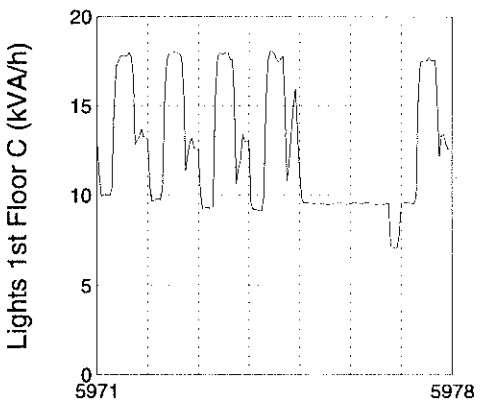

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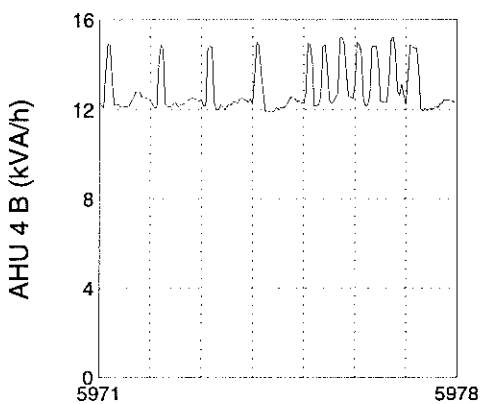

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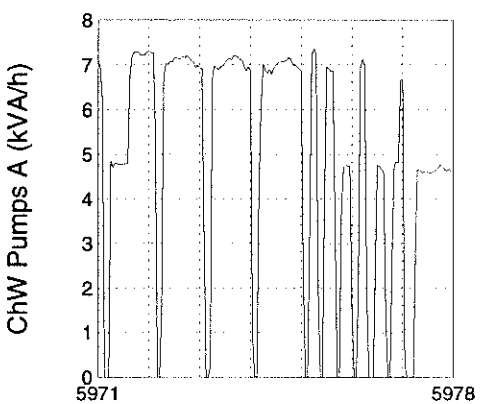

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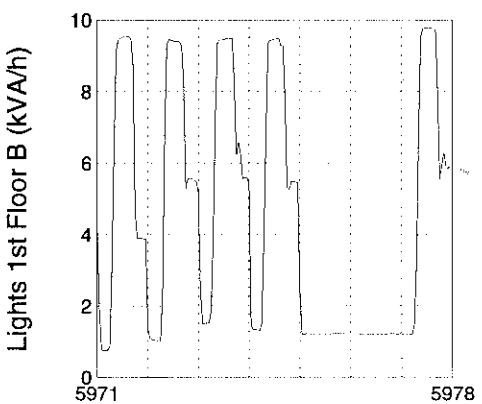

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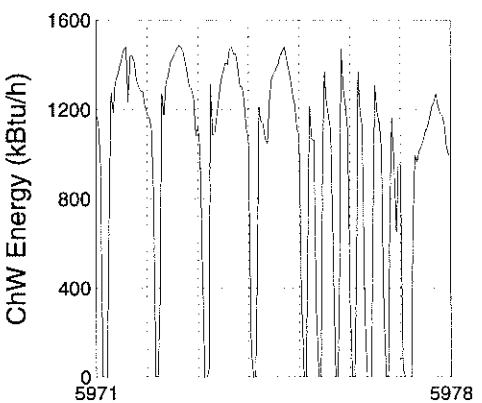

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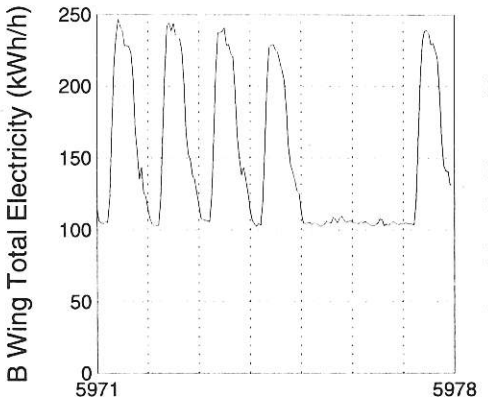

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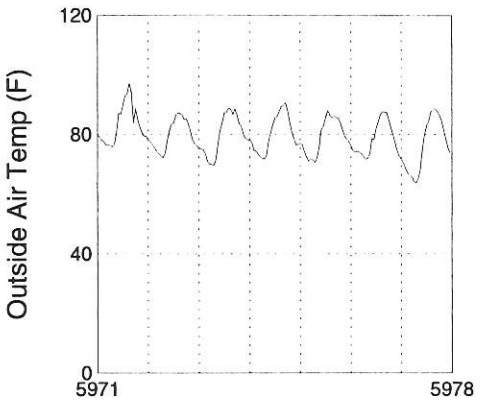

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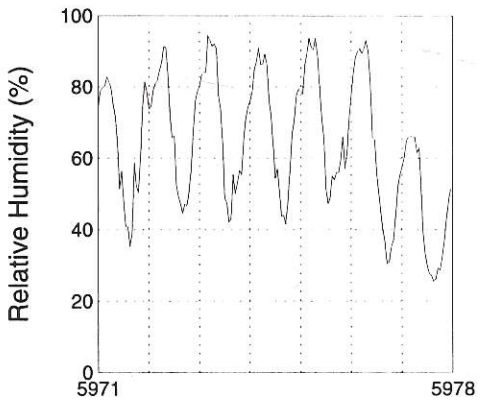

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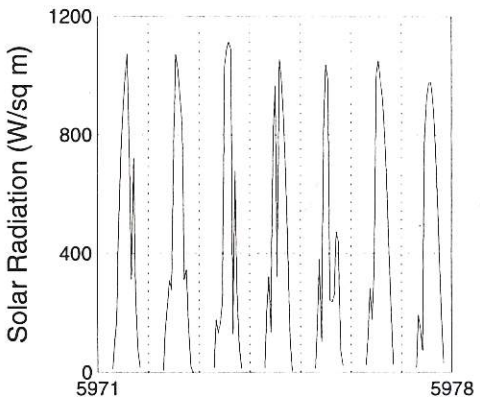

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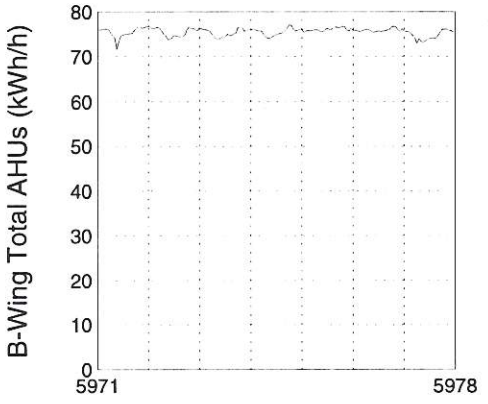

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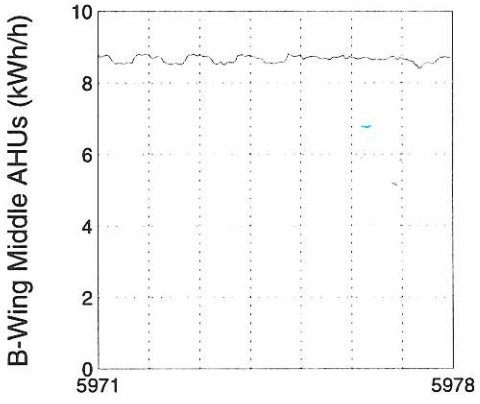

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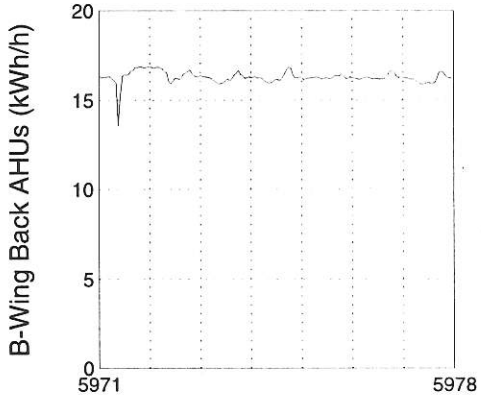

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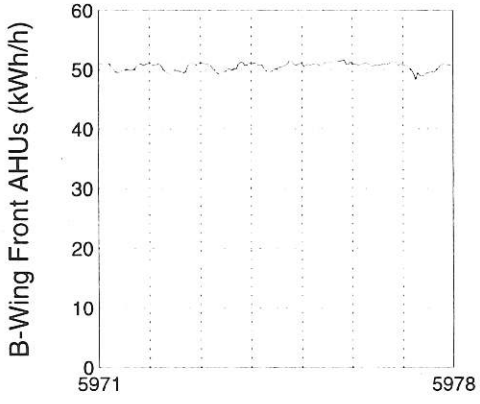
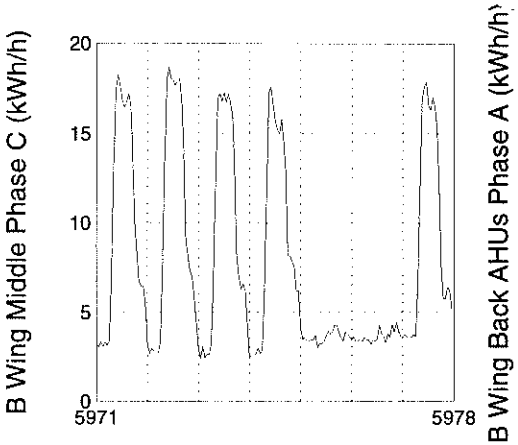
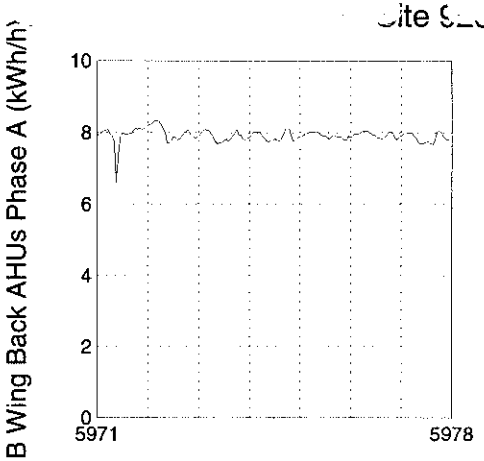
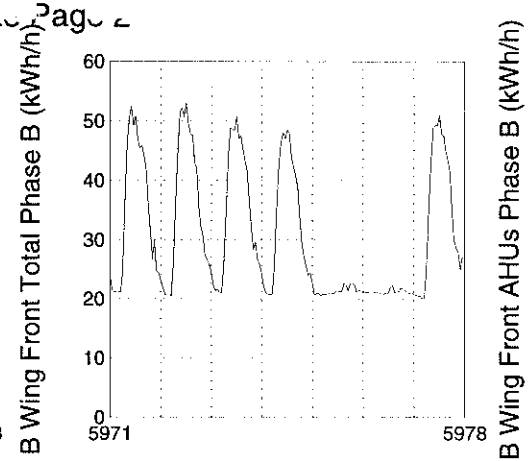
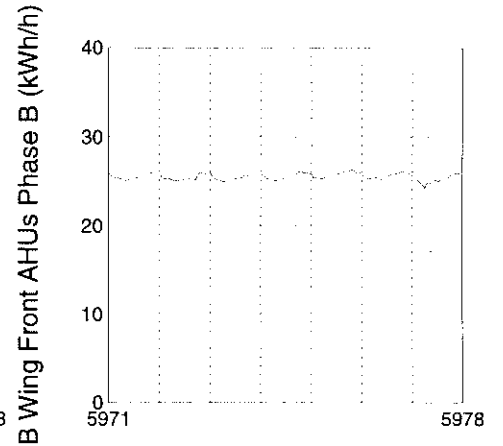


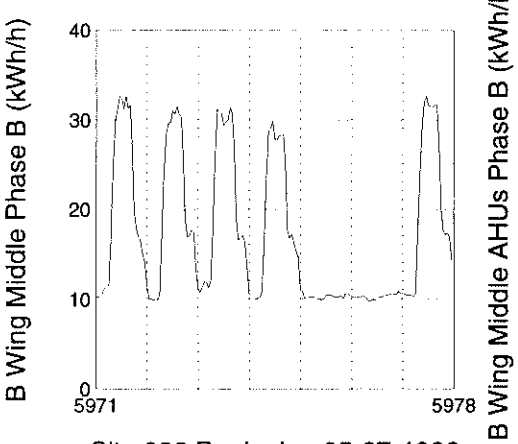
Site 923 Beginning 05-07-1996

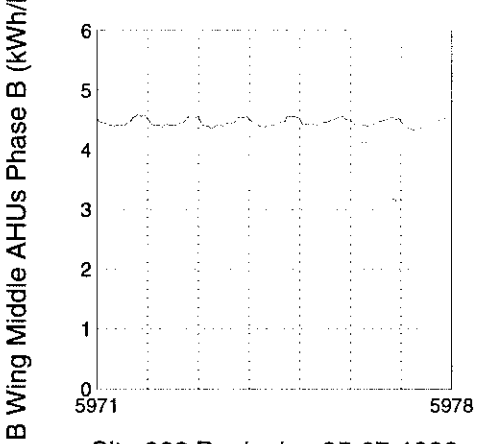

B Wing Middle Phase C (kWh/h)
20
15
10
5
0
5971
5978
Site 923 Beginning 05-07-1996

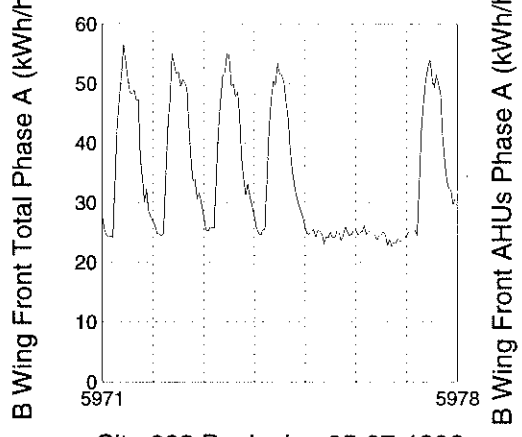

B Wing Back AHUs Phase A (kWh/h)
10
8
6
4
2
0
5971
5978
Site 923 Beginning 05-07-1996

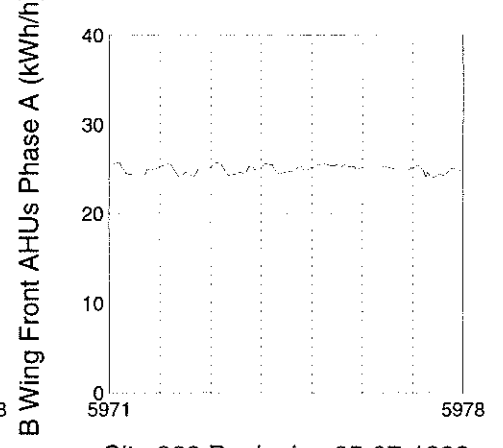

B Wing Front Total Phase B (kWh/h)
60
50
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

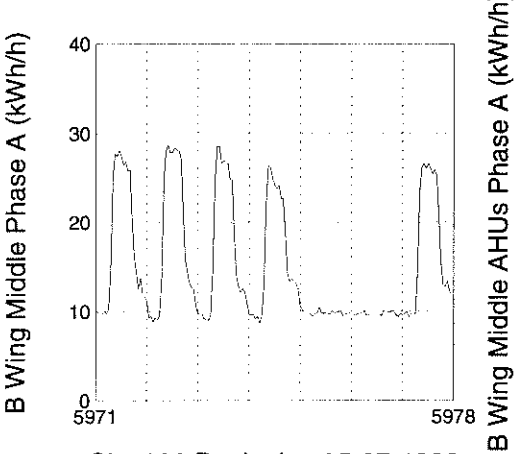

B Wing Front AHUs Phase B (kWh/h)
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

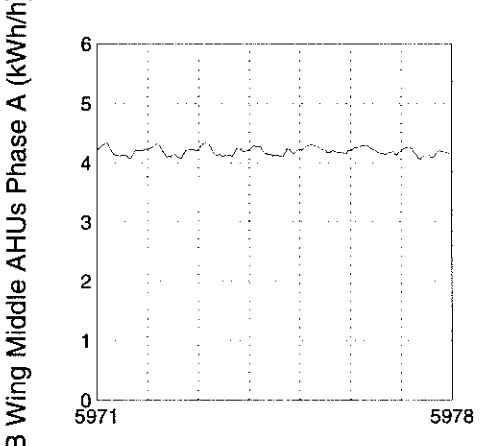

B Wing Middle Phase B (kWh/h)
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

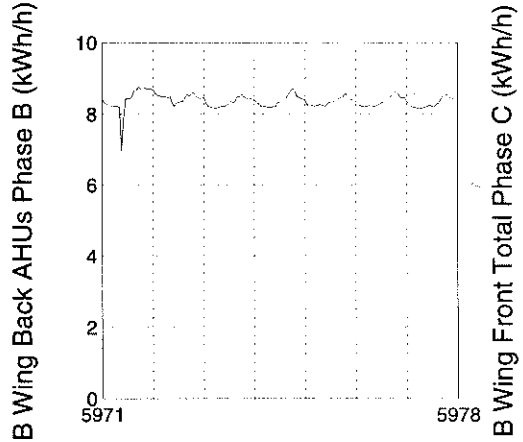

B Wing Middle AHUs Phase B (kWh/h)
6
5
4
3
2
1
0
5971
5978
Site 923 Beginning 05-07-1996

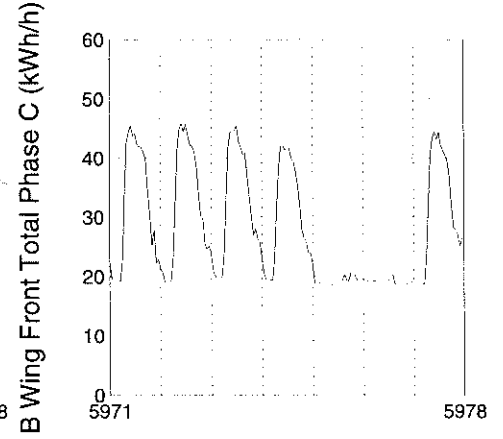

B Wing Front Total Phase A (kWh/h)
60
50
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

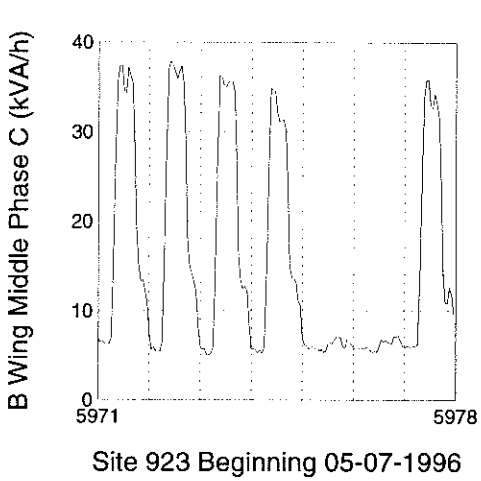

B Wing Front AHUs Phase A (kWh/h)
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

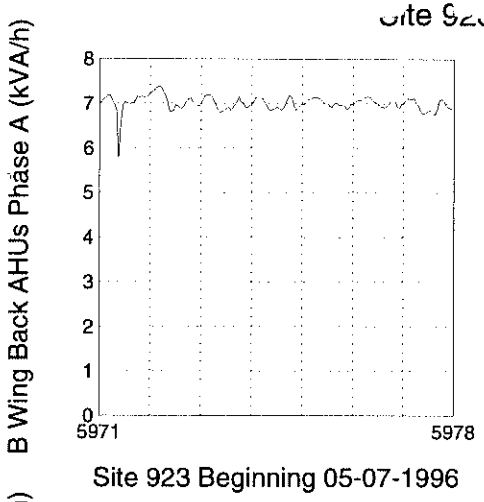

B Wing Middle Phase A (kWh/h)
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

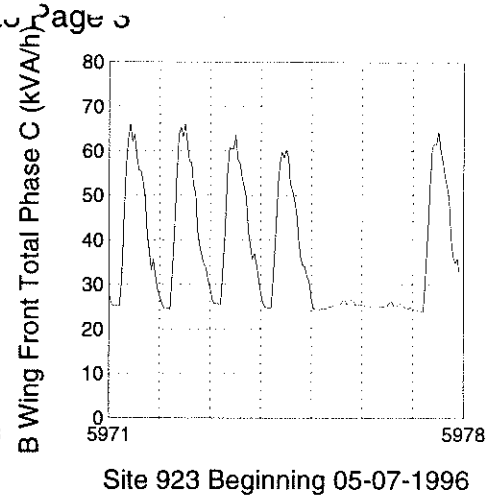

B Wing Middle AHUs Phase A (kWh/h)
6
5
4
3
2
1
0
5971
5978
Site 923 Beginning 05-07-1996

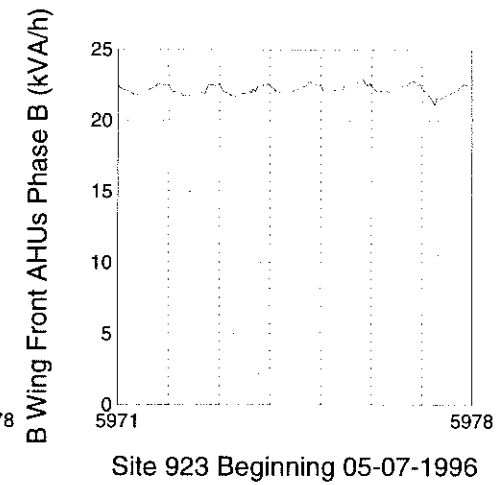

B Wing Back AHUs Phase B (kWh/h)
10
8
6
4
2
0
5971
5978
Site 923 Beginning 05-07-1996

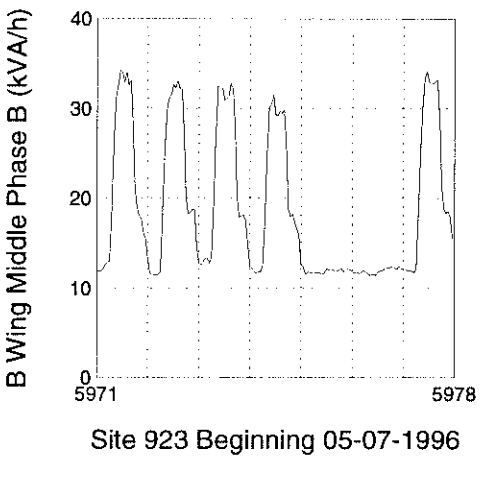

B Wing Front Total Phase C (kWh/h)
60
50
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

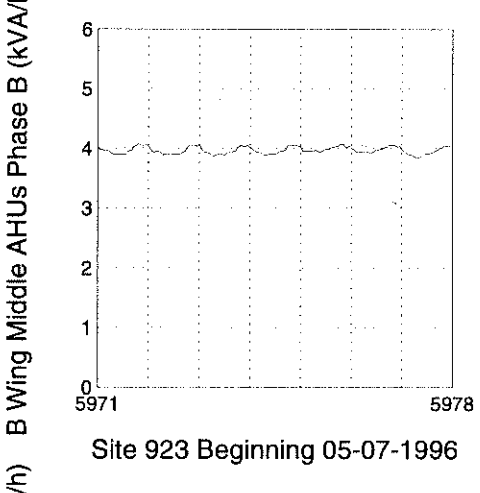

B Wing Middle Phase C (kVA/h)
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

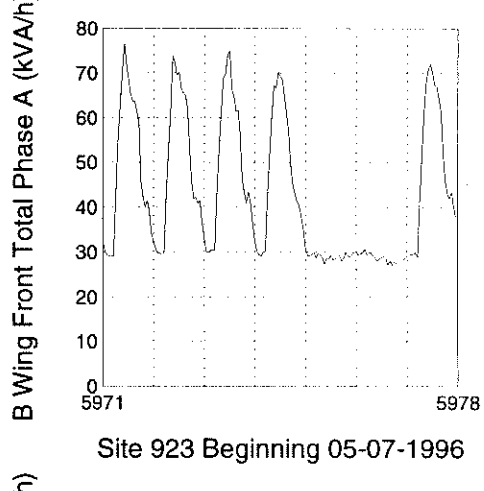

B Wing Back AHUs Phase A (kVA/h)
8
7
6
5
4
3
2
1
0
5971
5978
Site 923 Beginning 05-07-1996

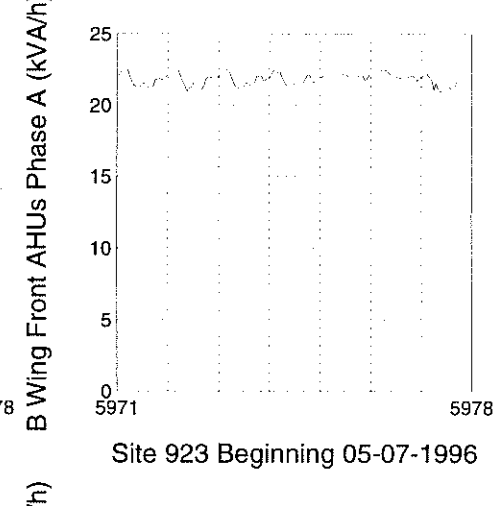

B Wing Front Total Phase C (kVA/h)
80
70
60
50
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

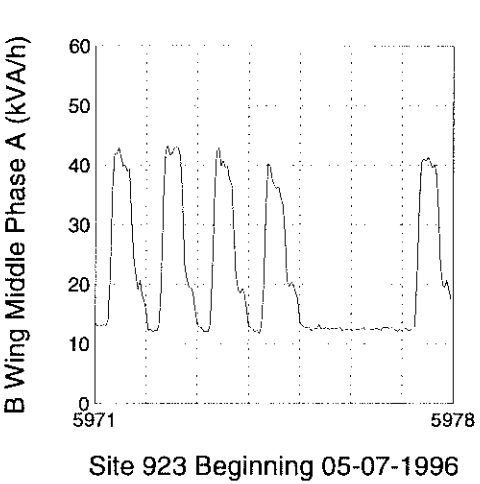

B Wing Front AHUs Phase B (kVA/h)
25
20
15
10
5
0
5971
5978
Site 923 Beginning 05-07-1996

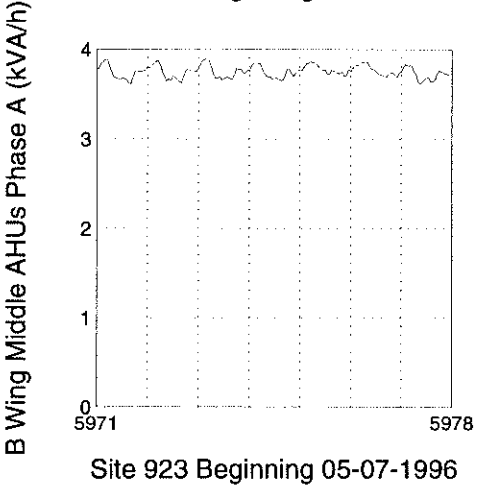

B Wing Middle Phase B (kVA/h)
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

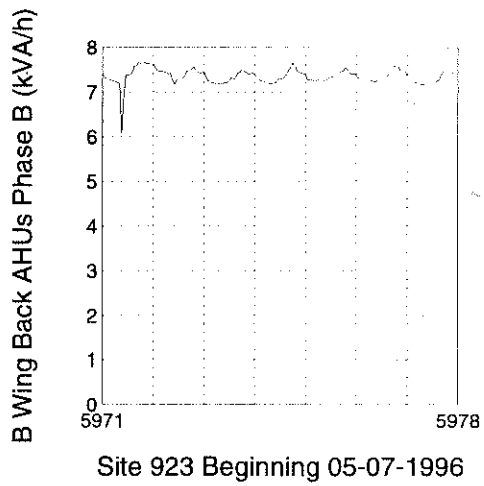

B Wing Middle AHUs Phase B (kVA/h)
6
5
4
3
2
1
0
5971
5978
Site 923 Beginning 05-07-1996

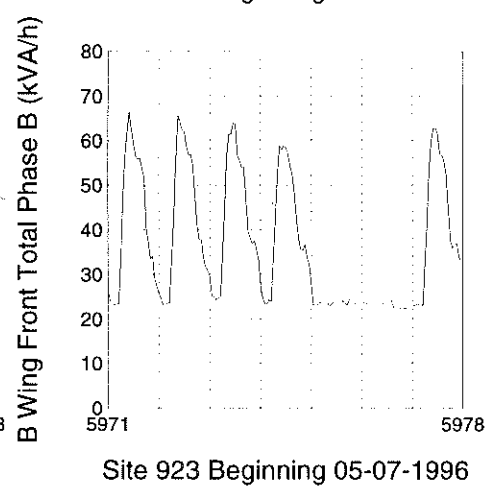

B Wing Front Total Phase A (kVA/h)
80
70
60
50
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

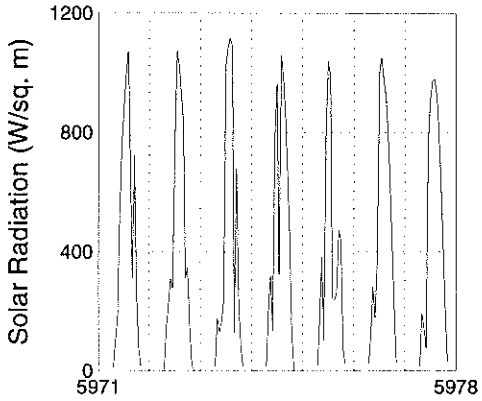

B Wing Front AHUs Phase A (kVA/h)
25
20
15
10
5
0
5971
5978
Site 923 Beginning 05-07-1996


B Wing Middle Phase A (kVA/h)
60
50
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996

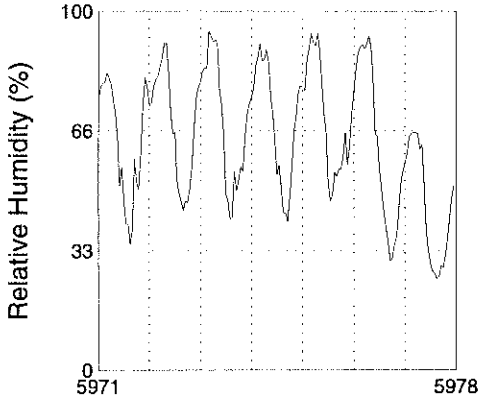

B Wing Middle AHUs Phase A (kVA/h)
4
3
2
1
0
5971
5978
Site 923 Beginning 05-07-1996


B Wing Back AHUs Phase B (kVA/h)
8
7
6
5
4
3
2
1
0
5971
5978
Site 923 Beginning 05-07-1996

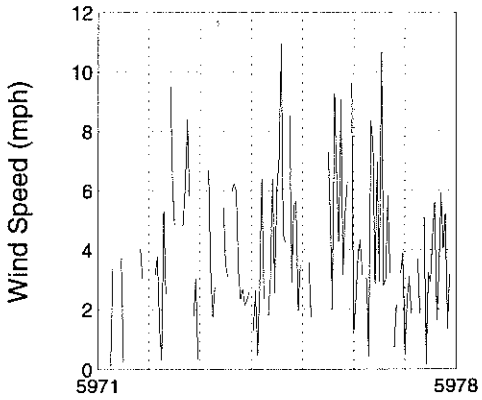

B Wing Front Total Phase B (kVA/h)
80
70
60
50
40
30
20
10
0
5971
5978
Site 923 Beginning 05-07-1996



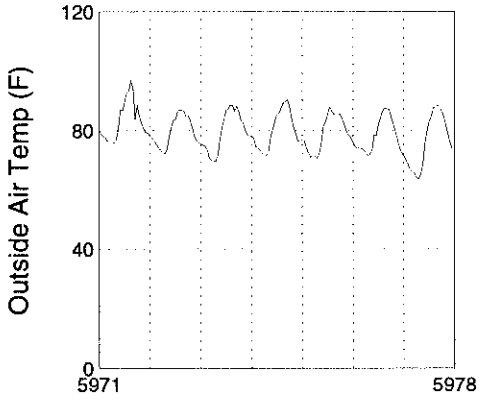
Site 923 Beginning 05-07-1996



Site 923 Beginning 05-07-1996



Site 923 Beginning 05-07-1996



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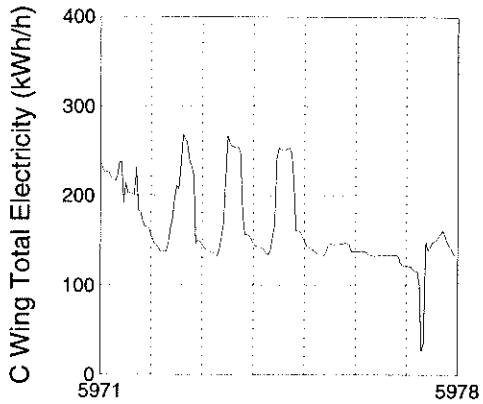

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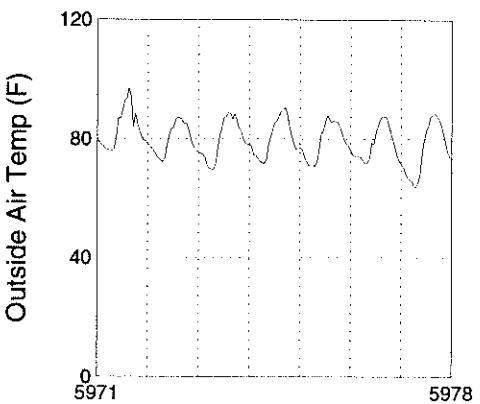
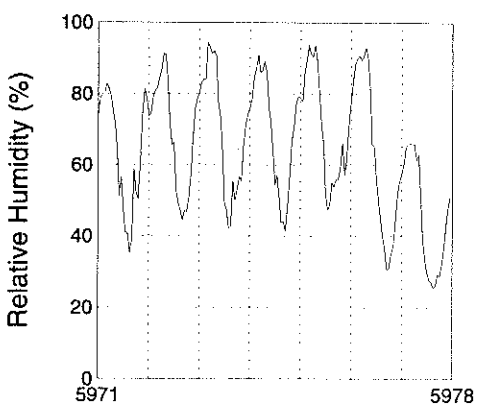


Site 924 Beginning 05-07-1996



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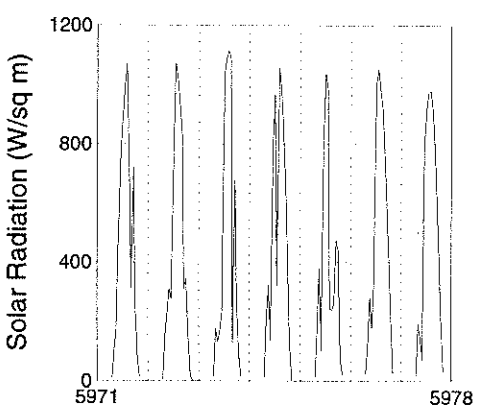

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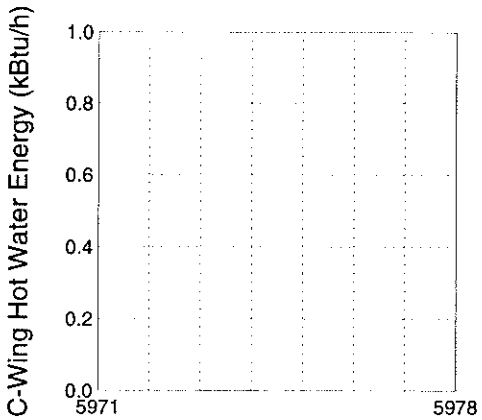

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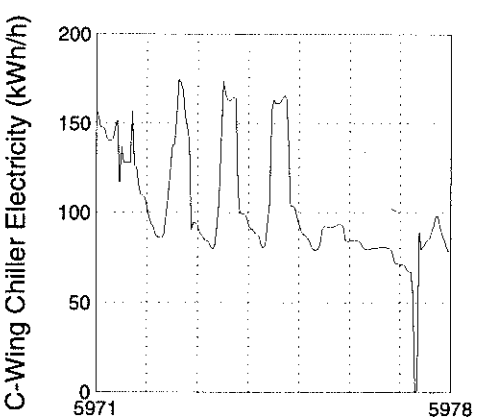

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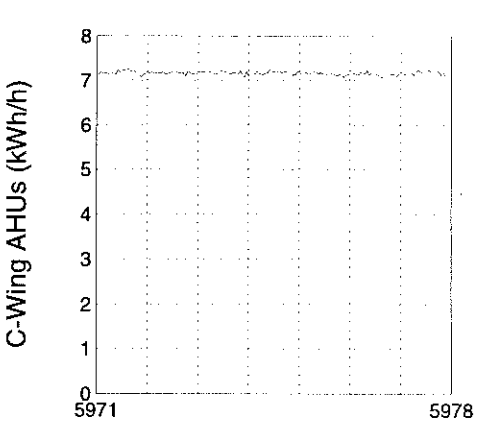

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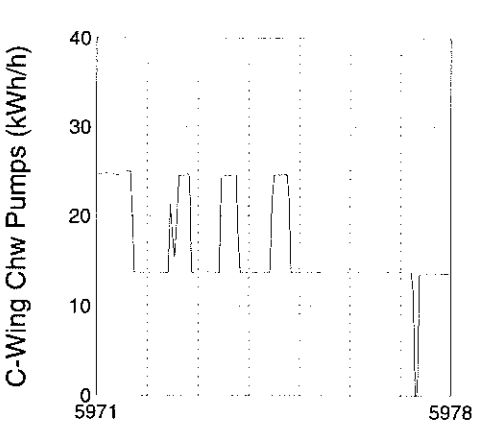
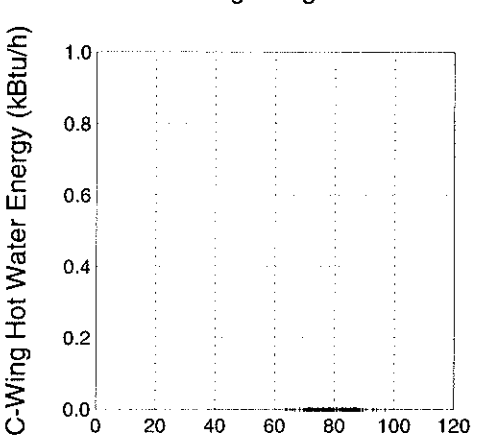
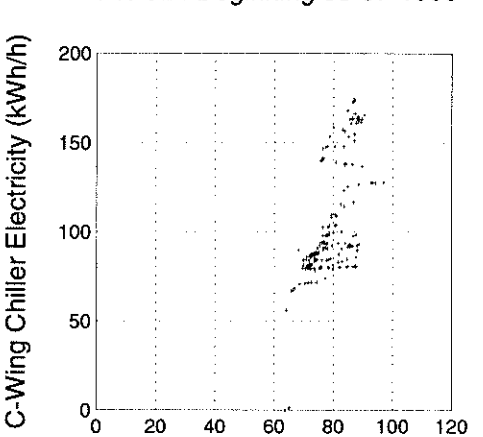


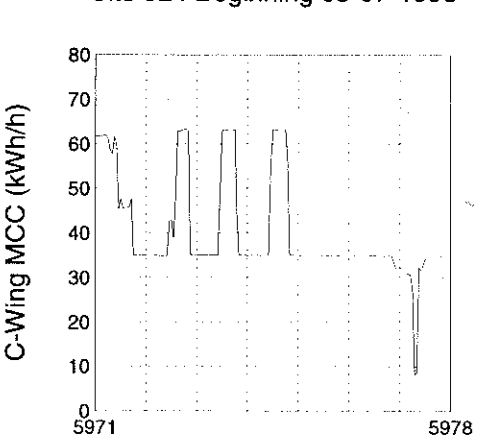
Site 924 Beginning 05-07-1996



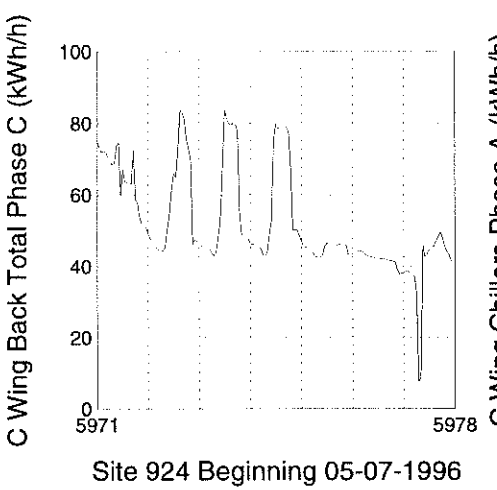
Outside Air Temp (F)

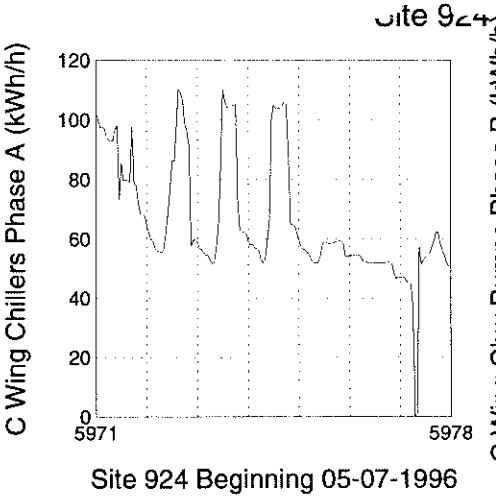


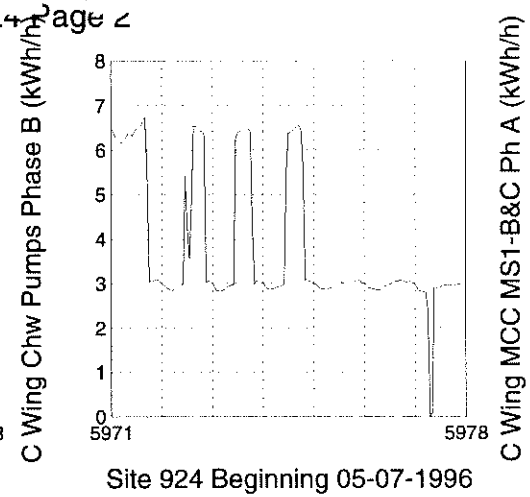
Outside Air Temp (F)

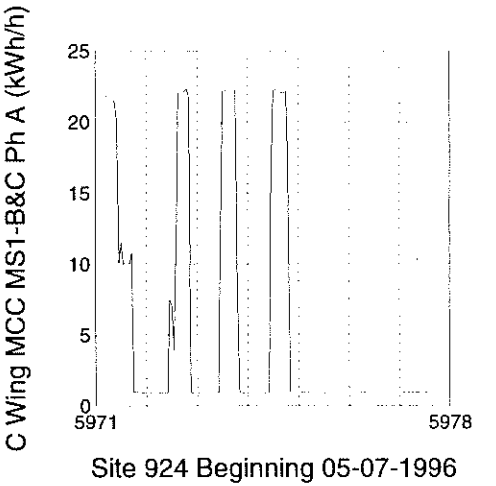


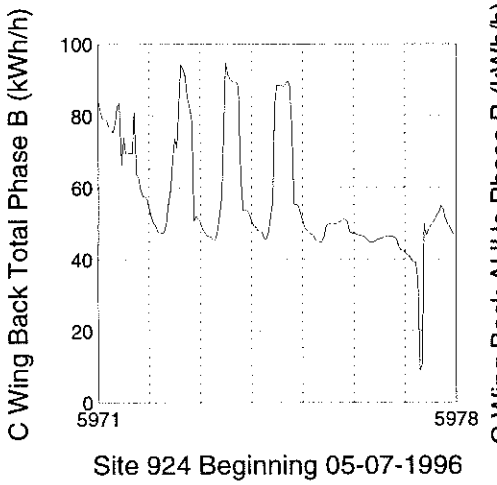
Site 924 Beginning 05-07-1996

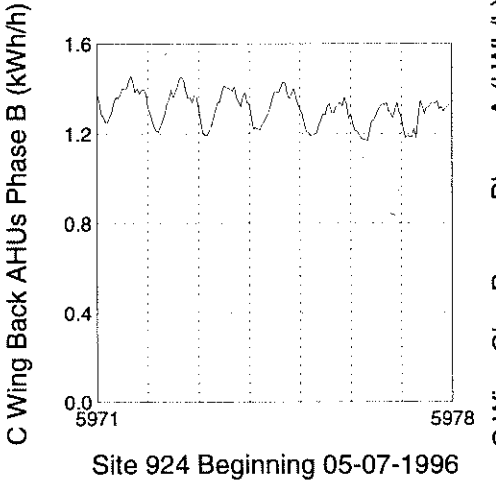

C Wing Back Total Phase C (kWh/h)
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996

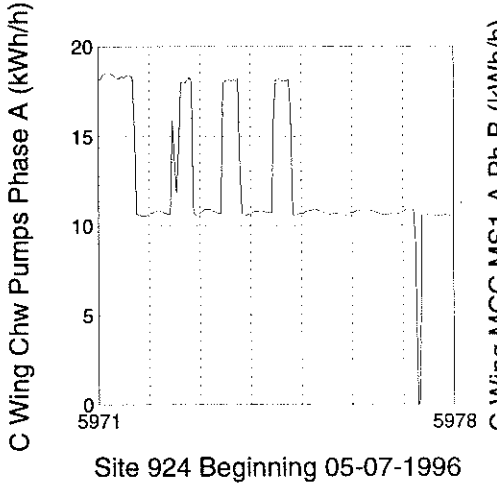

C Wing Chillers Phase A (kWh/h)
120
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996

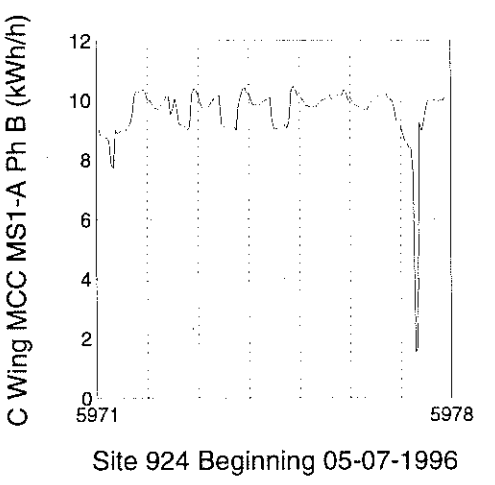

C Wing Chw Pumps Phase B (kWh/h)
8
7
6
5
4
3
2
1
0
5971
5978
Site 924 Beginning 05-07-1996

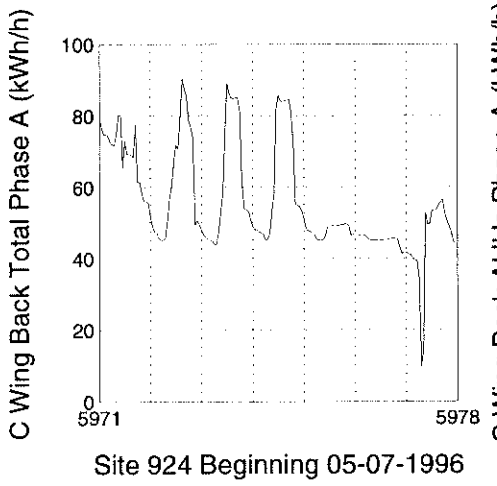

C Wing MCC MS1-B&C Ph A (kWh/h)
25
20
15
10
5
0
5971
5978
Site 924 Beginning 05-07-1996

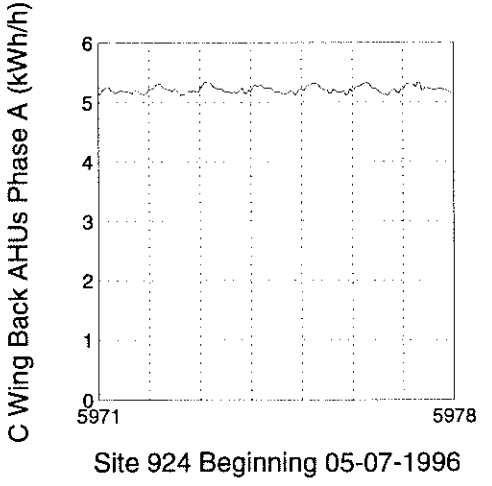

C Wing Back Total Phase B (kWh/h)
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996

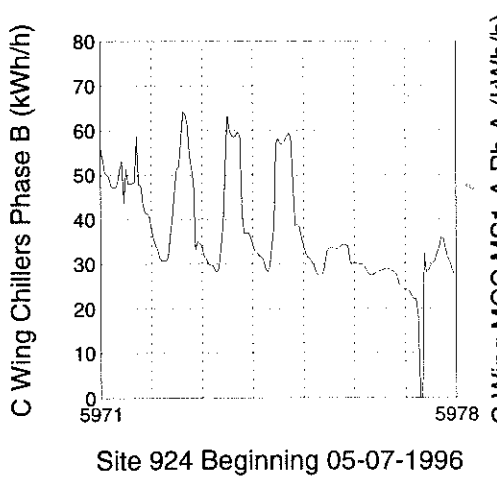

C Wing Back AHUs Phase B (kWh/h)
1.6
1.2
0.8
0.4
0.0
5971
5978
Site 924 Beginning 05-07-1996

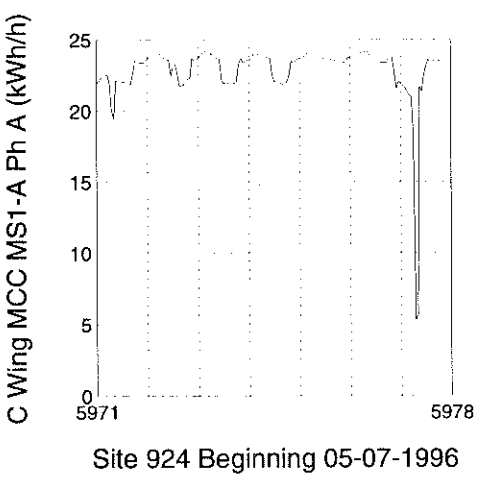

C Wing Chw Pumps Phase A (kWh/h)
20
15
10
5
0
5971
5978
Site 924 Beginning 05-07-1996

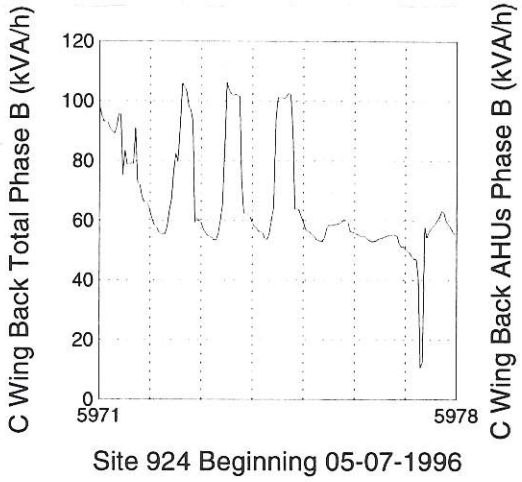

C Wing MCC MS1-A Ph B (kWh/h)
12
10
8
6
4
2
0
5971
5978
Site 924 Beginning 05-07-1996

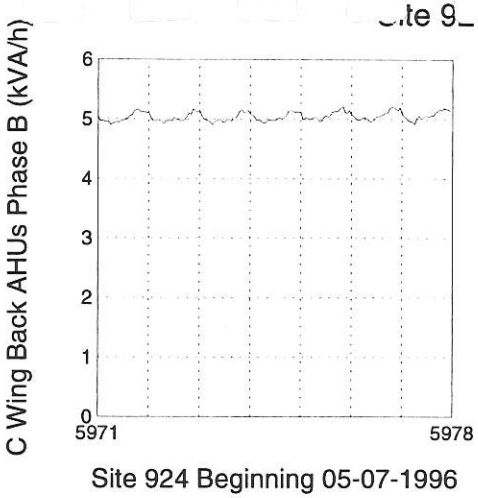

C Wing Back Total Phase A (kWh/h)
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996

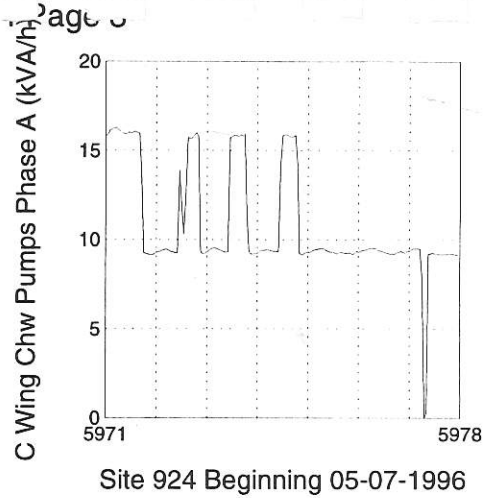

C Wing Back AHUs Phase A (kWh/h)
6
5
4
3
2
1
0
5971
5978
Site 924 Beginning 05-07-1996

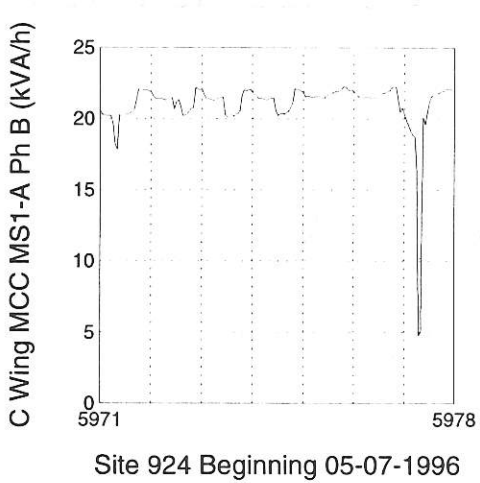

C Wing Chillers Phase B (kWh/h)
80
70
60
50
40
30
20
10
0
5971
5978
Site 924 Beginning 05-07-1996

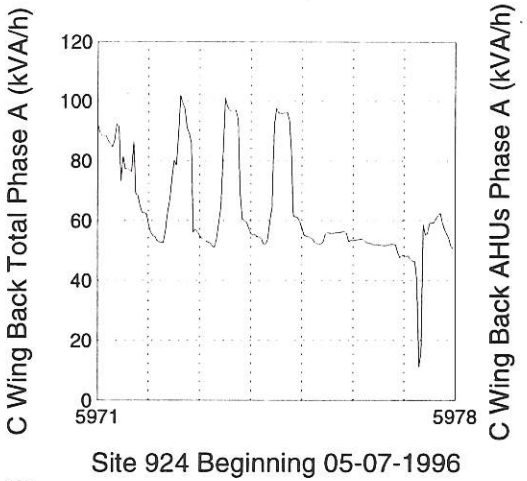

C Wing MCC MS1-A Ph A (kWh/h)
25
20
15
10
5
0
5971
5978
Site 924 Beginning 05-07-1996

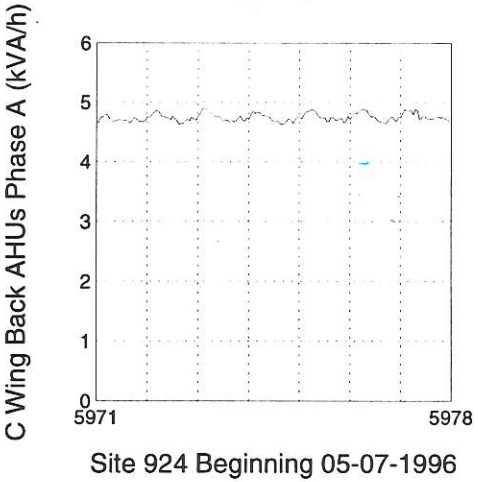

C Wing Back Total Phase B (kVA/h)
120
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996

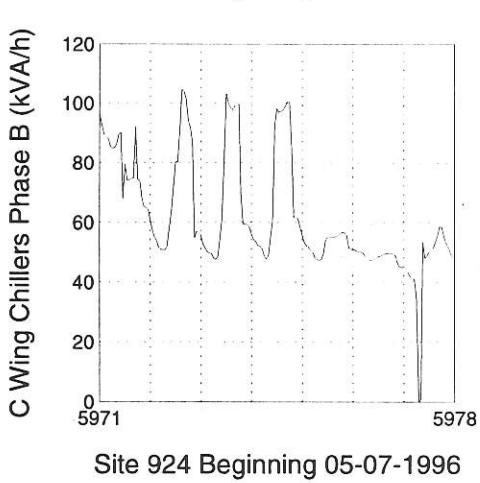

C Wing Back AHUs Phase B (kVA/h)
6
5
4
3
2
1
0
5971
5978
Site 924 Beginning 05-07-1996

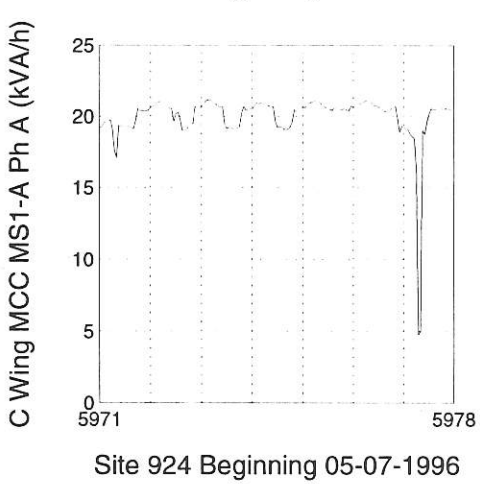

C Wing Chw Pumps Phase A (kVA/h)
20
15
10
5
0
5971
5978
Site 924 Beginning 05-07-1996

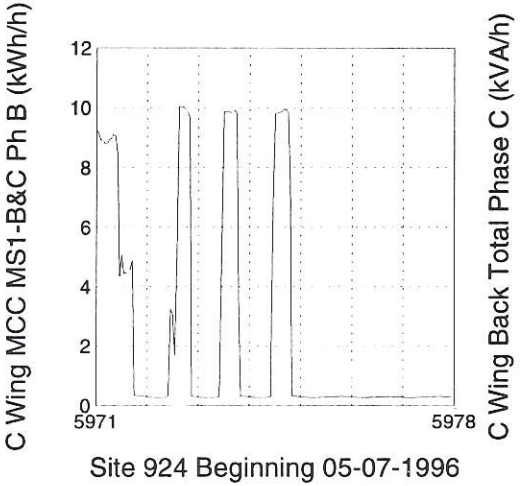

C Wing MCC MS1-A Ph B (kVA/h)
25
20
15
10
5
0
5971
5978
Site 924 Beginning 05-07-1996

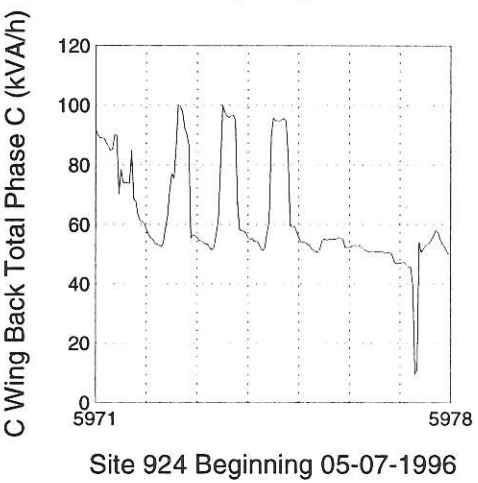

C Wing Back Total Phase A (kVA/h)
120
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996

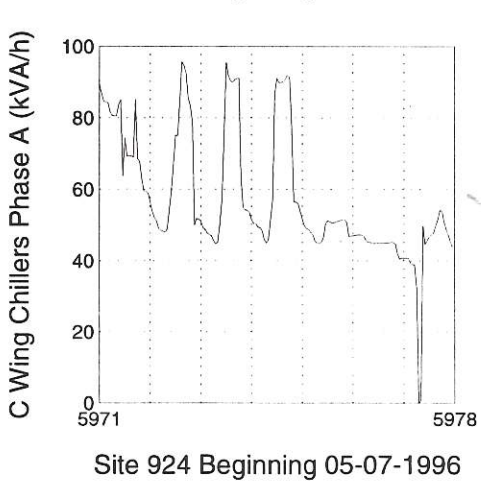

C Wing Back AHUs Phase A (kVA/h)
6
5
4
3
2
1
0
5971
5978
Site 924 Beginning 05-07-1996

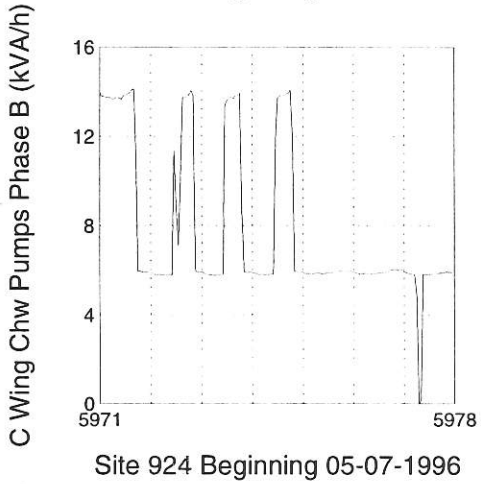

C Wing Chillers Phase B (kVA/h)
120
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996

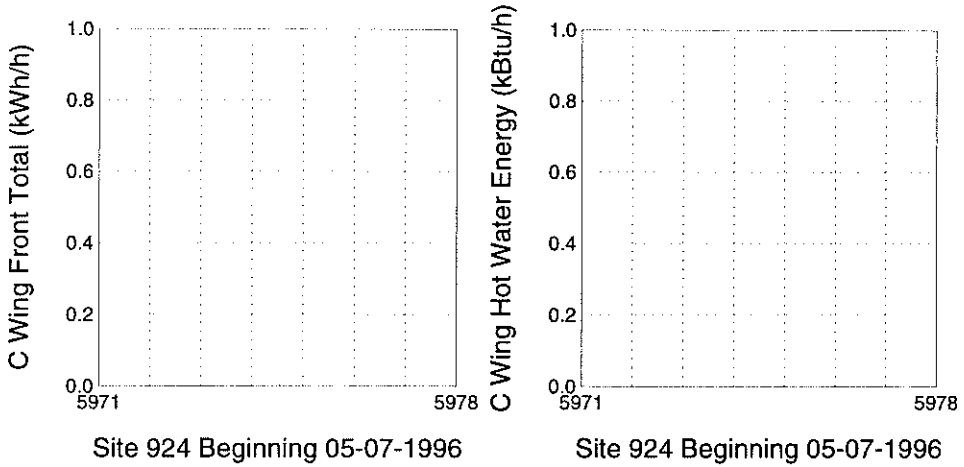

C Wing MCC MS1-A Ph A (kVA/h)
25
20
15
10
5
0
5971
5978
Site 924 Beginning 05-07-1996


C Wing MCC MS1-B&C Ph B (kWh/h)
12
10
8
6
4
2
0
5971
5978
Site 924 Beginning 05-07-1996

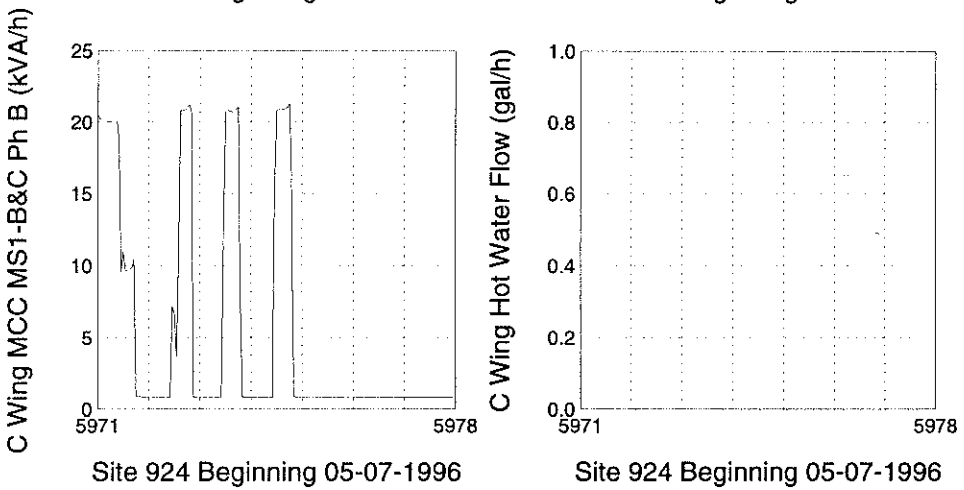

C Wing Back Total Phase C (kVA/h)
120
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996


C Wing Chillers Phase A (kVA/h)
100
80
60
40
20
0
5971
5978
Site 924 Beginning 05-07-1996

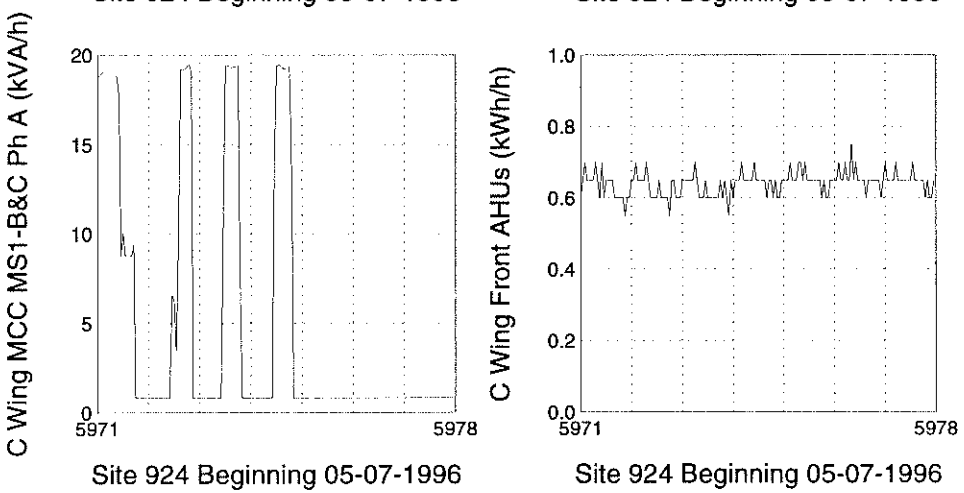

C Wing Chw Pumps Phase B (kVA/h)
16
12
8
4
0
5971
5978
Site 924 Beginning 05-07-1996


C Wing Front Total (kWh/h)
1.0
0.8
0.6
0.4
0.2
0.0
5971
5978
Site 924 Beginning 05-07-1996

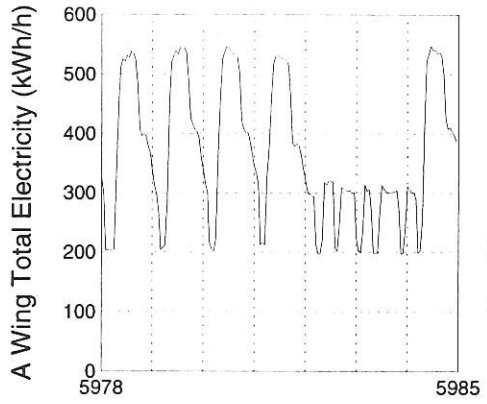
C Wing Hot Water Energy (kBtu/h)
1.0
0.8
0.6
0.4
0.2
0.0
5971
5978
Site 924 Beginning 05-07-1996


C Wing MCC MS1-B&C Ph B (kVA/h)
25
20
15
10
5
0
5971
5978
Site 924 Beginning 05-07-1996

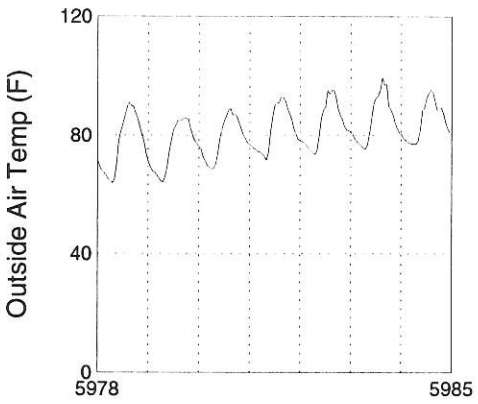
C Wing Hot Water Flow (gal/h)
1.0
0.8
0.6
0.4
0.2
0.0
5971
5978
Site 924 Beginning 05-07-1996


C Wing MCC MS1-B&C Ph A (kVA/h)
20
15
10
5
0
5971
5978
Site 924 Beginning 05-07-1996

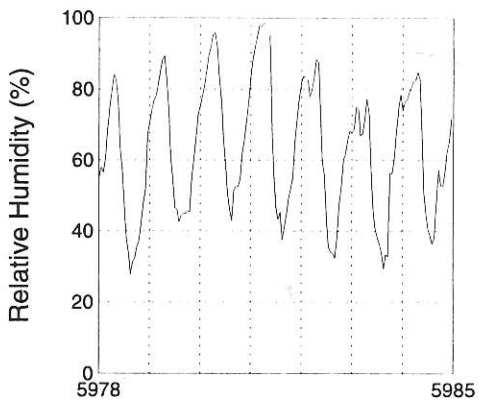
C Wing Front AHUs (kWh/h)
1.0
0.8
0.6
0.4
0.2
0.0
5971
5978
Site 924 Beginning 05-07-1996



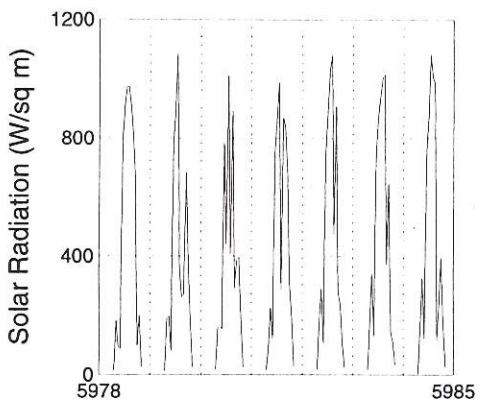
Site 922 Beginning 05-14-1996



Site 922 Beginning 05-14-1996



Site 922 Beginning 05-14-1996



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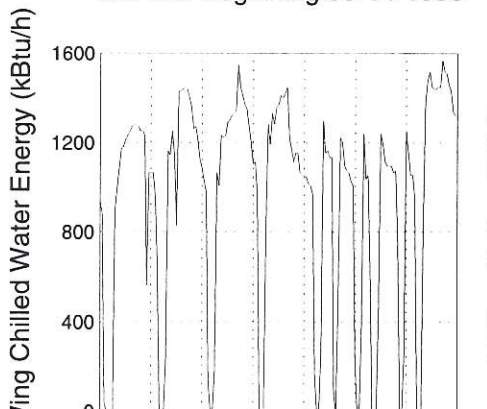
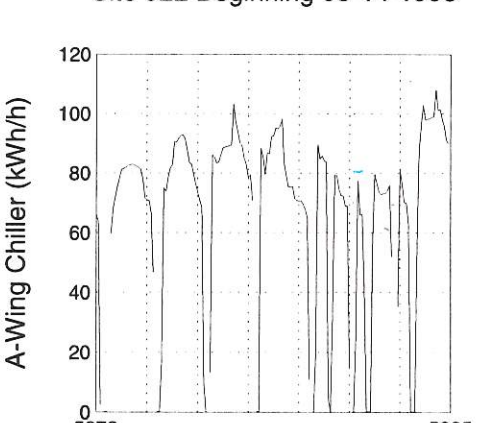
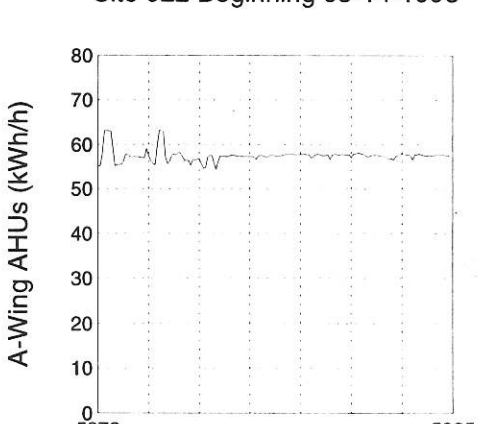


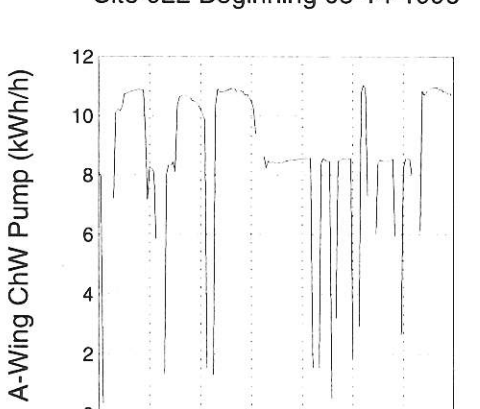
Site 922 Beginning 05-14-1996



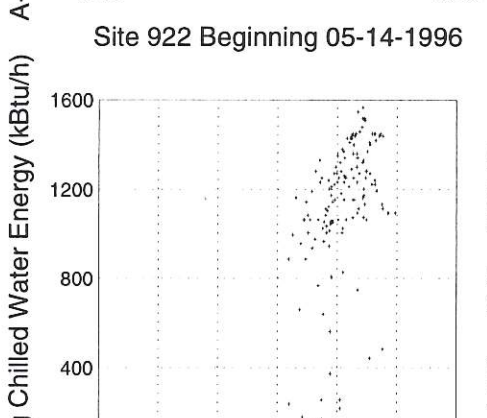
Site 922 Beginning 05-14-1996



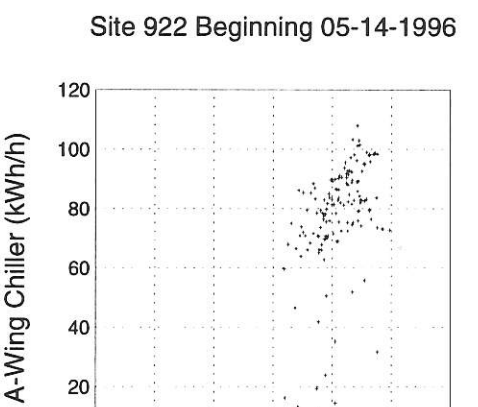
Site 922 Beginning 05-14-1996



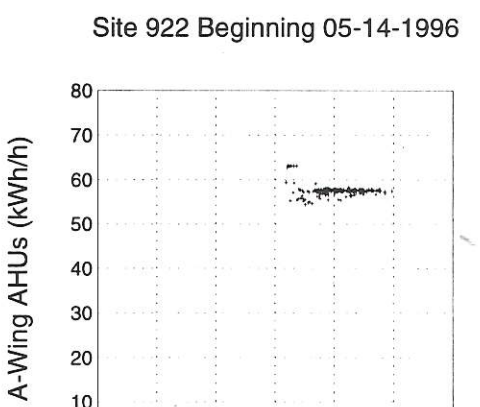
Site 922 Beginning 05-14-1996



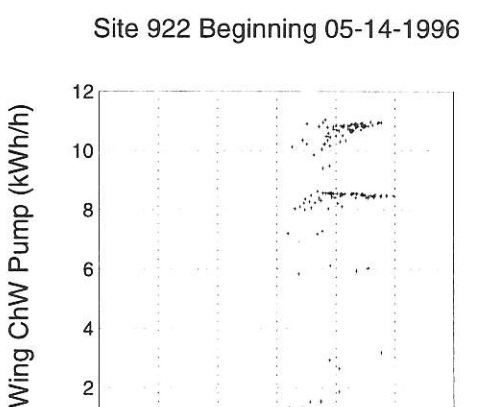
Outside Air Temp (F)



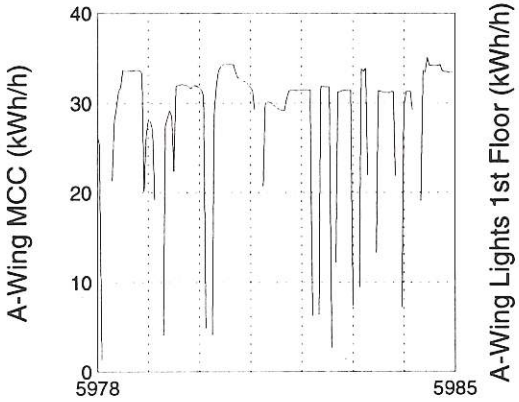
Outside Air Temp (F)

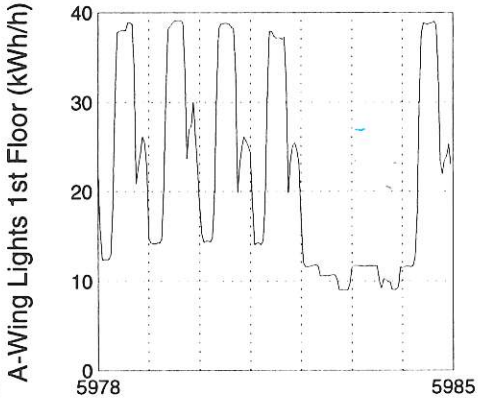


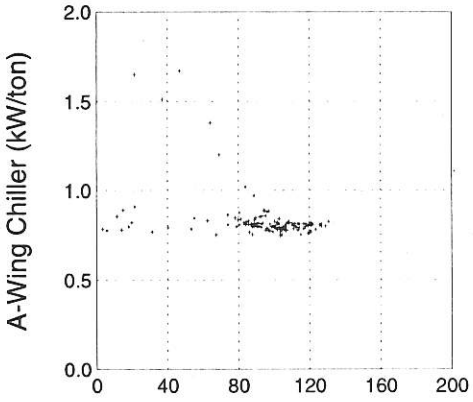
Outside Air Temp (F)

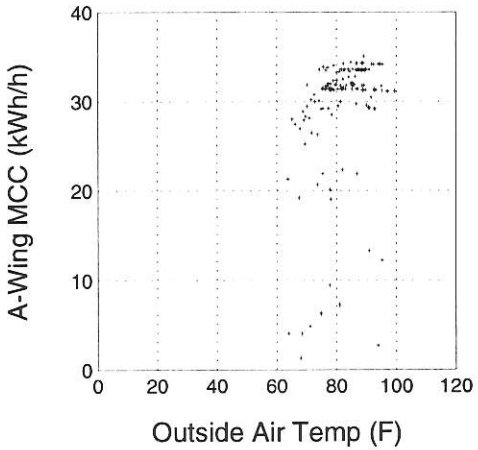


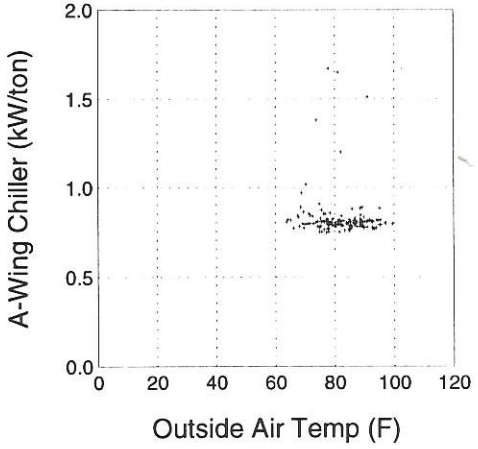
Outside Air Temp (F)

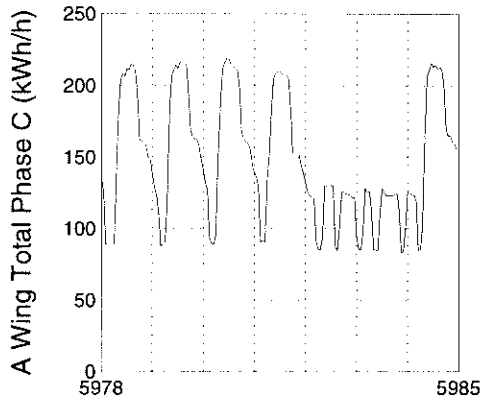

A-Wing MCC (kWh/h)
40
30
20
10
0
5978
5985
Site 922 Beginning 05-14-1996


A-Wing Lights 1st Floor (kWh/h)
40
30
20
10
0
5978
5985
Site 922 Beginning 05-14-1996

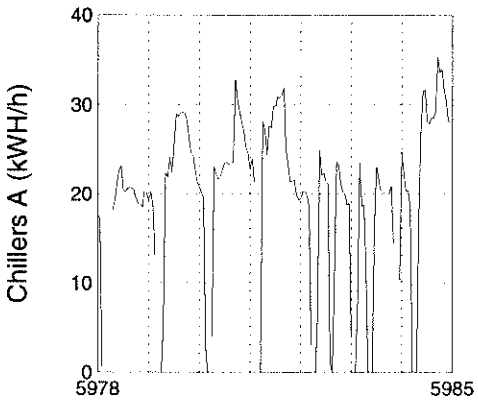

A-Wing Chiller (kW/ton)
2.0
1.5
1.0
0.5
0.0
0
40
80
120
160
200
Tons


A-Wing MCC (kWh/h)
40
30
20
10
0
0
20
40
60
80
100
120
Outside Air Temp (F)

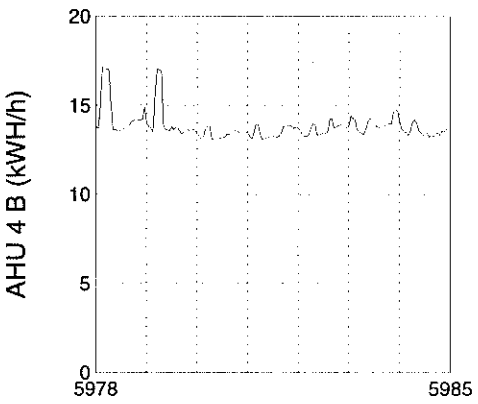

A-Wing Chiller (kW/ton)
2.0
1.5
1.0
0.5
0.0
0
20
40
60
80
100
120
Outside Air Temp (F)



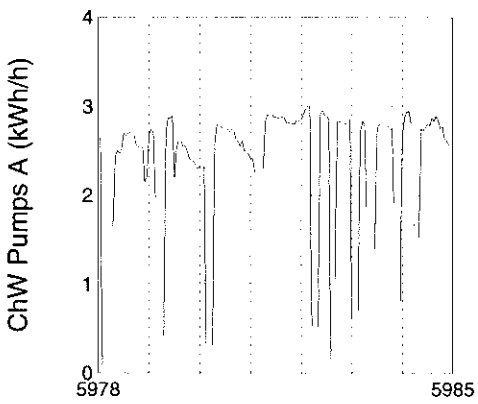
Site 922 Beginning 05-14-1996



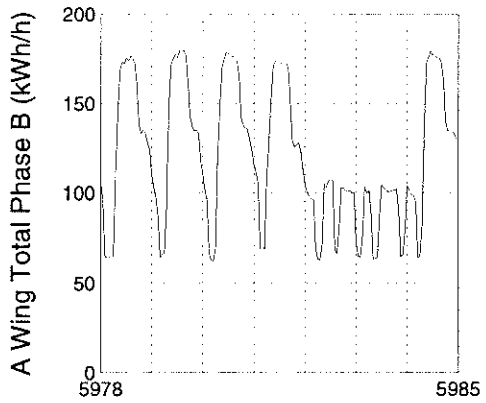
Site 922 Beginning 05-14-1996



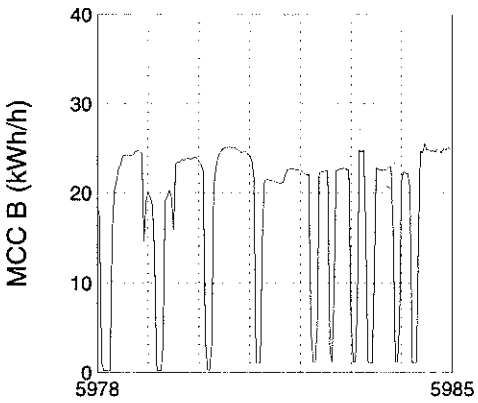
Site 922 Beginning 05-14-1996



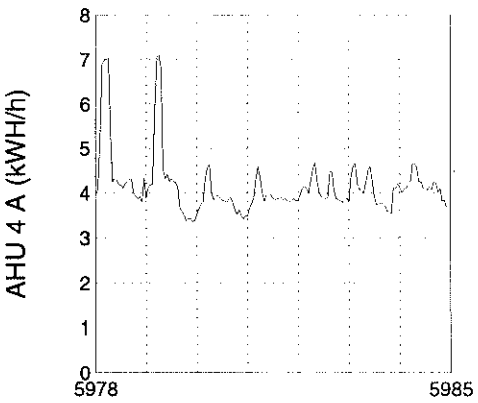
Site 922 Beginning 05-14-1996



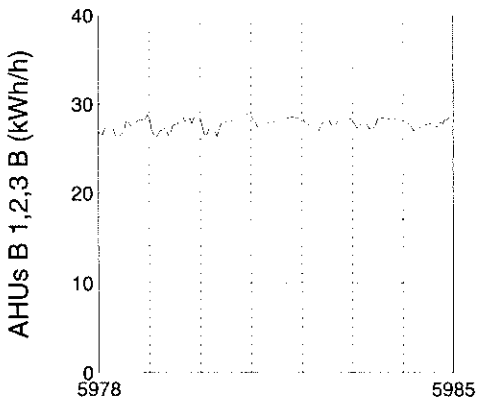
Site 922 Beginning 05-14-1996



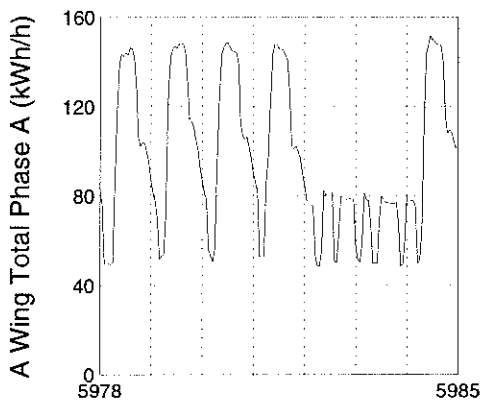
Site 922 Beginning 05-14-1996



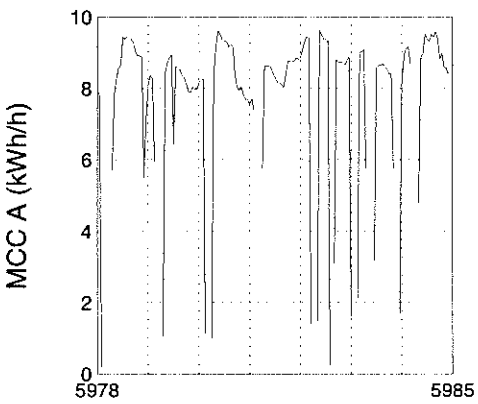
Site 922 Beginning 05-14-1996



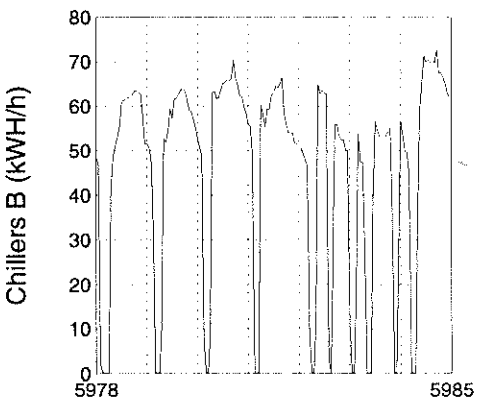
Site 922 Beginning 05-14-1996



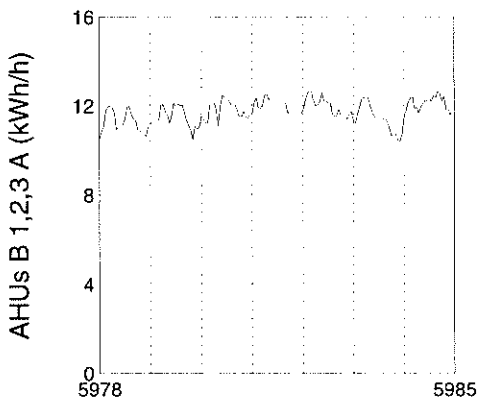
Site 922 Beginning 05-14-1996



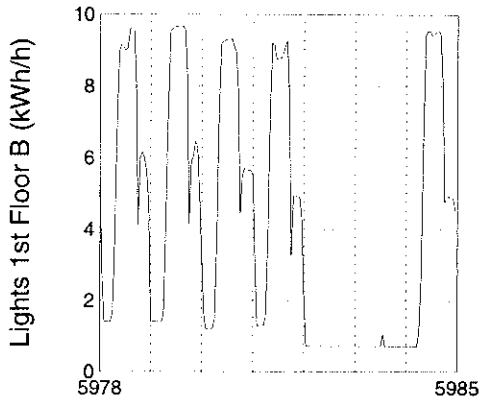
Site 922 Beginning 05-14-1996



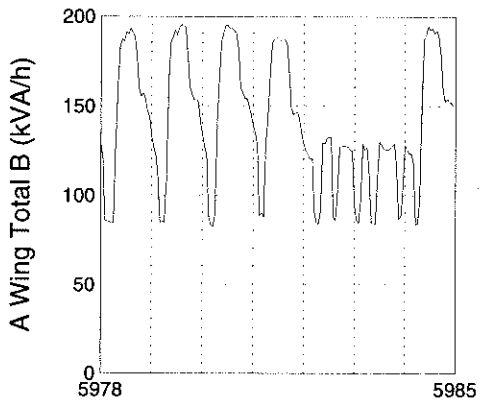
Site 922 Beginning 05-14-1996



Site 922 Beginning 05-14-1996



Site 922 Beginning 05-14-1996



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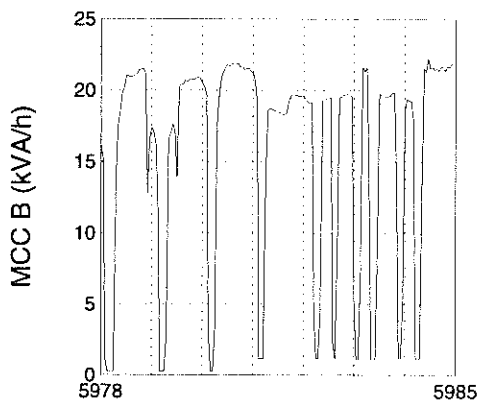

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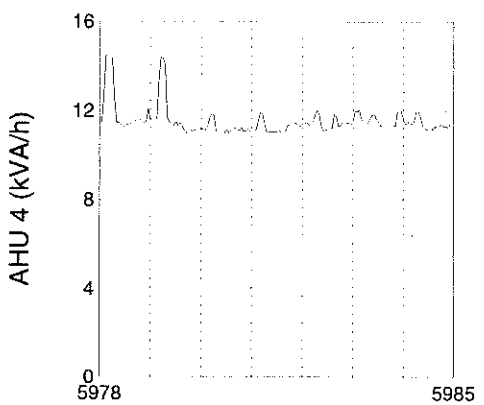

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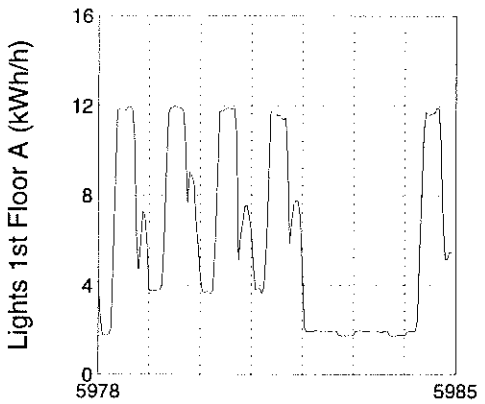

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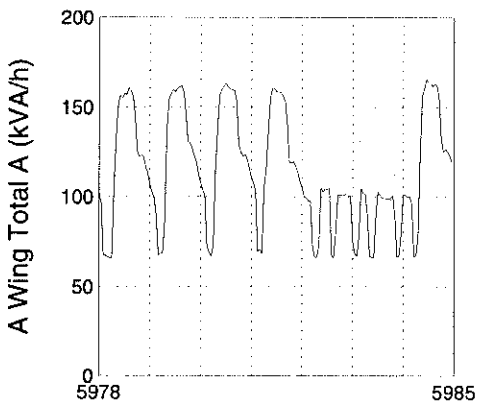

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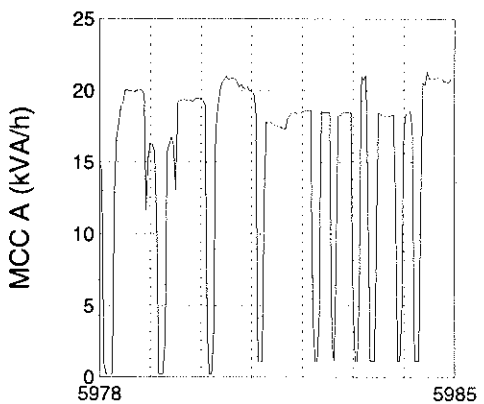

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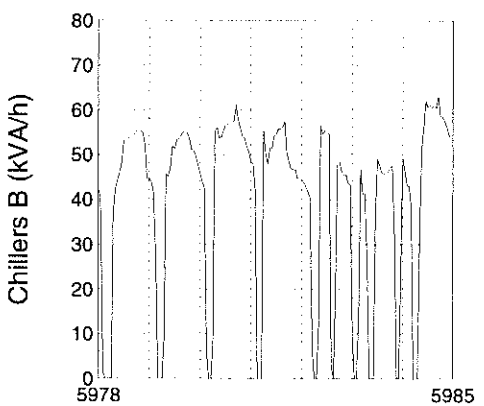

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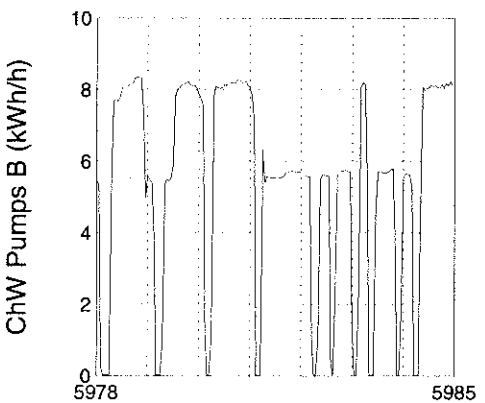

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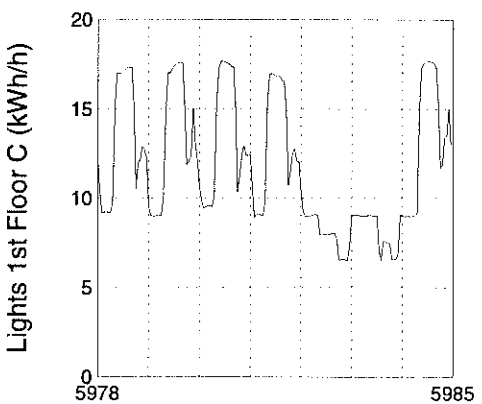

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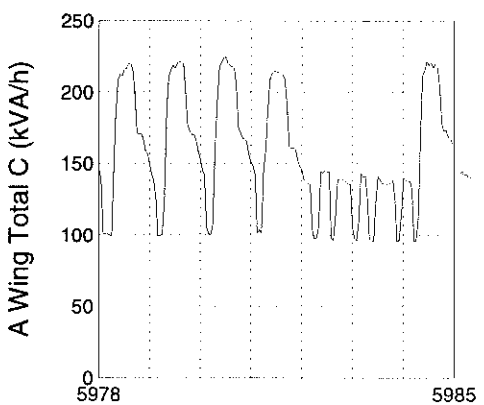

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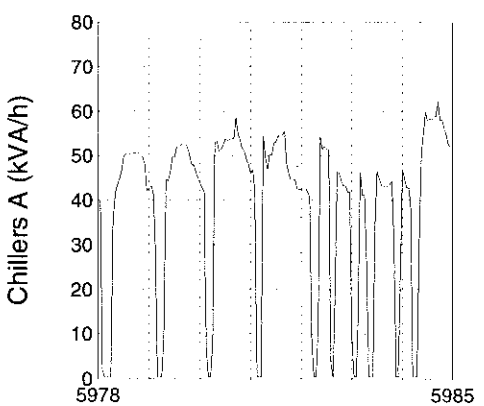

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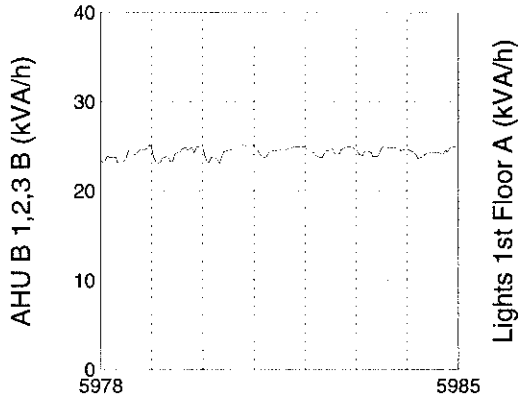

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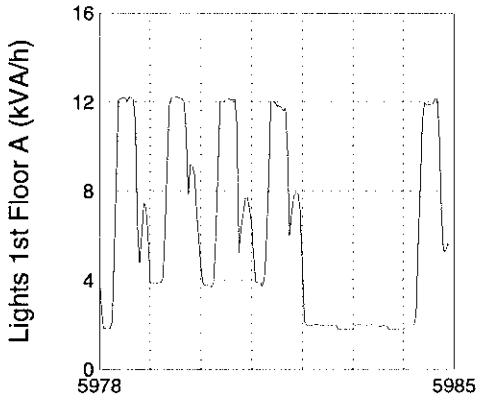

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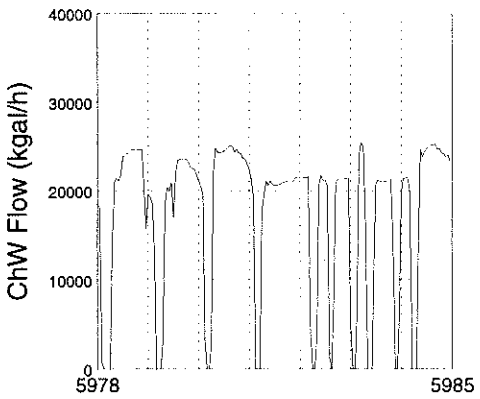

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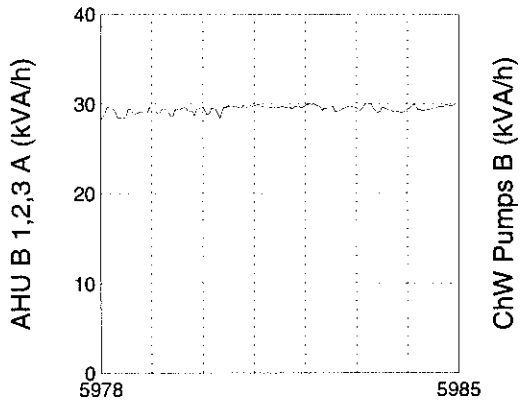

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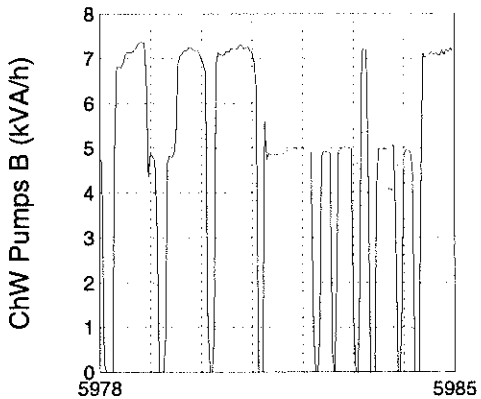

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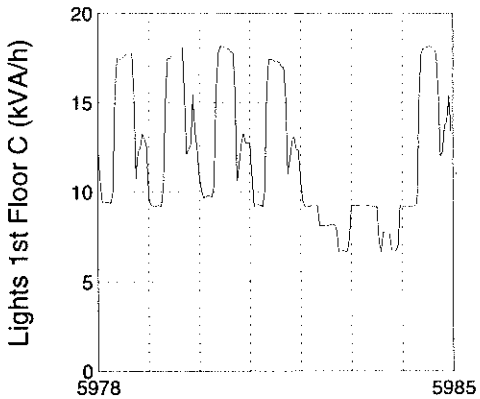

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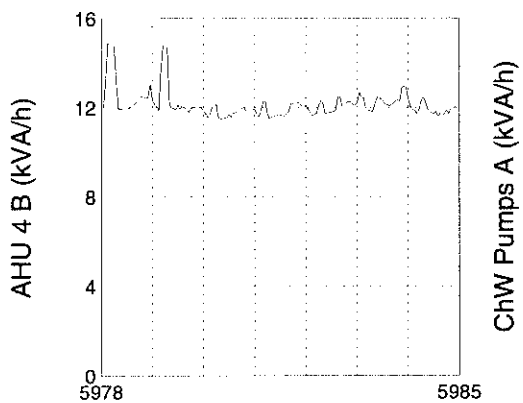

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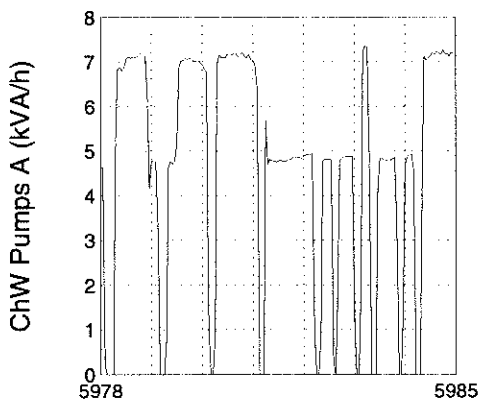

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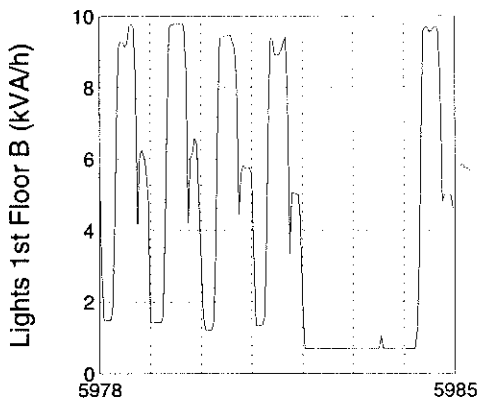

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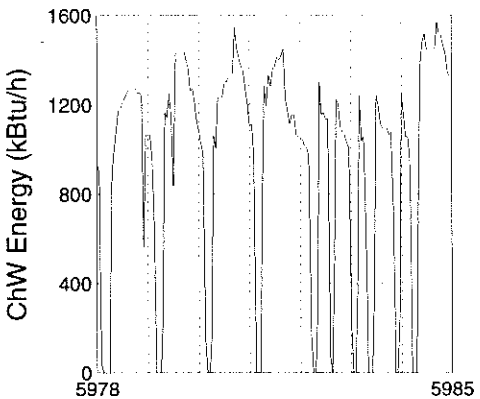

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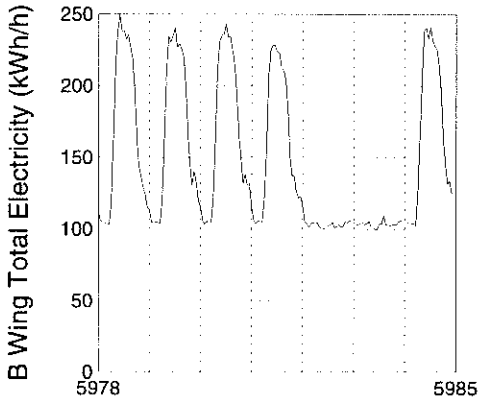

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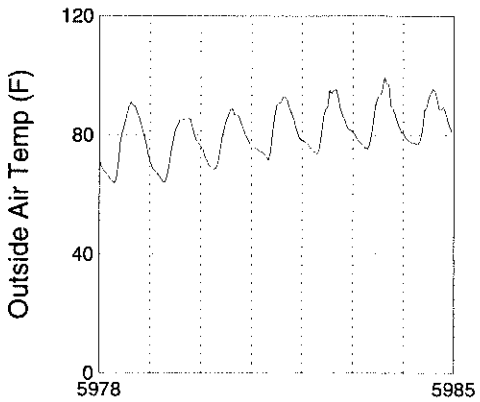

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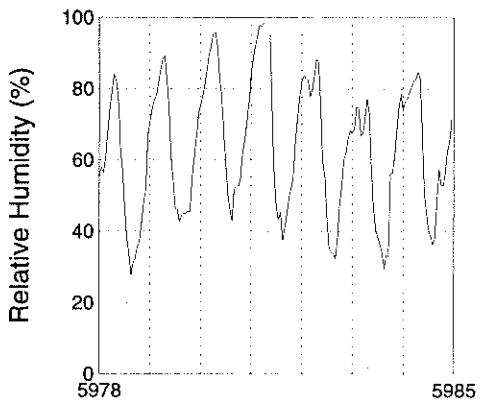

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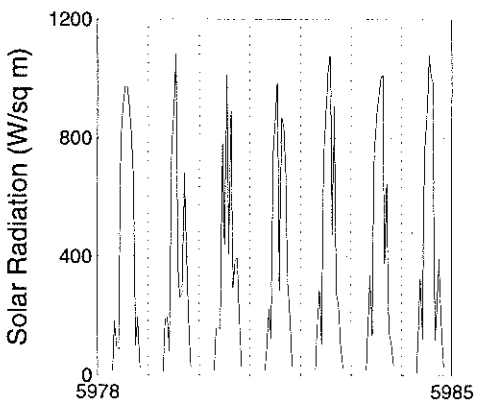

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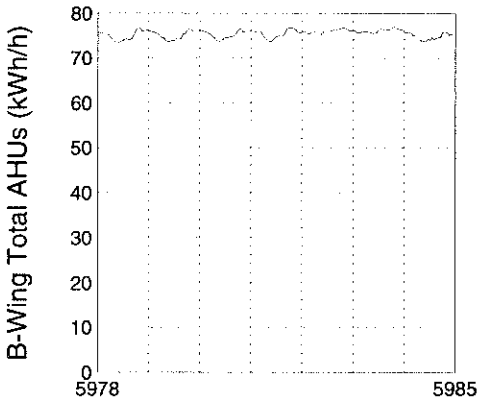

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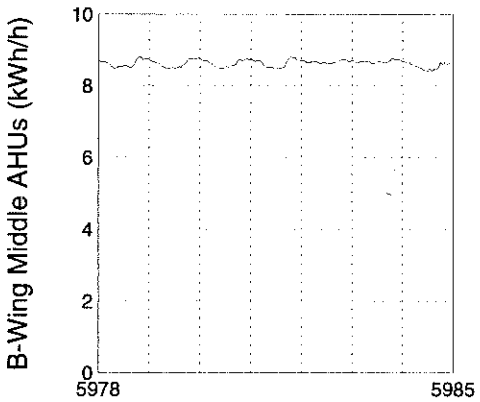

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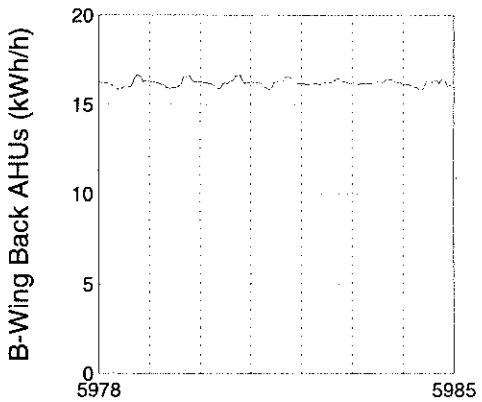

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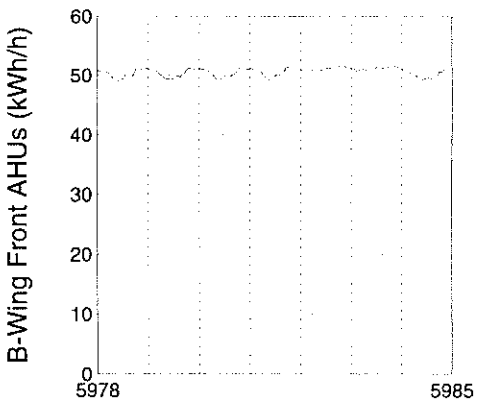

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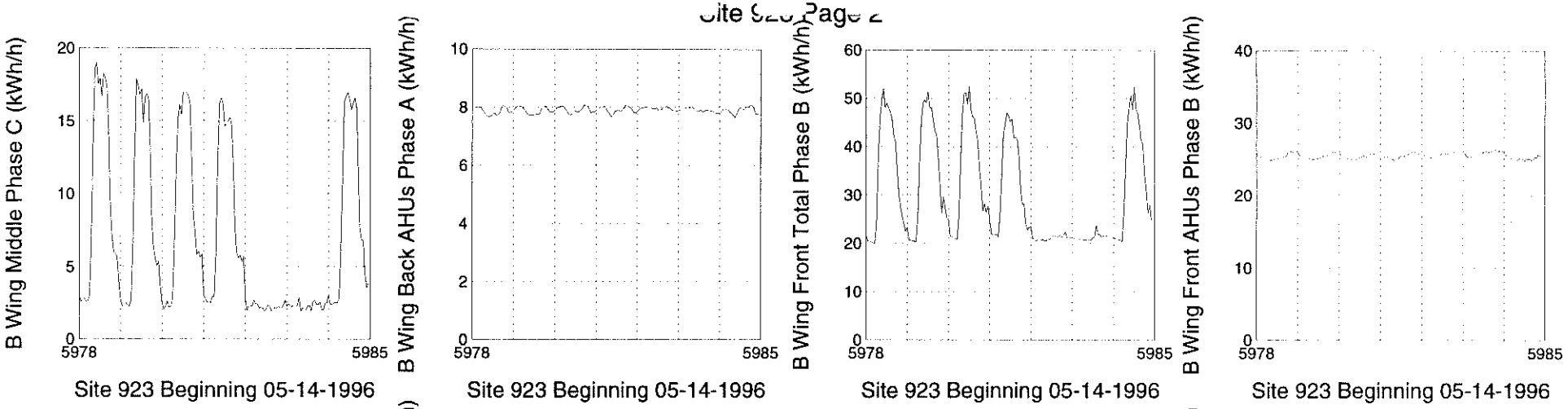
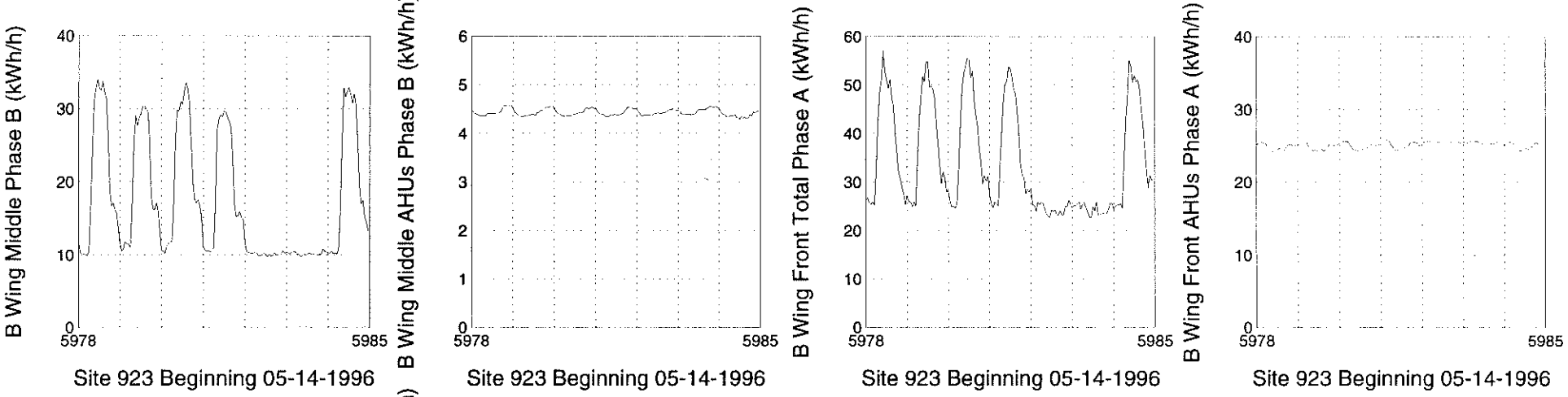
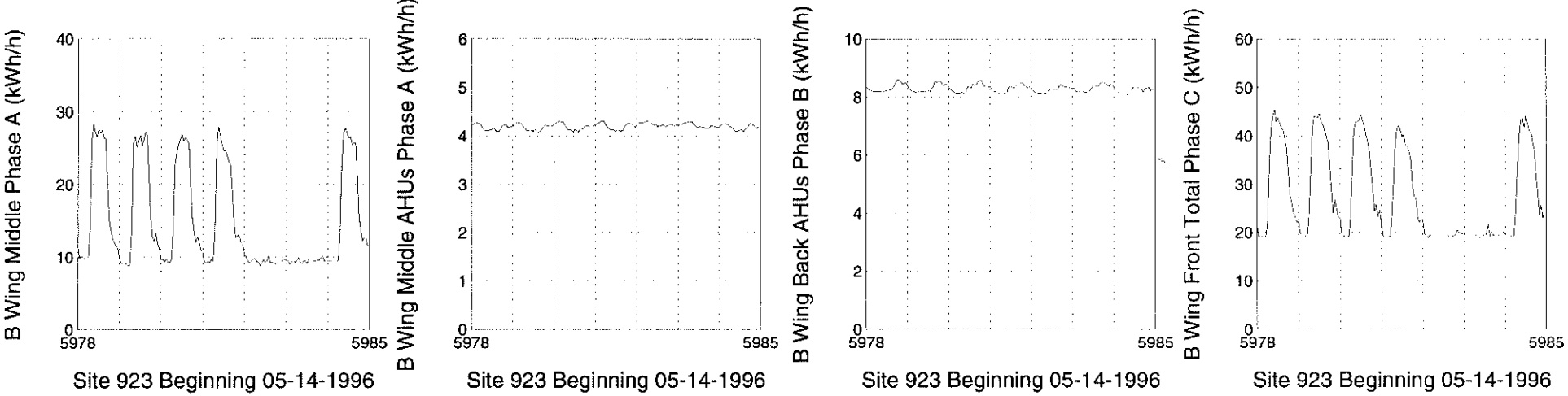
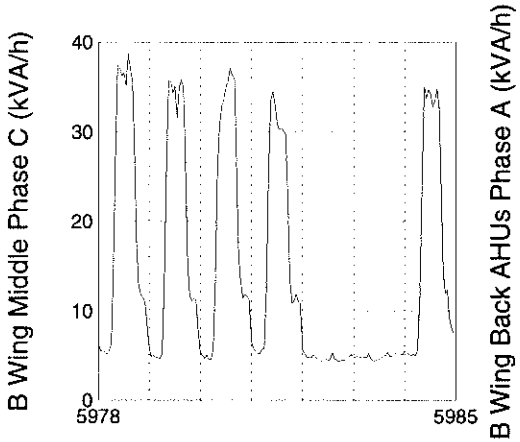
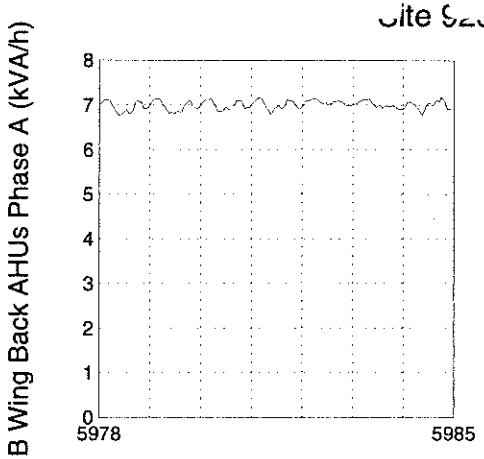
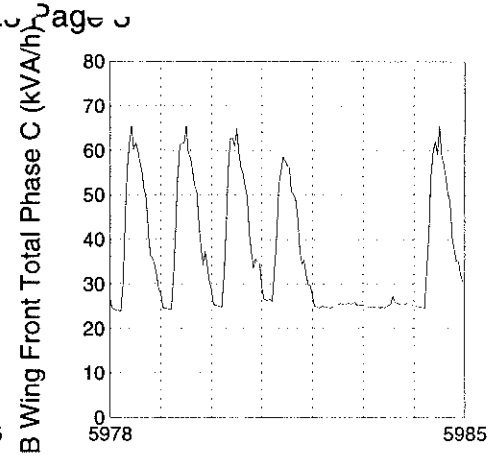

B Wing Middle Phase C (kWh/h)
B Wing Back AHUs Phase A (kWh/h)
B Wing Front Total Phase B (kWh/h)
B Wing Front AHUs Phase B (kWh/h)
5978
5985
Site 923 Beginning 05-14-1996

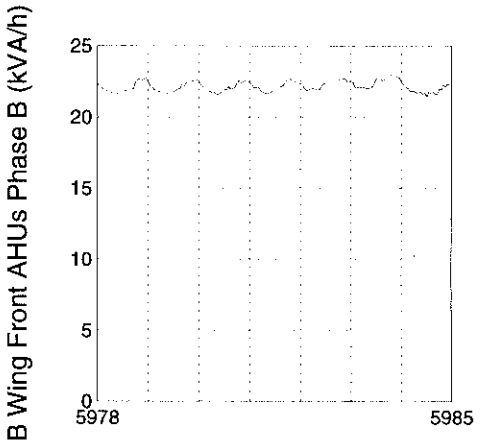

B Wing Middle Phase B (kWh/h)
B Wing Middle AHUs Phase B (kWh/h)
B Wing Front Total Phase A (kWh/h)
B Wing Front AHUs Phase A (kWh/h)
5978
5985
Site 923 Beginning 05-14-1996

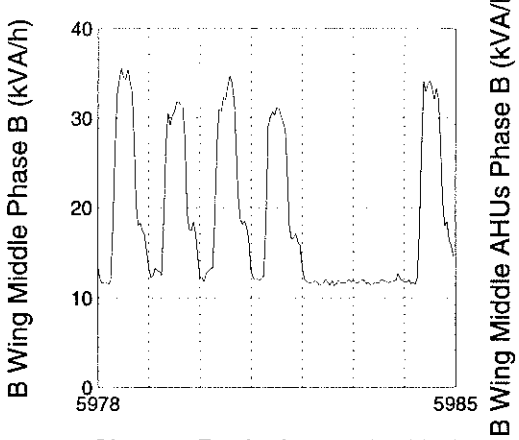

B Wing Middle Phase A (kWh/h)
B Wing Middle AHUs Phase A (kWh/h)
B Wing Back AHUs Phase B (kWh/h)
B Wing Front Total Phase C (kWh/h)
5978
5985
Site 923 Beginning 05-14-1996

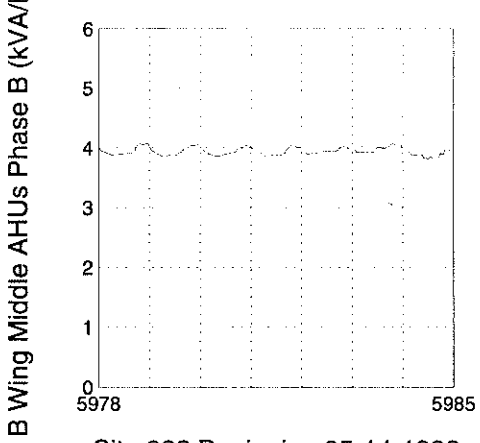

B Wing Middle Phase C (kVA/h)
40
30
20
10
0
5978
5985
Site 923 Beginning 05-14-1996

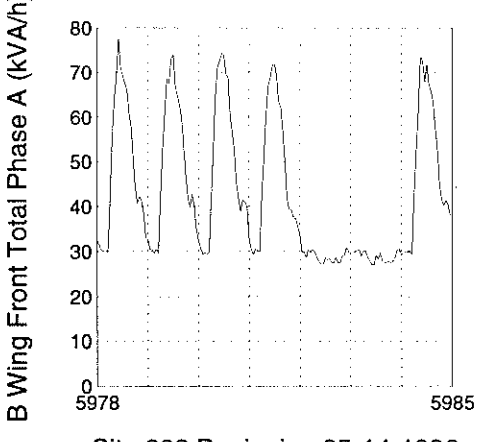

B Wing Back AHUs Phase A (kVA/h)
8
7
6
5
4
3
2
1
0
5978
5985
Site 923 Beginning 05-14-1996

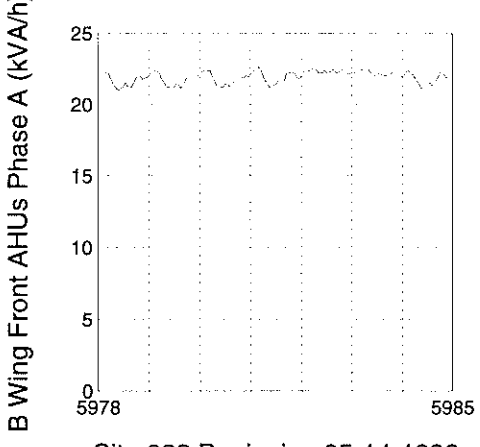

B Wing Front Total Phase C (kVA/h)
80
70
60
50
40
30
20
10
0
5978
5985
Site 923 Beginning 05-14-1996

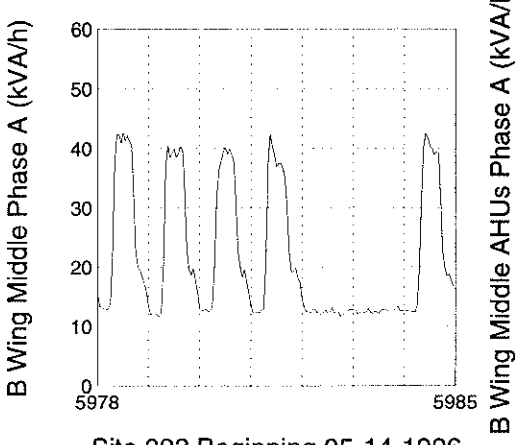

B Wing Front AHUs Phase B (kVA/h)
25
20
15
10
5
0
5978
5985
Site 923 Beginning 05-14-1996

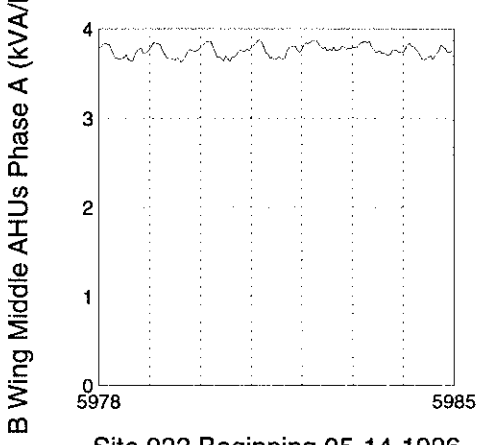

B Wing Middle Phase B (kVA/h)
40
30
20
10
0
5978
5985
Site 923 Beginning 05-14-1996

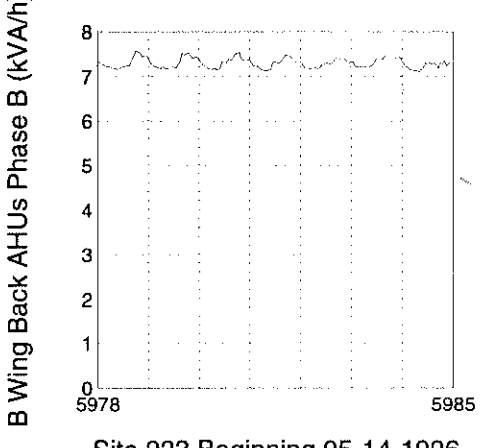

B Wing Middle AHUs Phase B (kVA/h)
6
5
4
3
2
1
0
5978
5985
Site 923 Beginning 05-14-1996

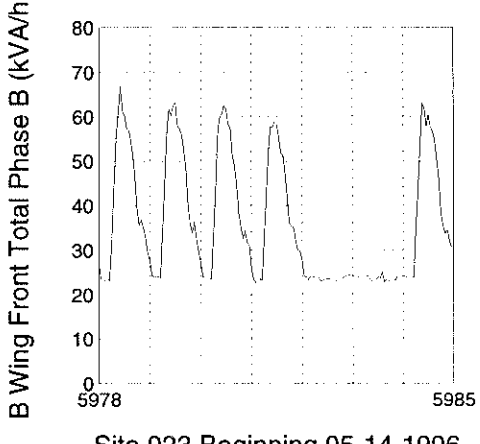

B Wing Front Total Phase A (kVA/h)
80
70
60
50
40
30
20
10
0
5978
5985
Site 923 Beginning 05-14-1996

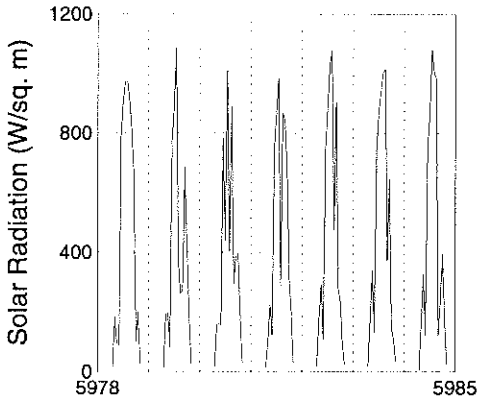

B Wing Front AHUs Phase A (kVA/h)
25
20
15
10
5
0
5978
5985
Site 923 Beginning 05-14-1996


B Wing Middle Phase A (kVA/h)
60
50
40
30
20
10
0
5978
5985
Site 923 Beginning 05-14-1996

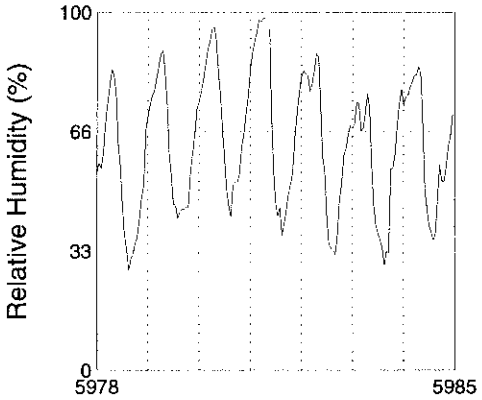

B Wing Middle AHUs Phase A (kVA/h)
4
3
2
1
0
5978
5985
Site 923 Beginning 05-14-1996


B Wing Back AHUs Phase B (kVA/h)
8
7
6
5
4
3
2
1
0
5978
5985
Site 923 Beginning 05-14-1996

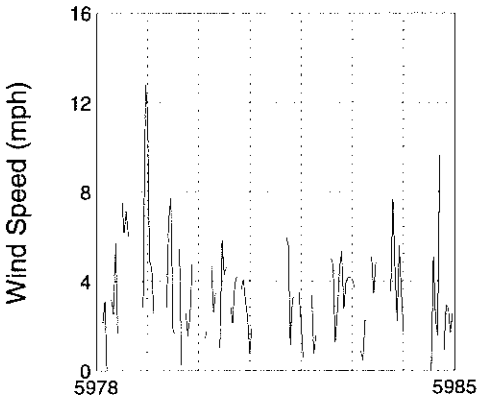

B Wing Front Total Phase B (kVA/h)
80
70
60
50
40
30
20
10
0
5978
5985
Site 923 Beginning 05-14-1996



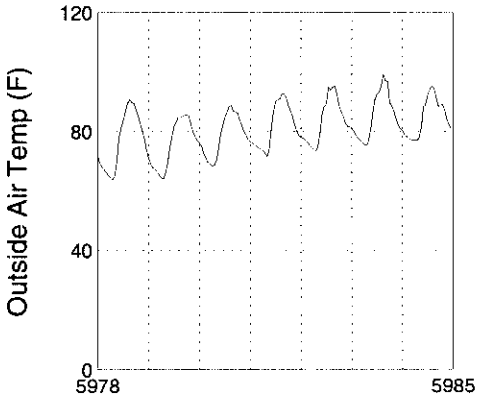
Site 923 Beginning 05-14-1996



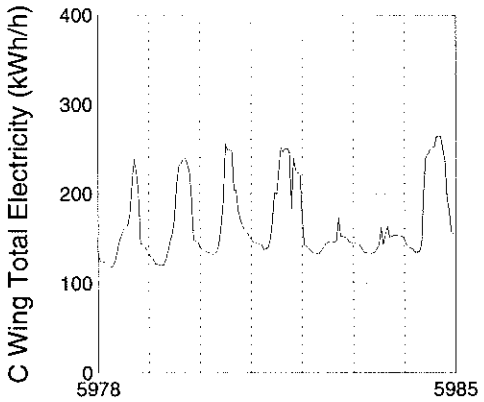
Site 923 Beginning 05-14-1996

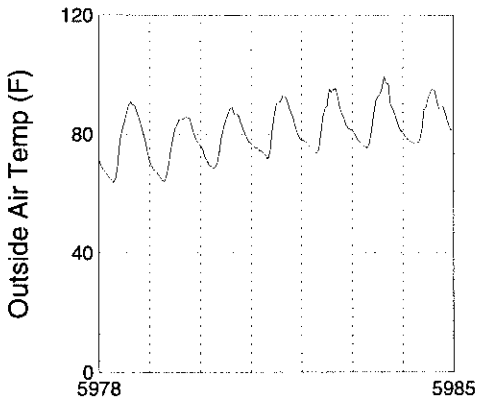


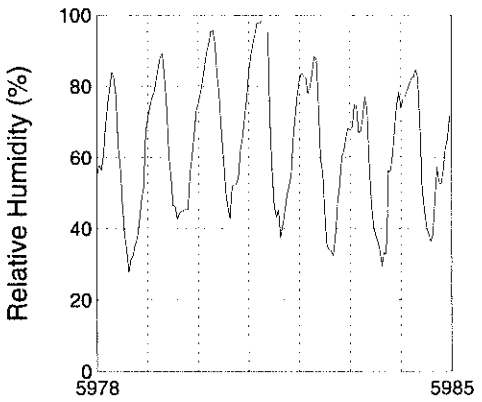
Site 923 Beginning 05-14-1996

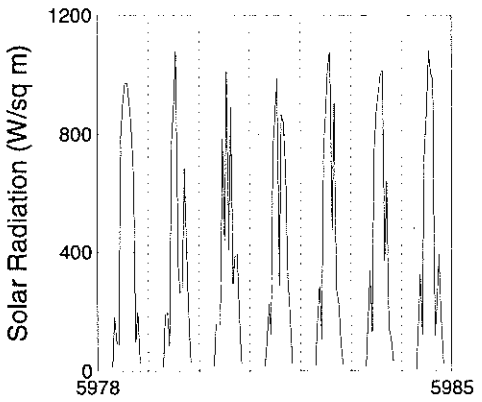


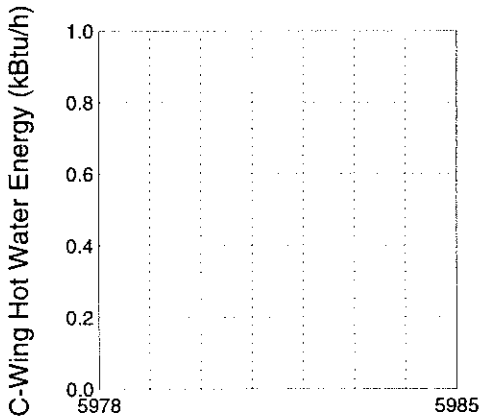
Site 923 Beginning 05-14-1996

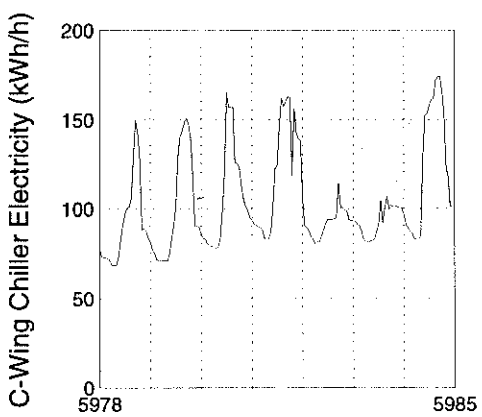

C Wing Total Electricity (kWh/h)
400
300
200
100
0
5978
5985
Site 924 Beginning 05-14-1996

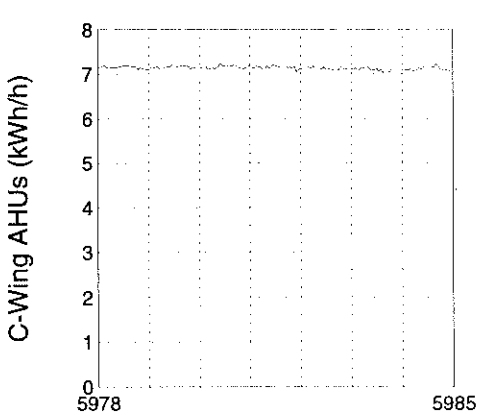

Outside Air Temp (F)
120
80
40
0
5978
5985
Site 924 Beginning 05-14-1996

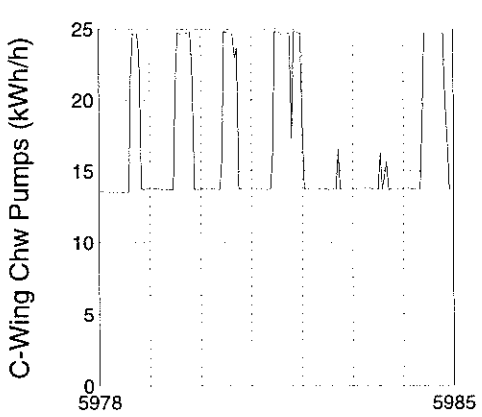

Relative Humidity (%)
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

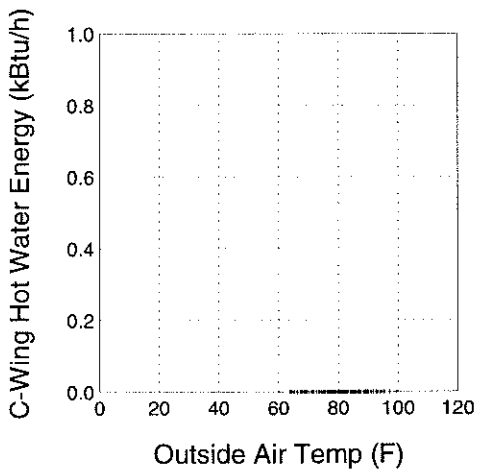

Solar Radiation (W/sq m)
1200
800
400
0
5978
5985
Site 924 Beginning 05-14-1996

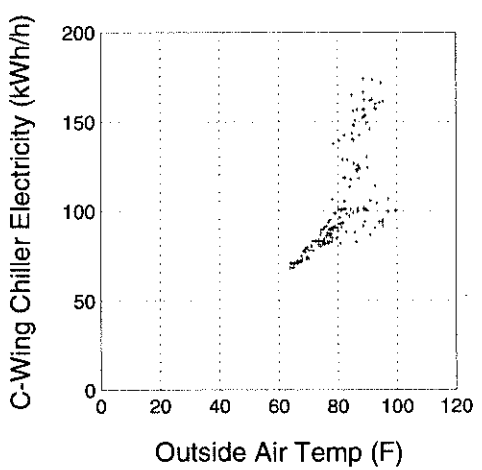

C-Wing Hot Water Energy (kBtu/h)
1.0
0.8
0.6
0.4
0.2
0.0
5978
5985
Site 924 Beginning 05-14-1996

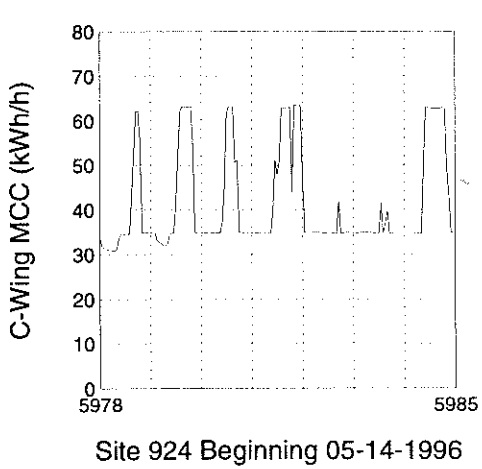

C-Wing Chiller Electricity (kWh/h)
200
150
100
50
0
5978
5985
Site 924 Beginning 05-14-1996

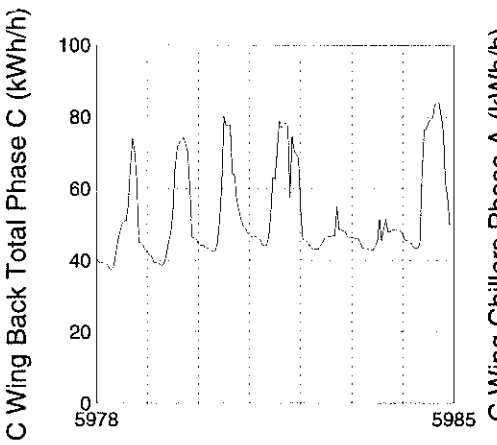

C-Wing AHUs (kWh/h)
8
7
6
5
4
3
2
1
0
5978
5985
Site 924 Beginning 05-14-1996

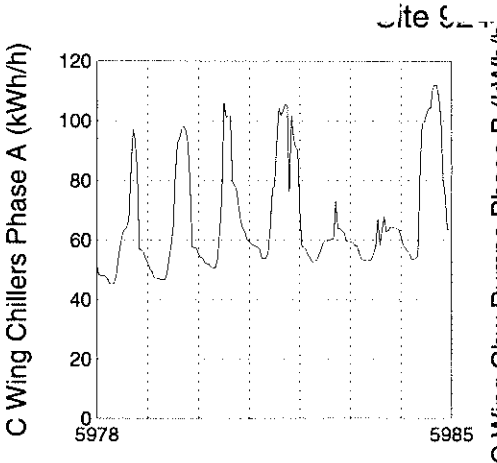

C-Wing Chw Pumps (kWh/h)
25
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996

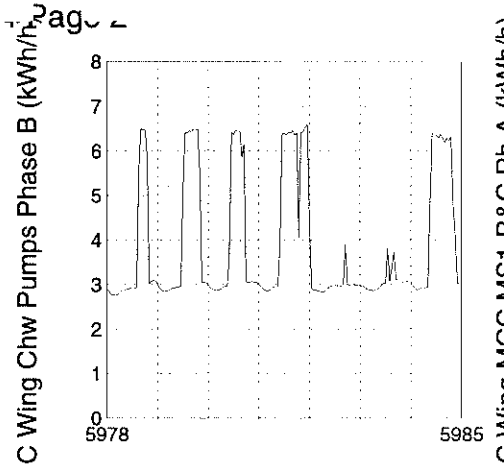

C-Wing Hot Water Energy (kBtu/h)
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60
80
100
120
Outside Air Temp (F)

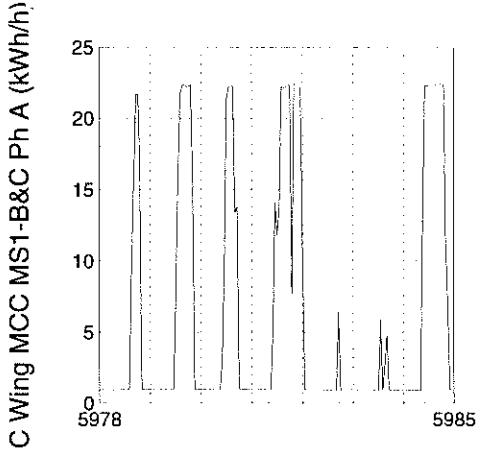

C-Wing Chiller Electricity (kWh/h)
200
150
100
50
0
0
20
40
60
80
100
120
Outside Air Temp (F)

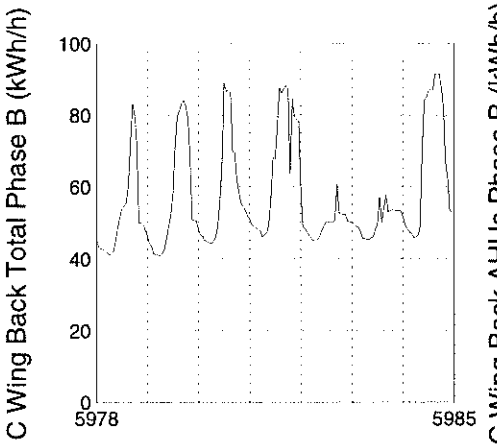

C-Wing MCC (kWh/h)
80
70
60
50
40
30
20
10
0
5978
5985
Site 924 Beginning 05-14-1996

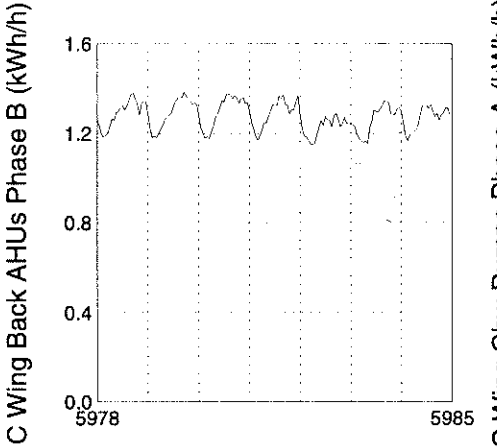

C Wing Back Total Phase C (kWh/h)
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

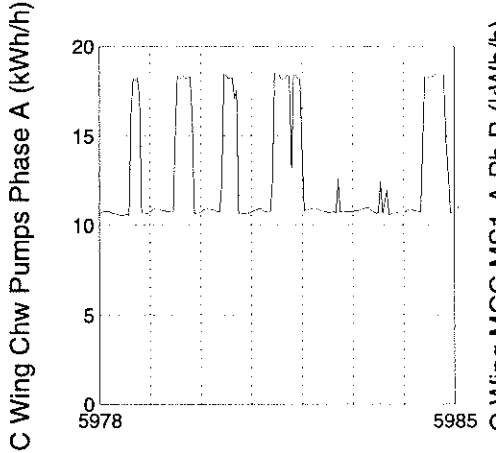

C Wing Chillers Phase A (kWh/h)
120
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

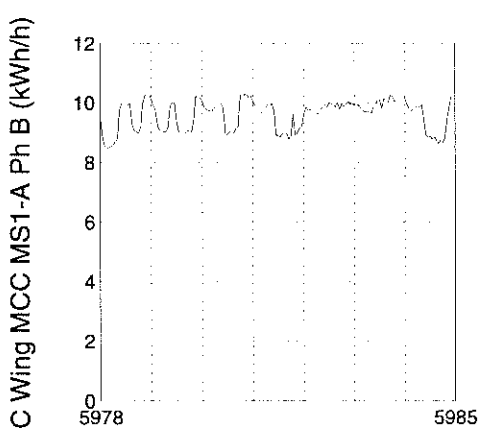

C Wing Chw Pumps Phase B (kWh/h)
8
7
6
5
4
3
2
1
0
5978
5985
Site 924 Beginning 05-14-1996

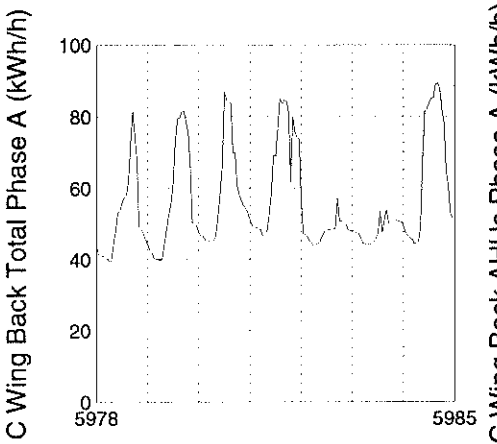

C Wing MCC MS1-B&C Ph A (kWh/h)
25
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996

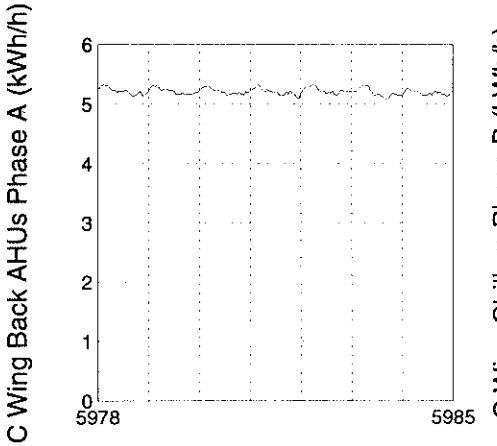

C Wing Back Total Phase B (kWh/h)
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

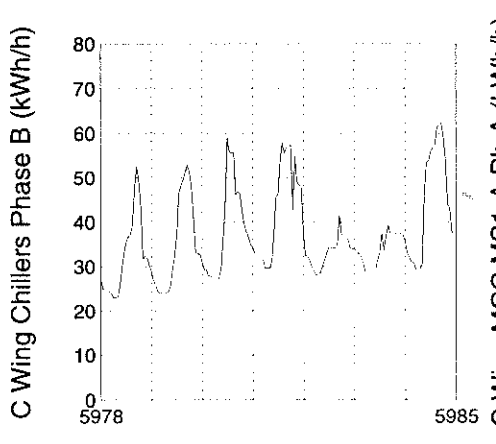

C Wing Back AHUs Phase B (kWh/h)
1.6
1.2
0.8
0.4
0.0
5978
5985
Site 924 Beginning 05-14-1996

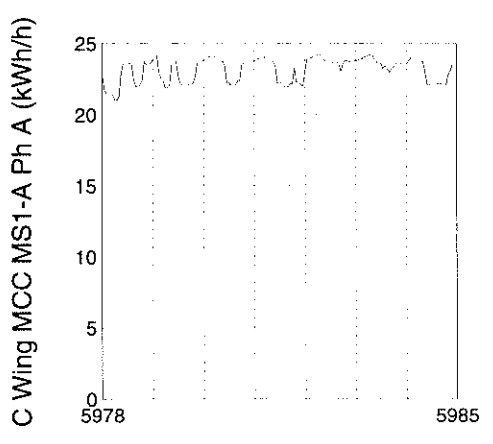

C Wing Chw Pumps Phase A (kWh/h)
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996

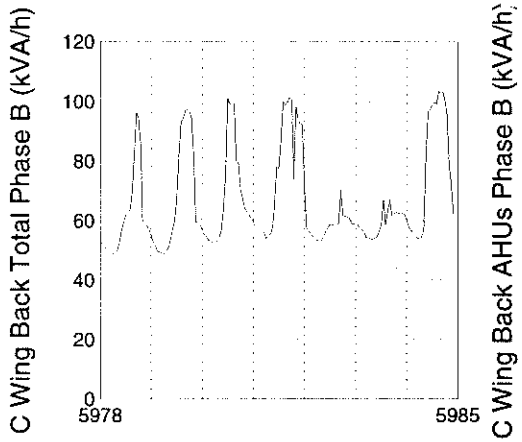

C Wing MCC MS1-A Ph B (kWh/h)
12
10
8
6
4
2
0
5978
5985
Site 924 Beginning 05-14-1996

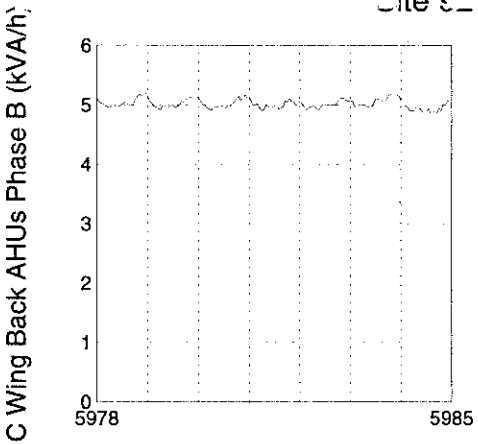

C Wing Back Total Phase A (kWh/h)
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

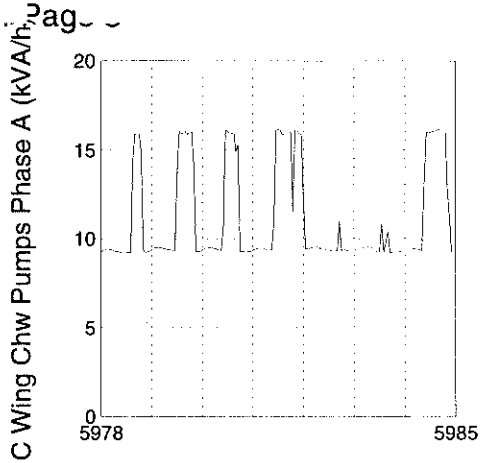

C Wing Back AHUs Phase A (kWh/h)
6
5
4
3
2
1
0
5978
5985
Site 924 Beginning 05-14-1996

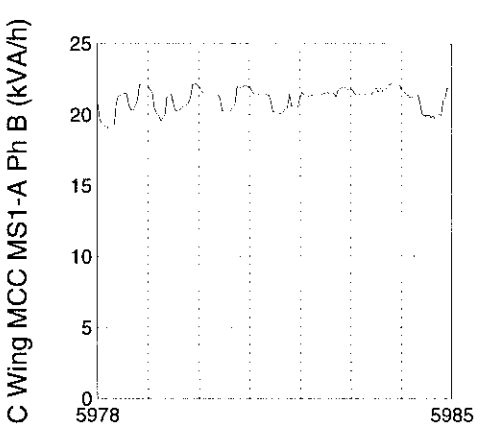

C Wing Chillers Phase B (kWh/h)
80
70
60
50
40
30
20
10
0
5978
5985
Site 924 Beginning 05-14-1996

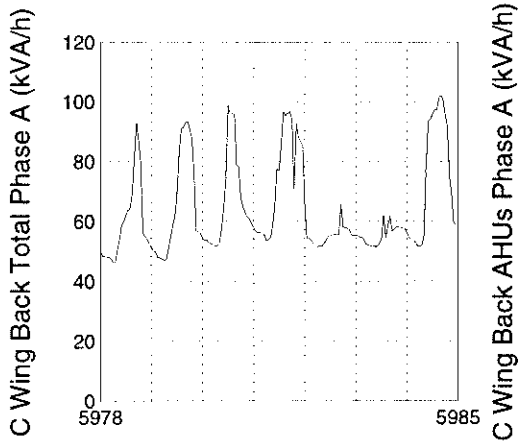

C Wing MCC MS1-A Ph A (kWh/h)
25
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996

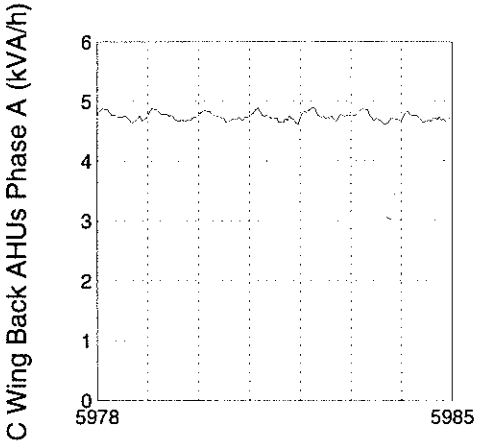

C Wing Back Total Phase B (kVA/h)
120
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

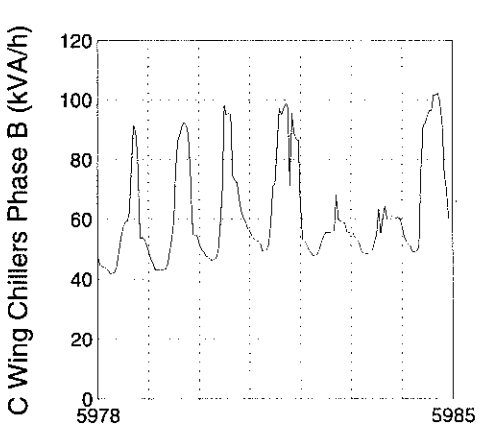

C Wing Back AHUs Phase B (kVA/h)
6
5
4
3
2
1
0
5978
5985
Site 924 Beginning 05-14-1996

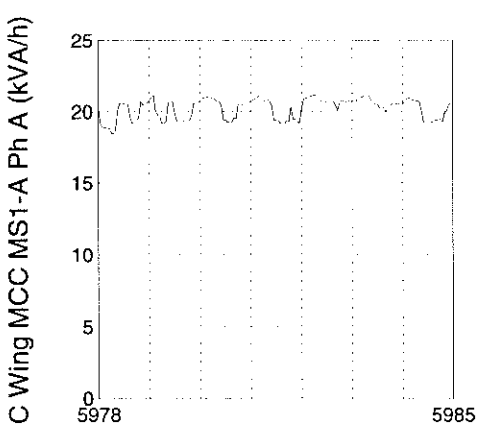

C Wing Chw Pumps Phase A (kVA/h)
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996

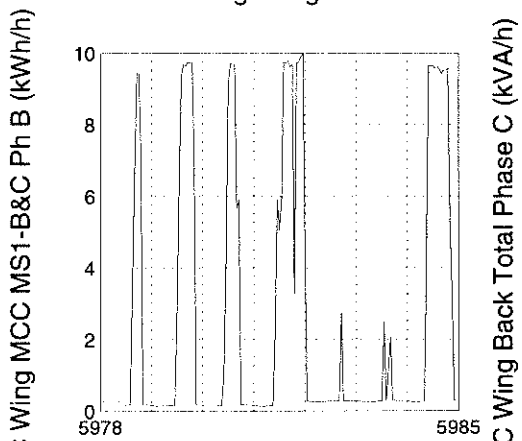

C Wing MCC MS1-A Ph B (kVA/h)
25
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996

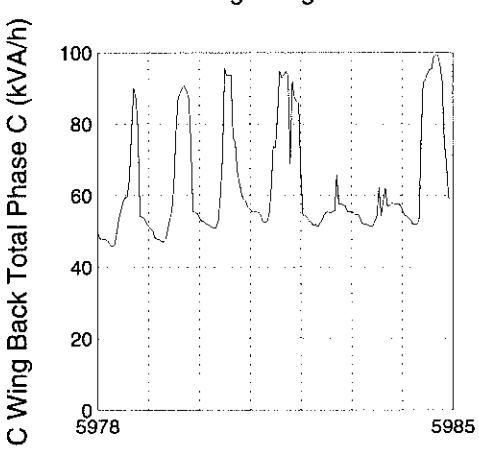

C Wing Back Total Phase A (kVA/h)
120
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

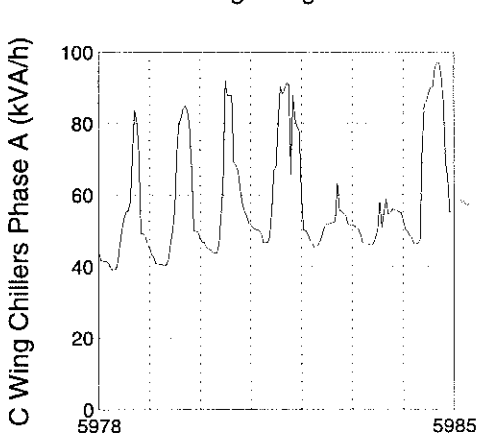

C Wing Back AHUs Phase A (kVA/h)
6
5
4
3
2
1
0
5978
5985
Site 924 Beginning 05-14-1996

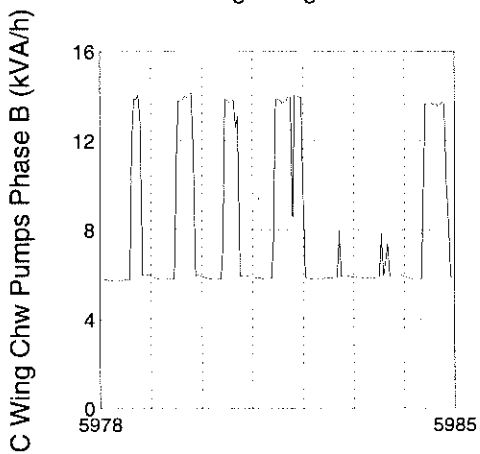

C Wing Chillers Phase B (kVA/h)
120
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

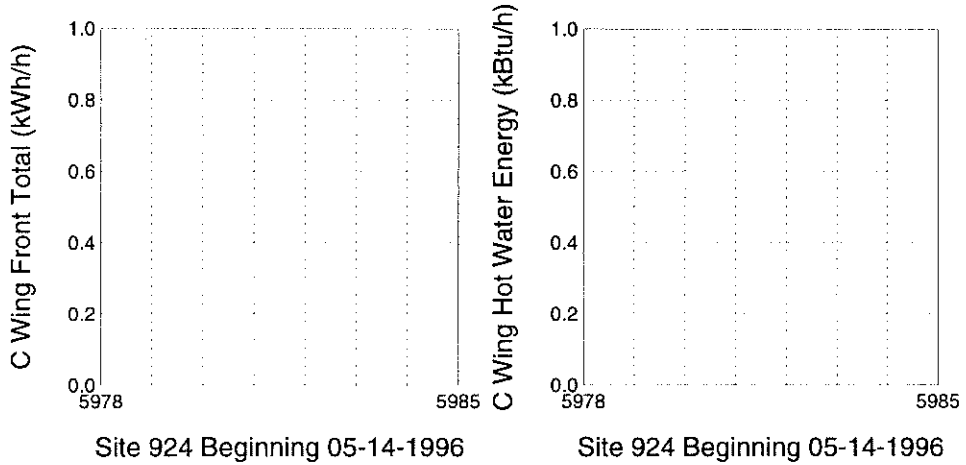

C Wing MCC MS1-A Ph A (kVA/h)
25
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996


C Wing MCC MS1-B&C Ph B (kWh/h)
10
8
6
4
2
0
5978
5985
Site 924 Beginning 05-14-1996

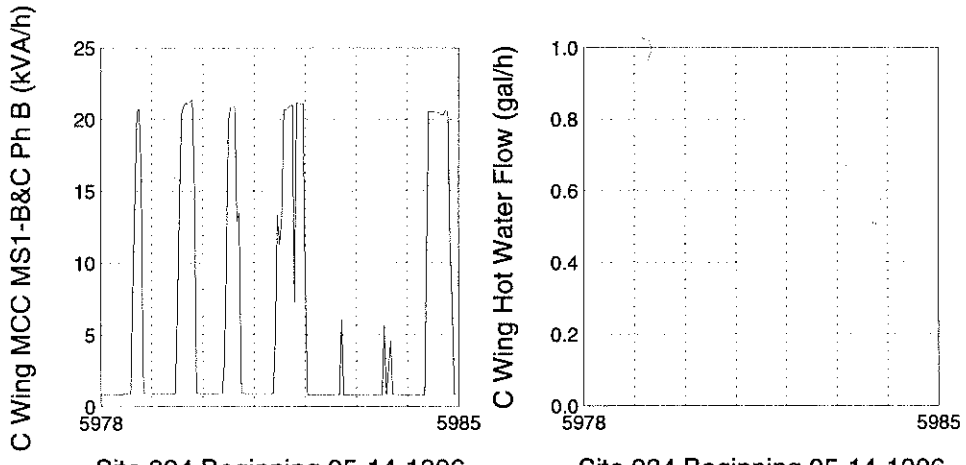

C Wing Back Total Phase C (kVA/h)
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996


C Wing Chillers Phase A (kVA/h)
100
80
60
40
20
0
5978
5985
Site 924 Beginning 05-14-1996

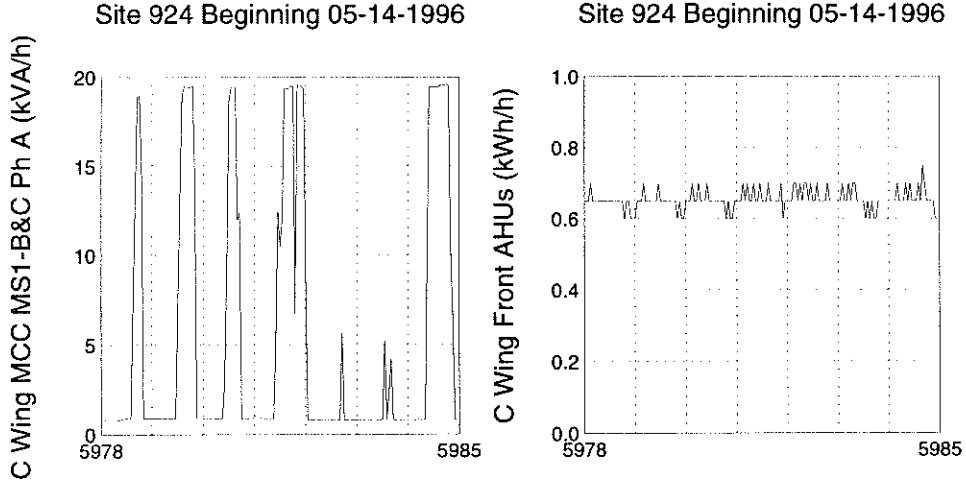

C Wing Chw Pumps Phase B (kVA/h)
16
12
8
4
0
5978
5985
Site 924 Beginning 05-14-1996


C Wing Front Total (kWh/h)
1.0
0.8
0.6
0.4
0.2
0.0
5978
5985
Site 924 Beginning 05-14-1996

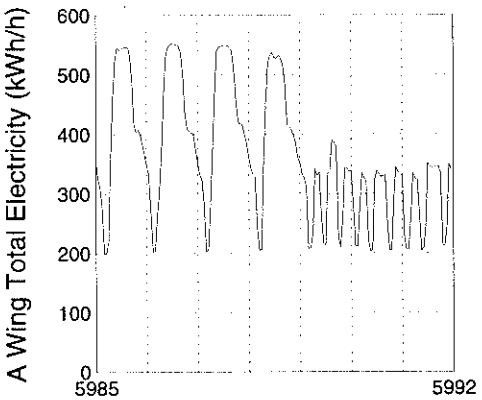
C Wing Hot Water Energy (kBtu/h)
1.0
0.8
0.6
0.4
0.2
0.0
5978
5985
Site 924 Beginning 05-14-1996


C Wing MCC MS1-B&C Ph B (kVA/h)
25
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996

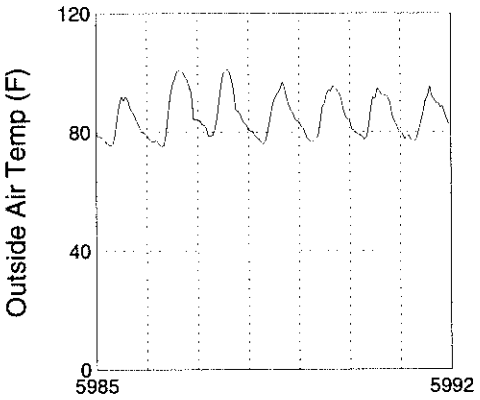
C Wing Hot Water Flow (gal/h)
1.0
0.8
0.6
0.4
0.2
0.0
5978
5985
Site 924 Beginning 05-14-1996


C Wing MCC MS1-B&C Ph A (kVA/h)
20
15
10
5
0
5978
5985
Site 924 Beginning 05-14-1996

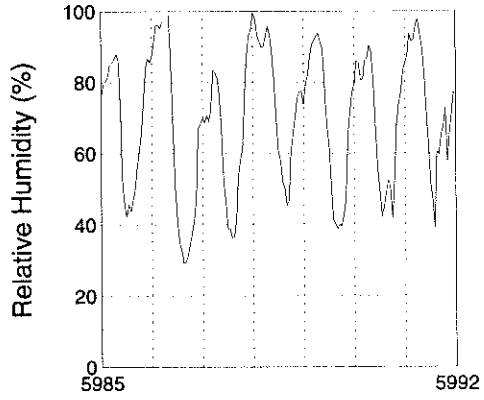
C Wing Front AHUs (kWh/h)
1.0
0.8
0.6
0.4
0.2
0.0
5978
5985
Site 924 Beginning 05-14-1996



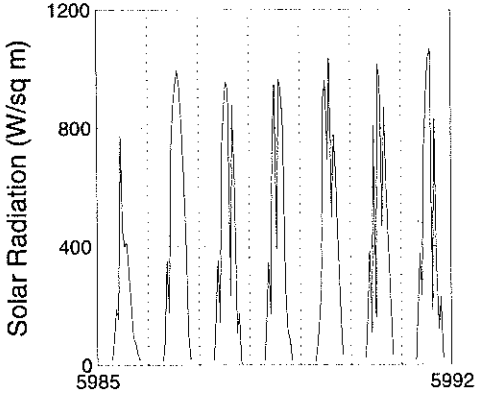
Site 922 Beginning 05-21-1996



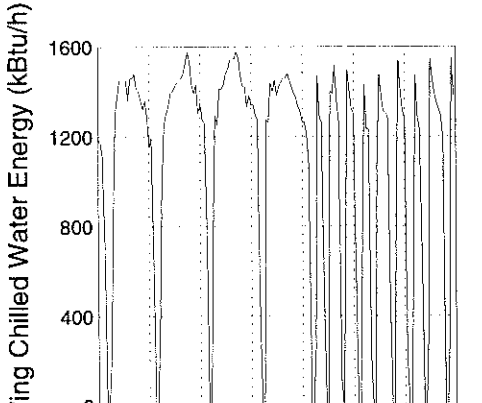
Site 922 Beginning 05-21-1996



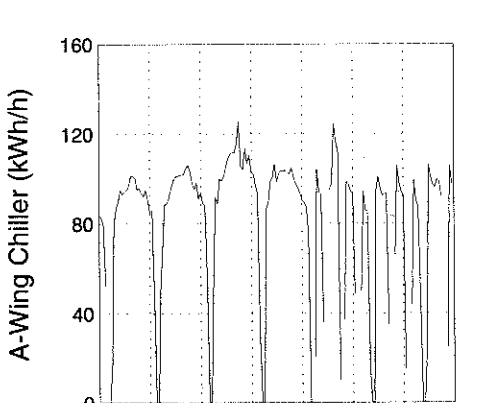
Site 922 Beginning 05-21-1996



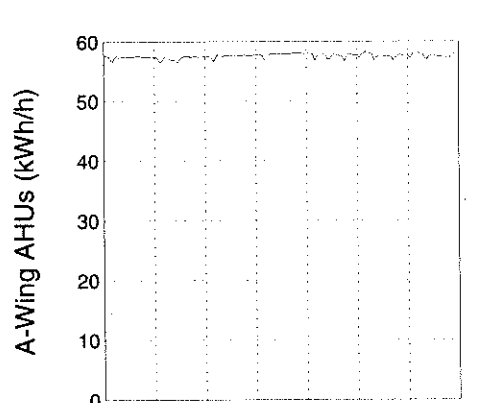
Site 922 Beginning 05-21-1996



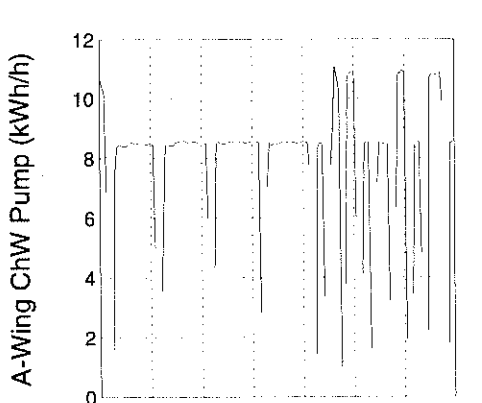
Site 922 Beginning 05-21-1996



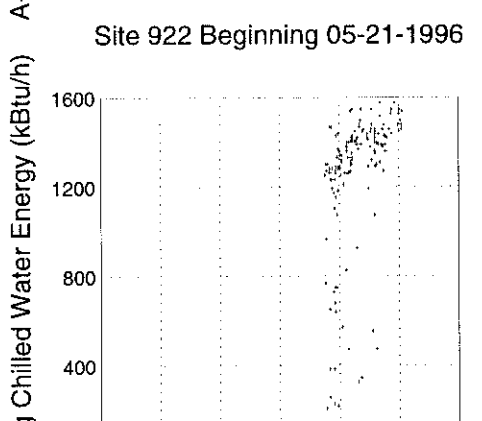
Site 922 Beginning 05-21-1996



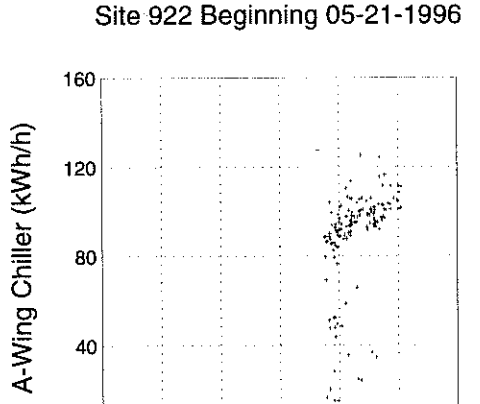
Site 922 Beginning 05-21-1996



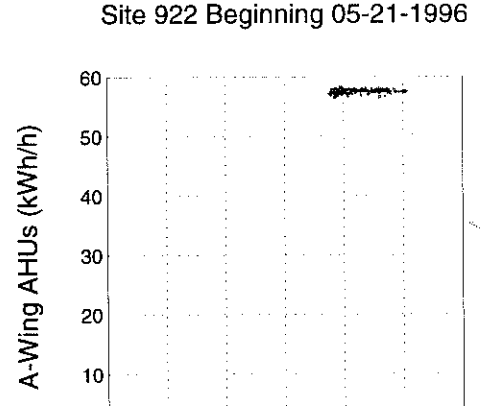
Site 922 Beginning 05-21-1996



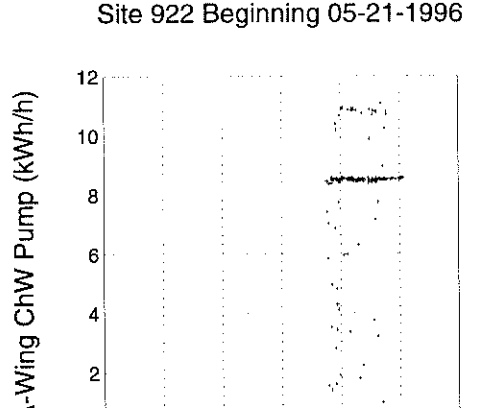
Outside Air Temp (F)



Outside Air Temp (F)



Outside Air Temp (F)



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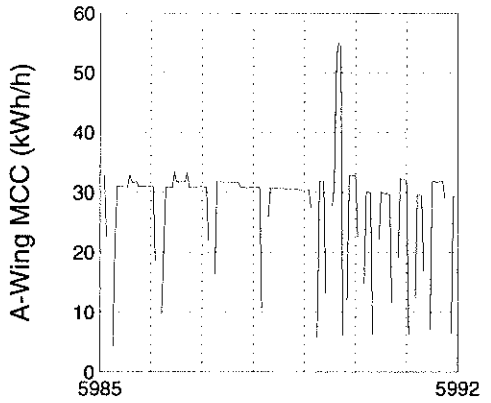
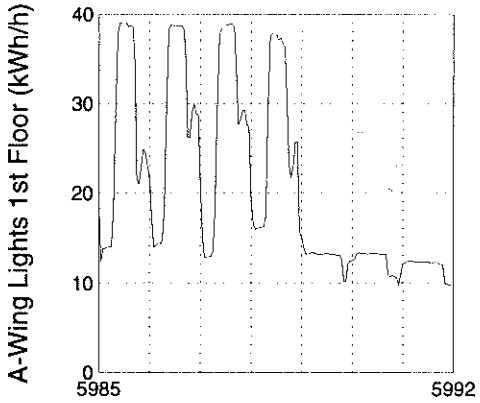


Site 922 Beginning 05-21-1996



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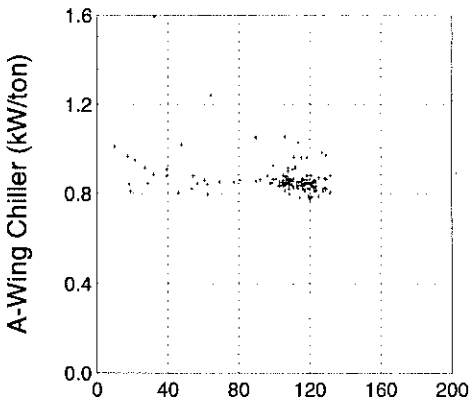
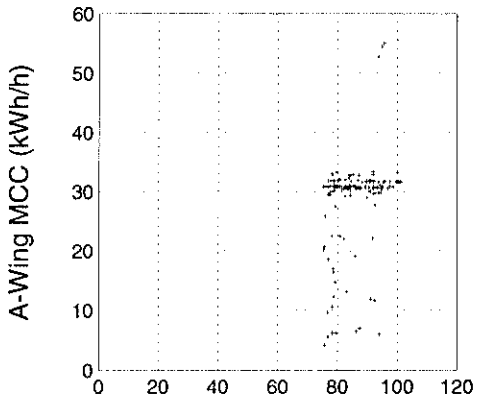


Tons



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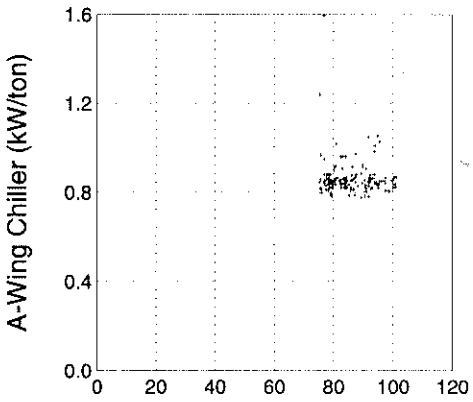
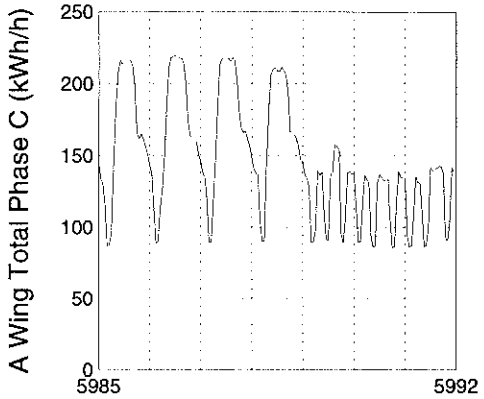


Outside Air Temp (F)



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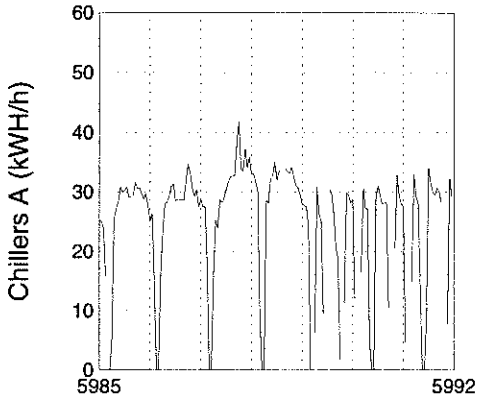

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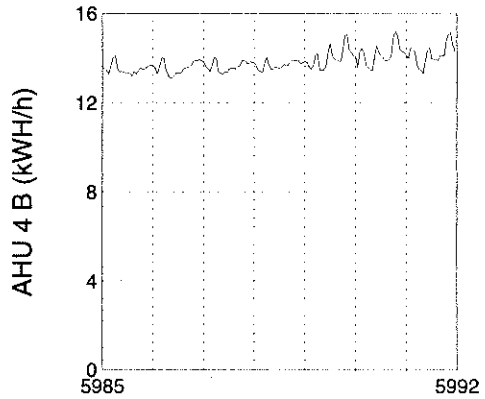

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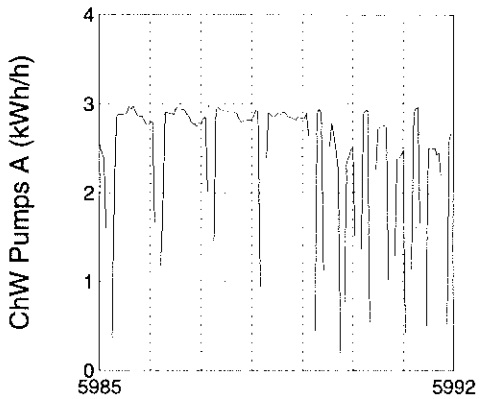

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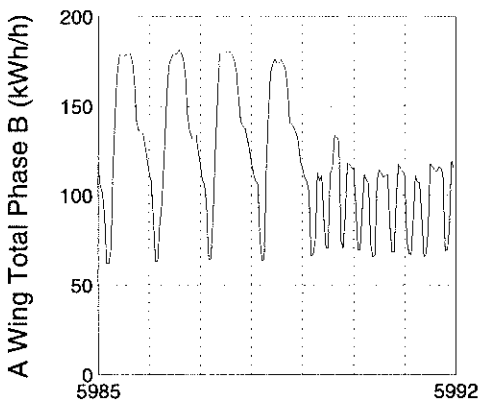

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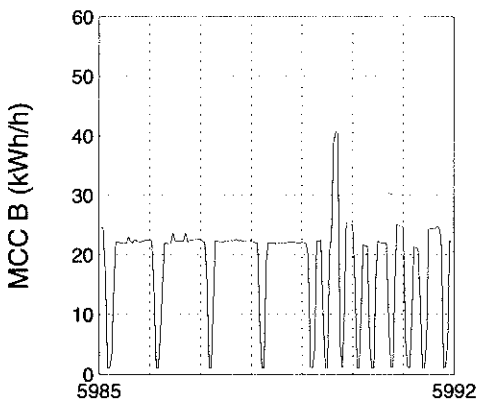

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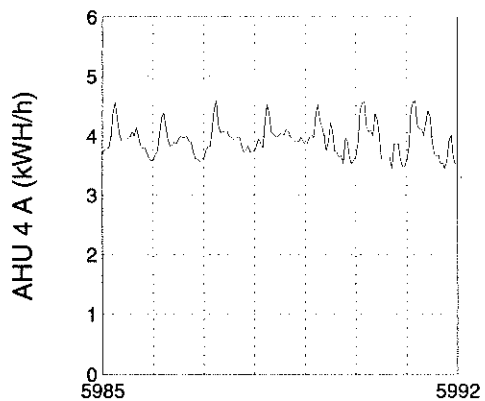

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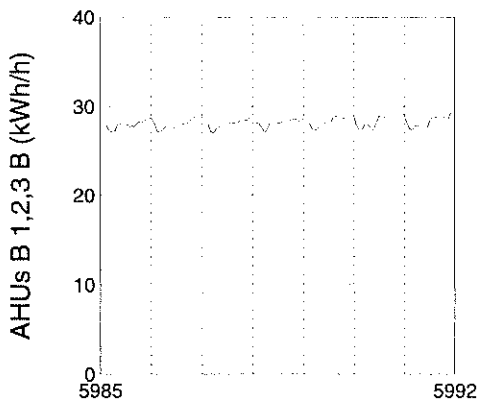

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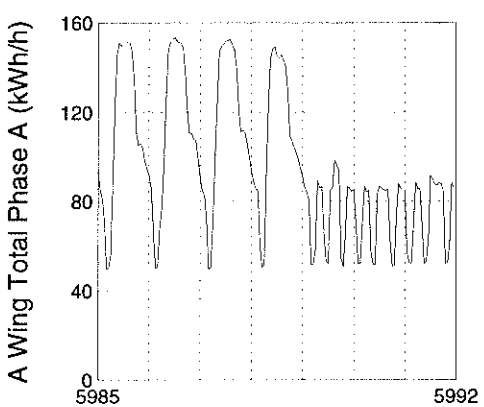

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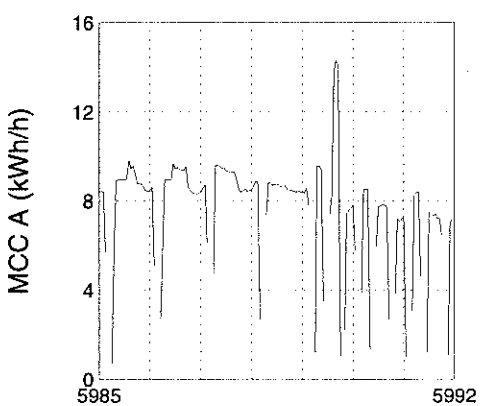

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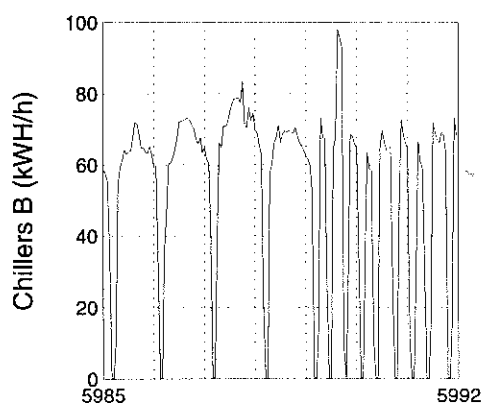

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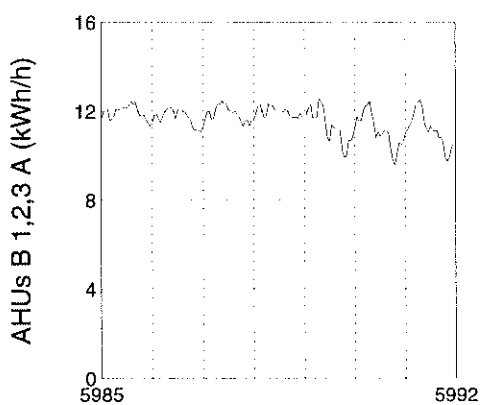

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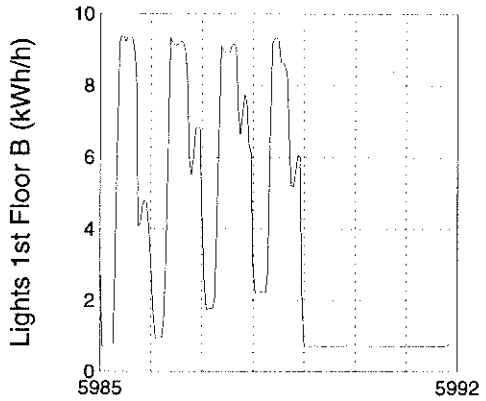
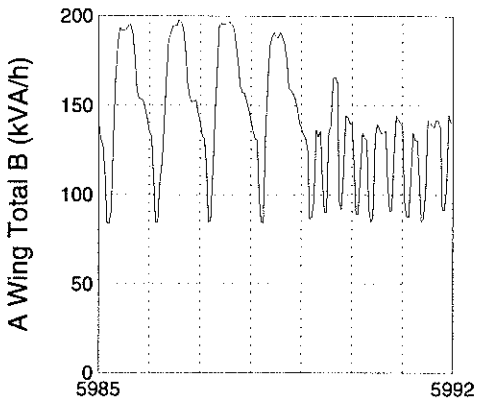
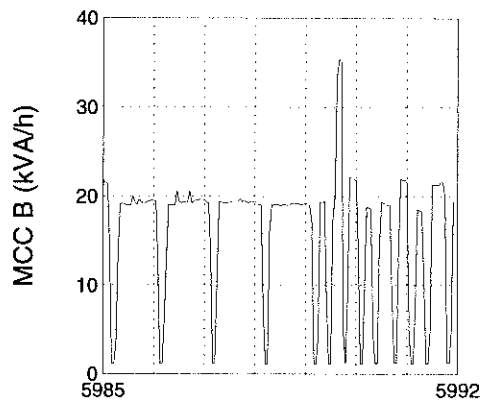
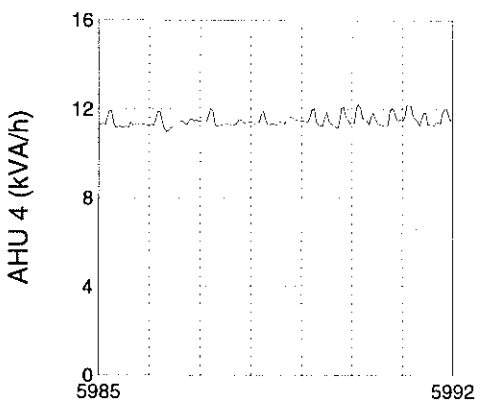
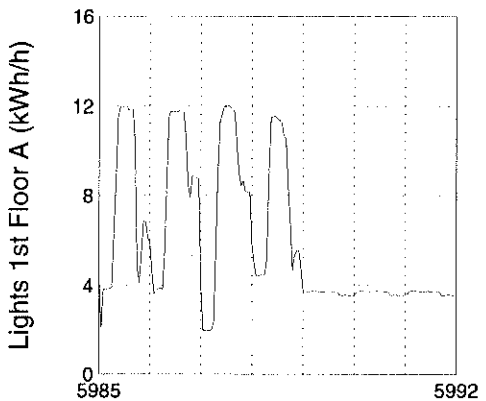
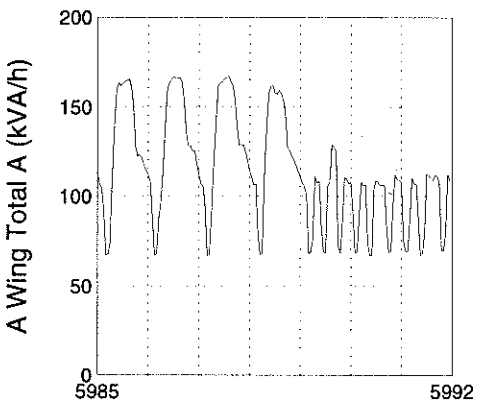

Lights 1st Floor B (kWh/h)
0
2
4
6
8
10
5985
5992
Site 922 Beginning 05-21-1996

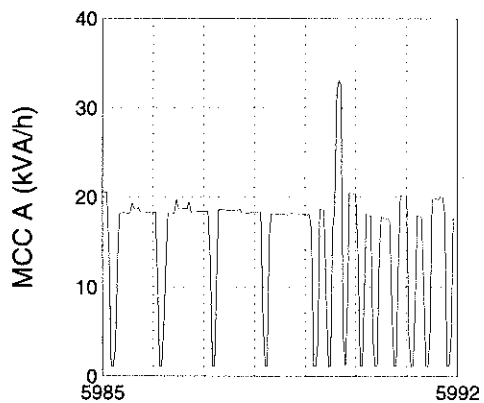

A Wing Total B (kVA/h)
0
50
100
150
200
5985
5992
Site 922 Beginning 05-21-1996

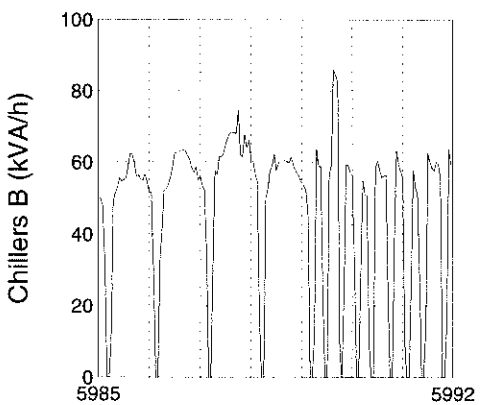

MCC B (kVA/h)
0
10
20
30
40
5985
5992
Site 922 Beginning 05-21-1996

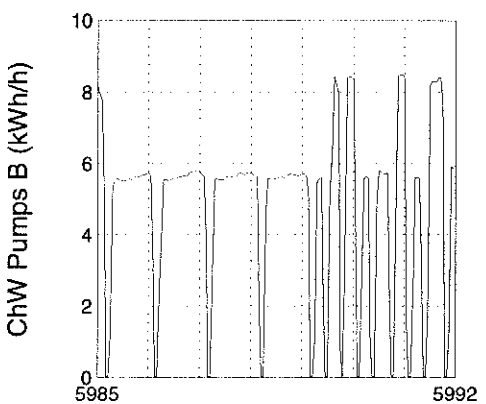

AHU 4 (kVA/h)
0
4
8
12
16
5985
5992
Site 922 Beginning 05-21-1996

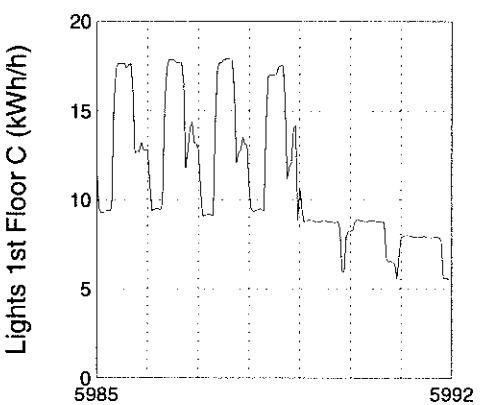

Lights 1st Floor A (kWh/h)
0
4
8
12
16
5985
5992
Site 922 Beginning 05-21-1996

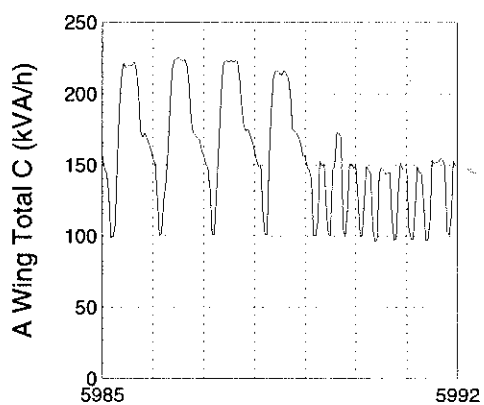

A Wing Total A (kVA/h)
0
50
100
150
200
5985
5992
Site 922 Beginning 05-21-1996

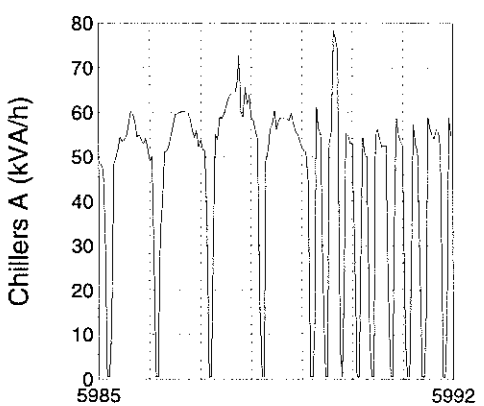

MCC A (kVA/h)
0
10
20
30
40
5985
5992
Site 922 Beginning 05-21-1996

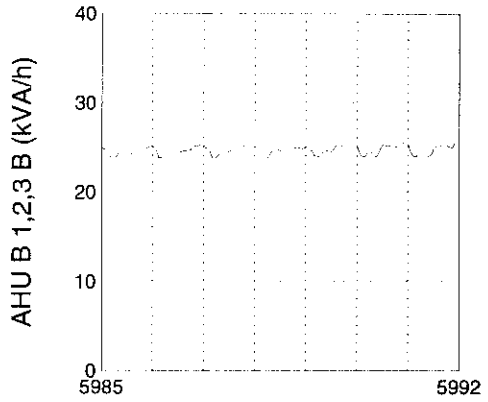

Chillers B (kVA/h)
0
20
40
60
80
100
5985
5992
Site 922 Beginning 05-21-1996


ChW Pumps B (kWh/h)
0
2
4
6
8
10
5985
5992
Site 922 Beginning 05-21-1996


Lights 1st Floor C (kWh/h)
0
5
10
15
20
5985
5992
Site 922 Beginning 05-21-1996


A Wing Total C (kVA/h)
0
50
100
150
200
250
5985
5992
Site 922 Beginning 05-21-1996


Chillers A (kVA/h)
0
10
20
30
40
50
60
70
80
5985
5992
Site 922 Beginning 05-21-1996



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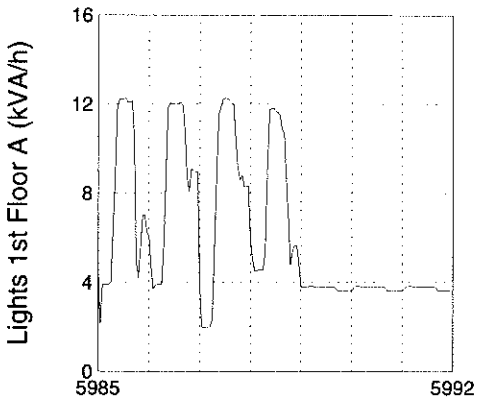

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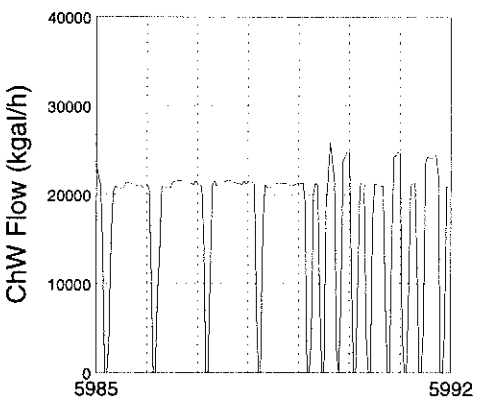

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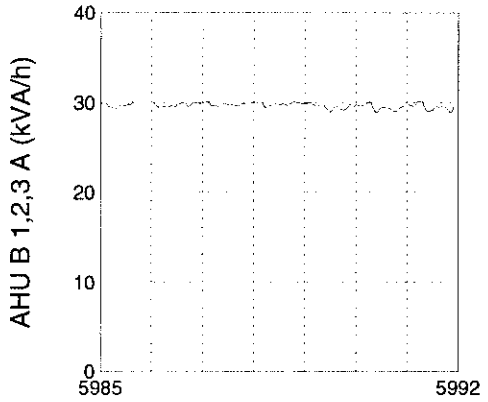

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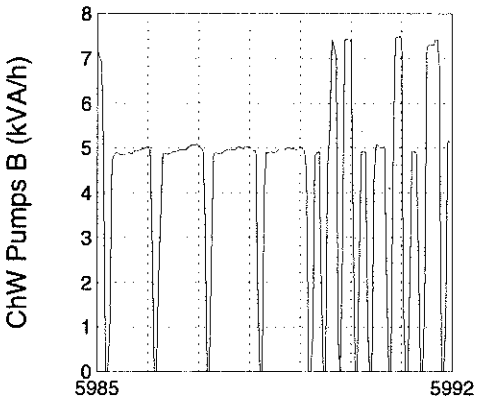

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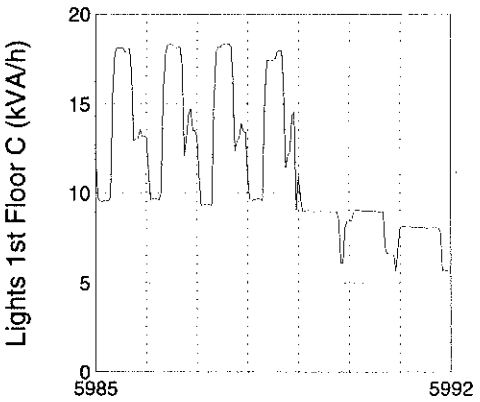

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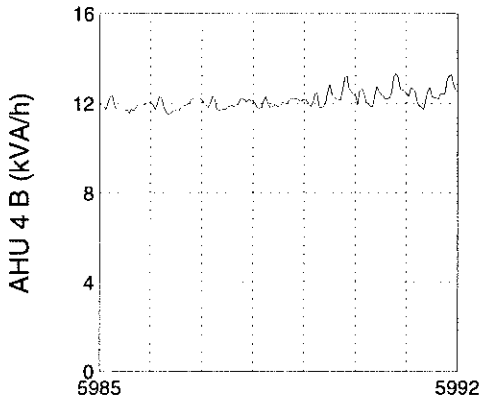

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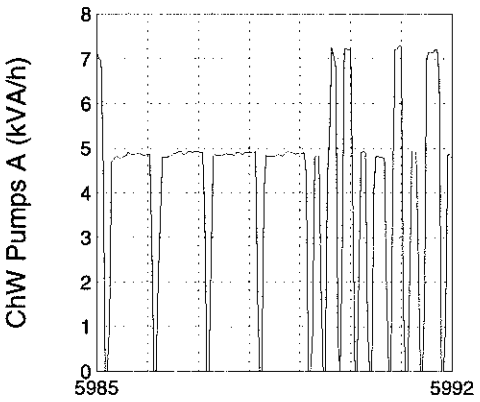

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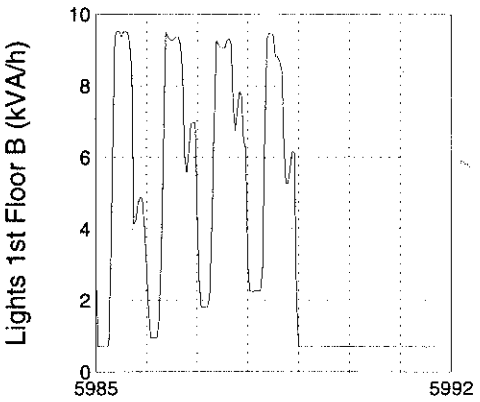

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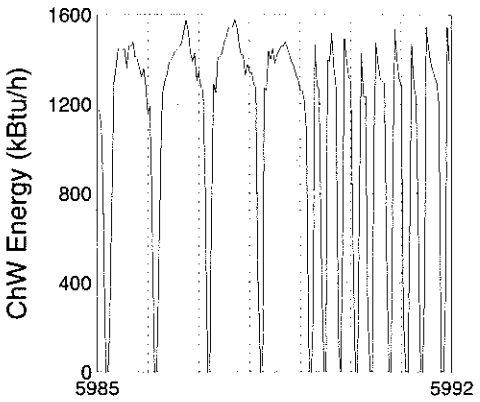

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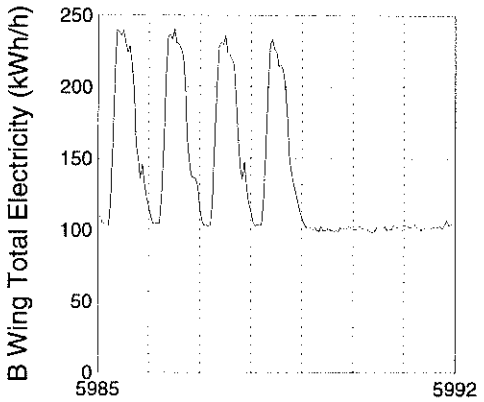
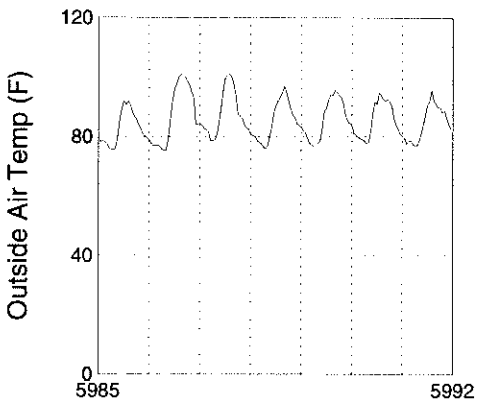
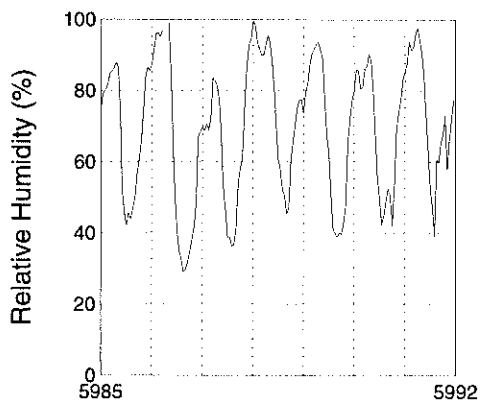


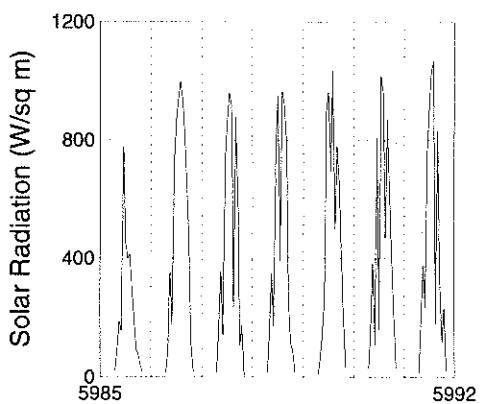
Site 923 Beginning 05-21-1996



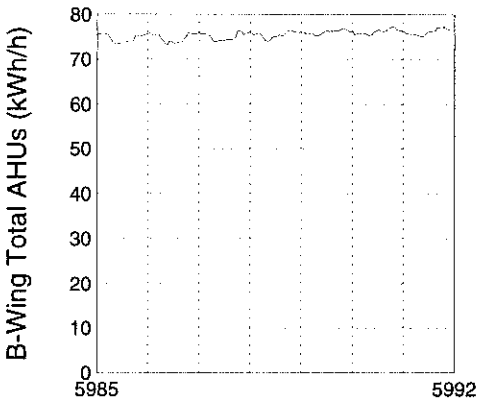
Site 923 Beginning 05-21-1996



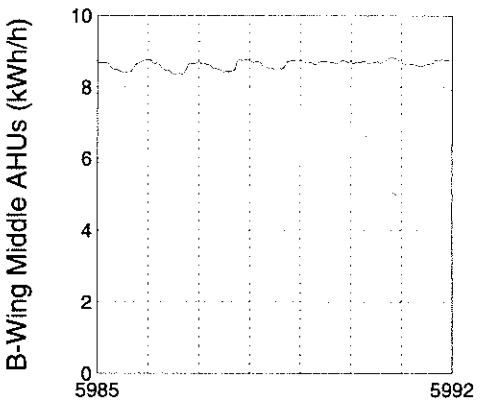
Site 923 Beginning 05-21-1996



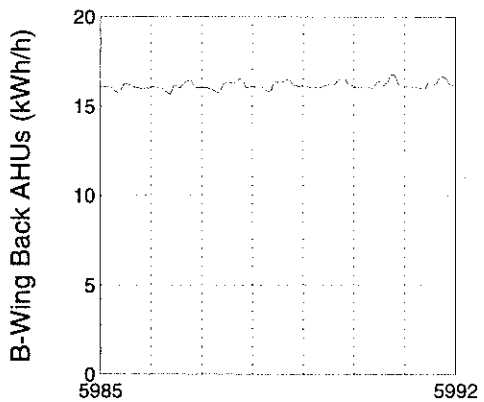
Site 923 Beginning 05-21-1996



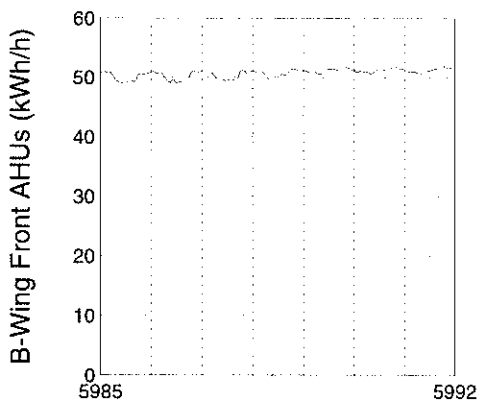
Site 923 Beginning 05-21-1996



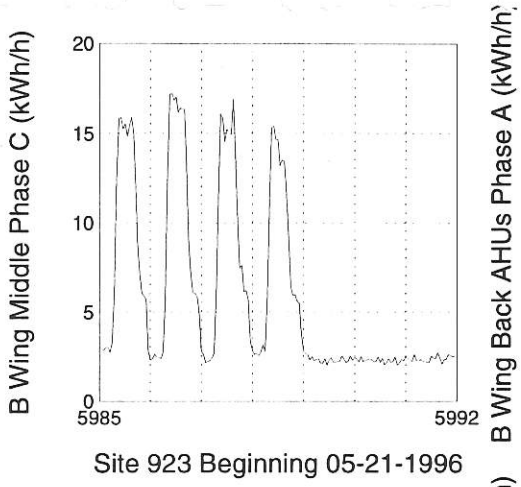
Site 923 Beginning 05-21-1996

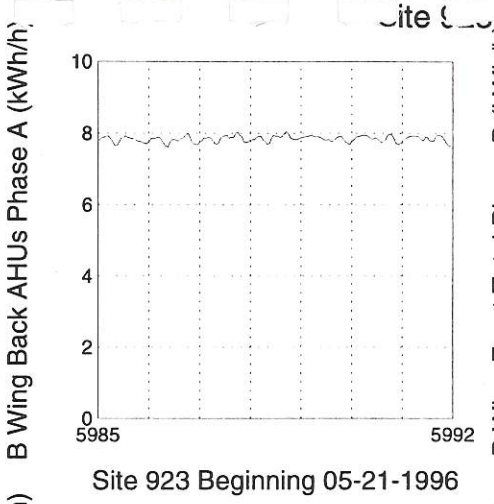


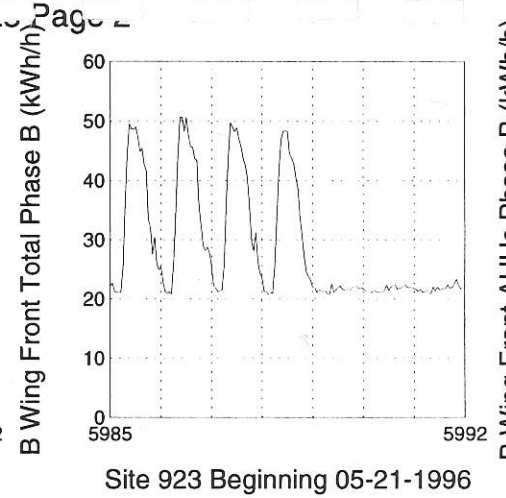
Site 923 Beginning 05-21-1996

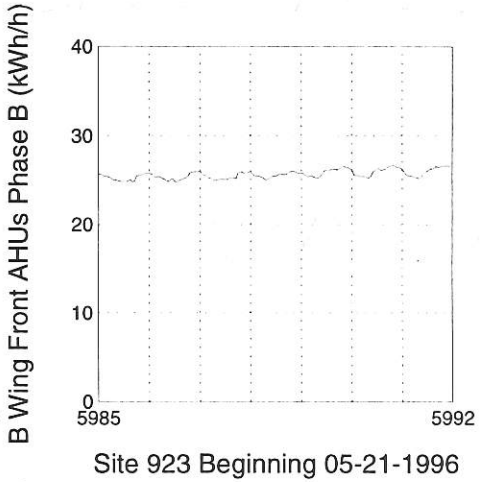


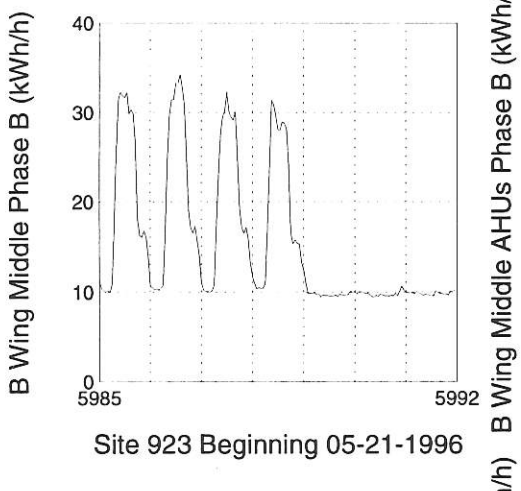
Site 923 Beginning 05-21-1996

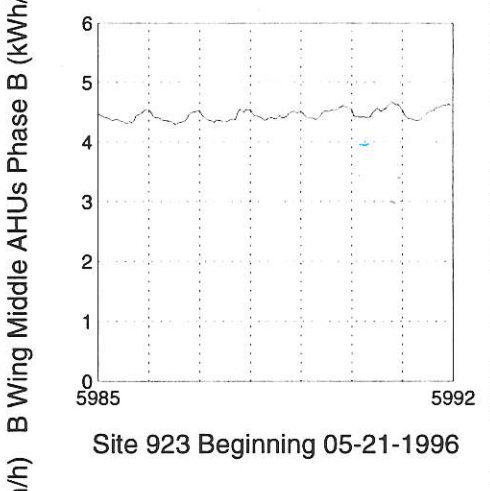

B Wing Middle Phase C (kWh/h)
20
15
10
5
0
5985
5992
Site 923 Beginning 05-21-1996

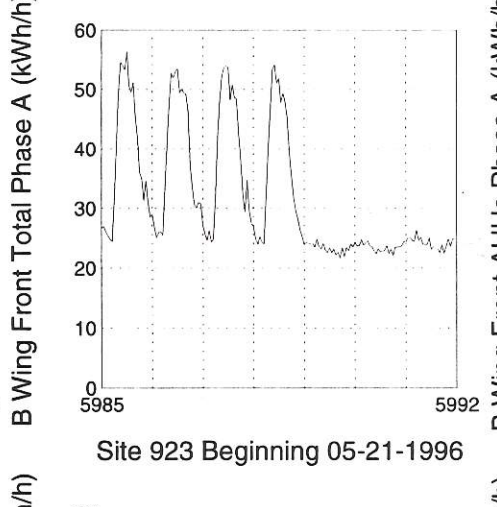

B Wing Back AHUs Phase A (kWh/h)
10
8
6
4
2
0
5985
5992
Site 923 Beginning 05-21-1996

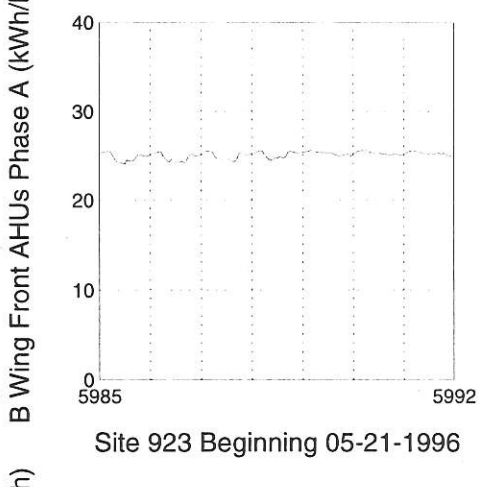

B Wing Front Total Phase B (kWh/h)
60
50
40
30
20
10
0
5985
5992
Site 923 Beginning 05-21-1996

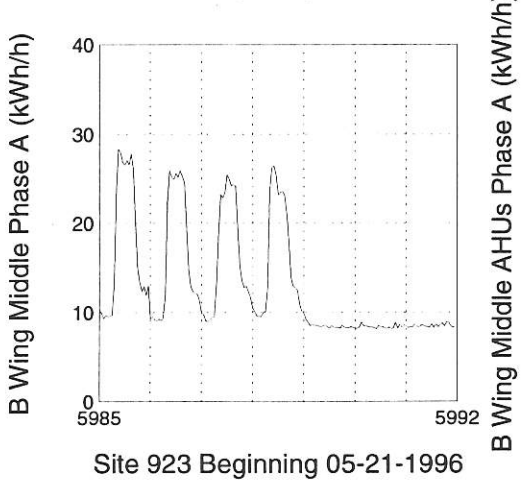

B Wing Front AHUs Phase B (kWh/h)
40
30
20
10
0
5985
5992
Site 923 Beginning 05-21-1996

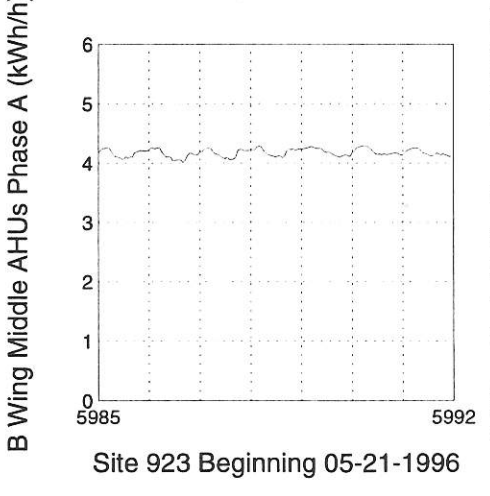

B Wing Middle Phase B (kWh/h)
40
30
20
10
0
5985
5992
Site 923 Beginning 05-21-1996

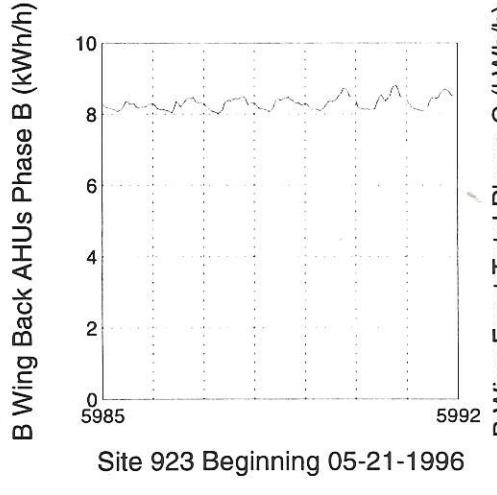

B Wing Middle AHUs Phase B (kWh/h)
6
5
4
3
2
1
0
5985
5992
Site 923 Beginning 05-21-1996

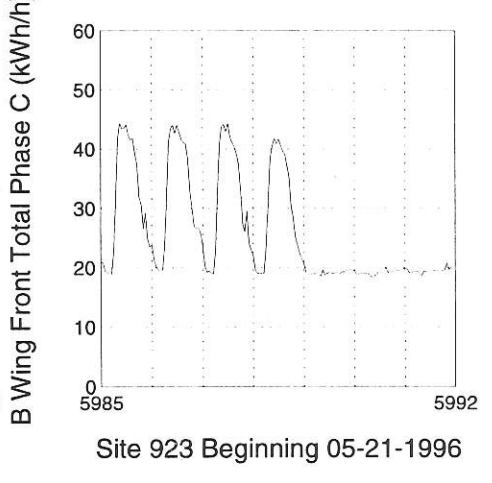

B Wing Front Total Phase A (kWh/h)
60
50
40
30
20
10
0
5985
5992
Site 923 Beginning 05-21-1996

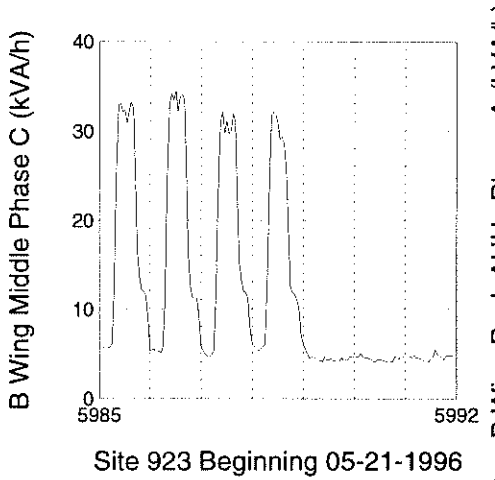

B Wing Front AHUs Phase A (kWh/h)
40
30
20
10
0
5985
5992
Site 923 Beginning 05-21-1996

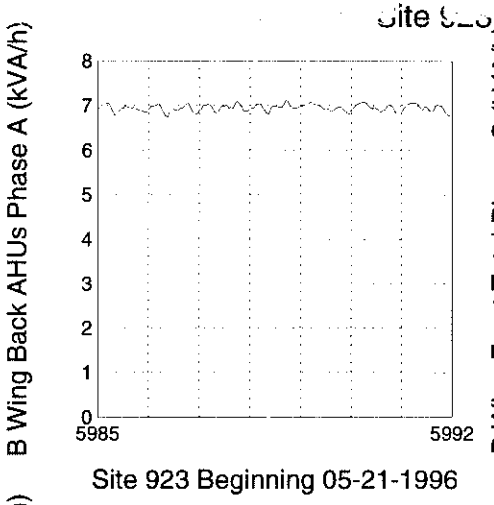

B Wing Middle Phase A (kWh/h)
40
30
20
10
0
5985
5992
Site 923 Beginning 05-21-1996

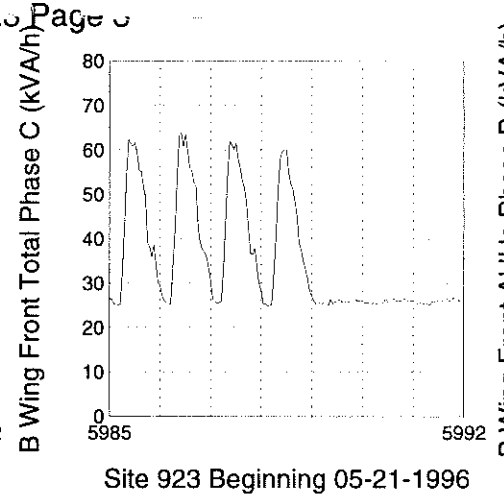

B Wing Middle AHUs Phase A (kWh/h)
6
5
4
3
2
1
0
5985
5992
Site 923 Beginning 05-21-1996

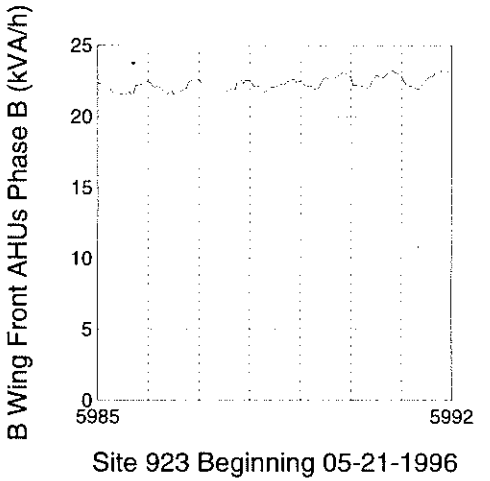

B Wing Back AHUs Phase B (kWh/h)
10
8
6
4
2
0
5985
5992
Site 923 Beginning 05-21-1996

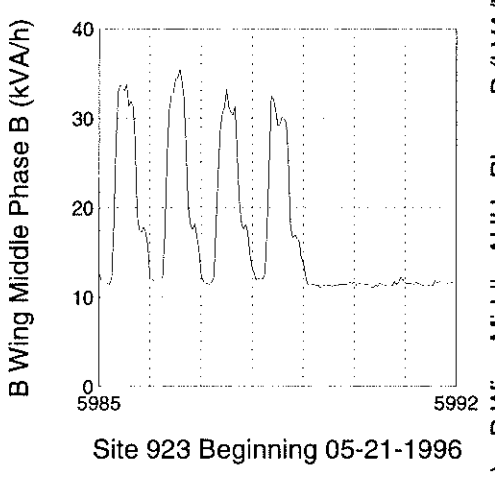

B Wing Front Total Phase C (kWh/h)
60
50
40
30
20
10
0
5985
5992
Site 923 Beginning 05-21-1996

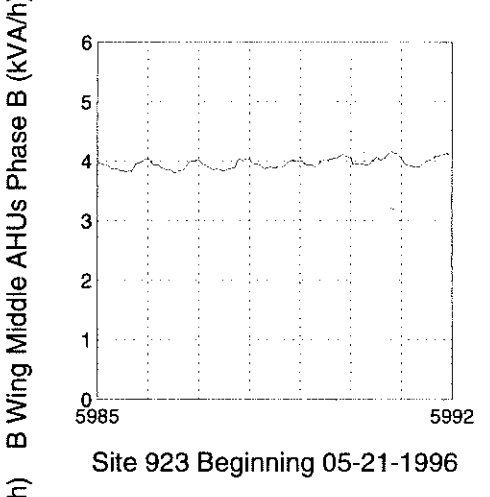

B Wing Middle Phase C (kVA/h)
0
10
20
30
40
5985
5992
Site 923 Beginning 05-21-1996

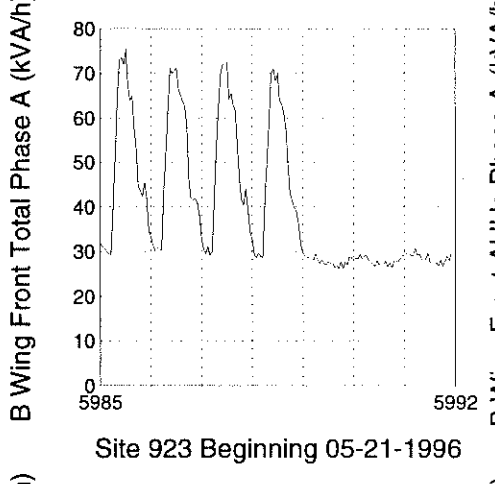

B Wing Back AHUs Phase A (kVA/h)
0
1
2
3
4
5
6
7
8
5985
5992
Site 923 Beginning 05-21-1996

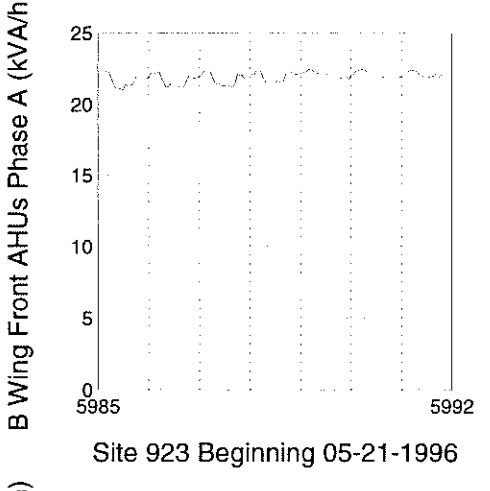

B Wing Front Total Phase C (kVA/h)
0
10
20
30
40
50
60
70
80
5985
5992
Site 923 Beginning 05-21-1996

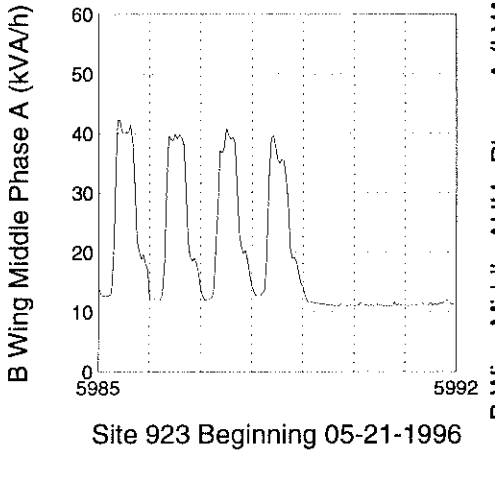

B Wing Front AHUs Phase B (kVA/h)
0
5
10
15
20
25
5985
5992
Site 923 Beginning 05-21-1996

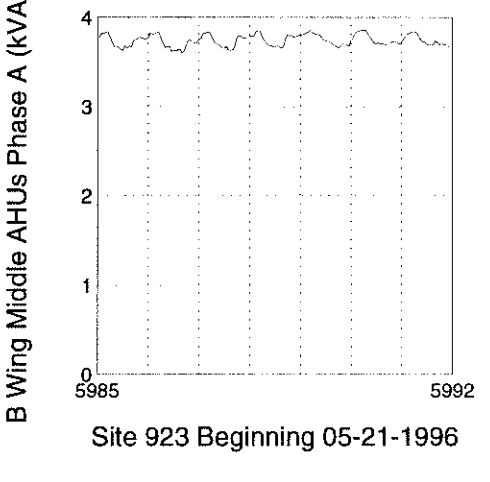

B Wing Middle Phase B (kVA/h)
0
10
20
30
40
5985
5992
Site 923 Beginning 05-21-1996

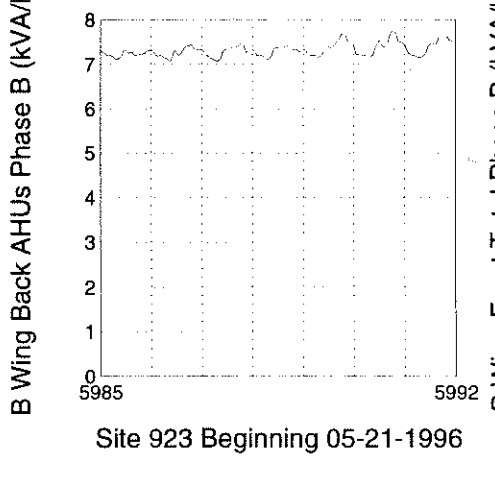

B Wing Middle AHUs Phase B (kVA/h)
0
1
2
3
4
5
6
5985
5992
Site 923 Beginning 05-21-1996

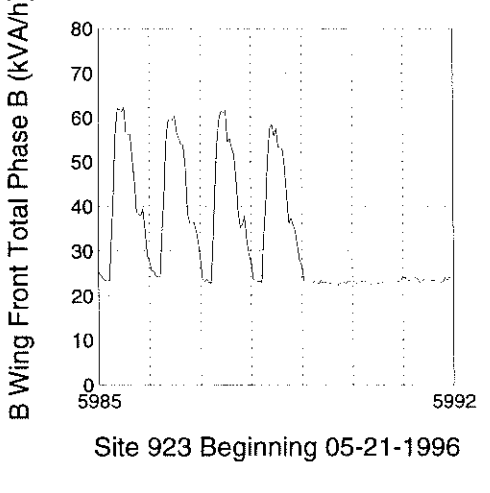

B Wing Front Total Phase A (kVA/h)
0
10
20
30
40
50
60
70
80
5985
5992
Site 923 Beginning 05-21-1996

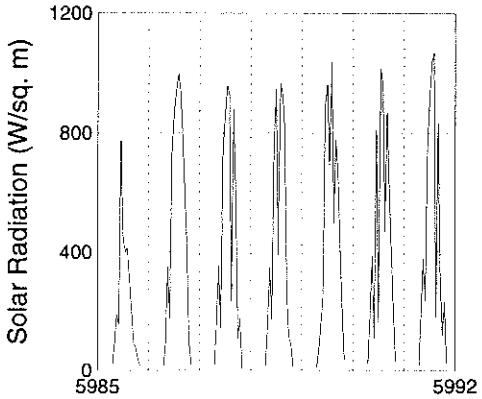

B Wing Front AHUs Phase A (kVA/h)
0
5
10
15
20
25
5985
5992
Site 923 Beginning 05-21-1996


B Wing Middle Phase A (kVA/h)
0
10
20
30
40
50
60
5985
5992
Site 923 Beginning 05-21-1996


B Wing Middle AHUs Phase A (kVA/h)
0
1
2
3
4
5985
5992
Site 923 Beginning 05-21-1996


B Wing Back AHUs Phase B (kVA/h)
0
1
2
3
4
5
6
7
8
5985
5992
Site 923 Beginning 05-21-1996


B Wing Front Total Phase B (kVA/h)
0
10
20
30
40
50
60
70
80
5985
5992
Site 923 Beginning 05-21-1996



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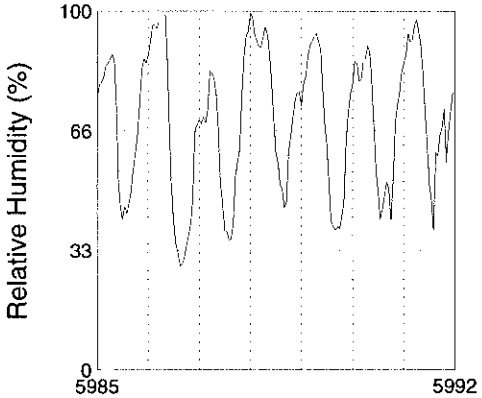

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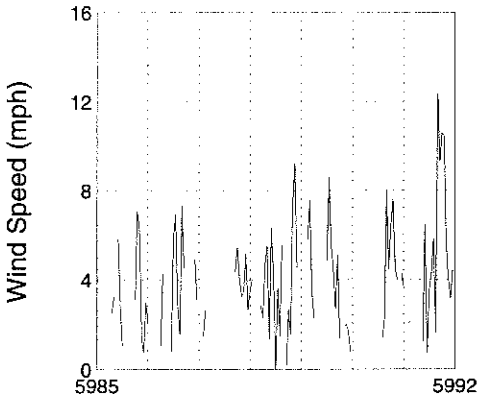

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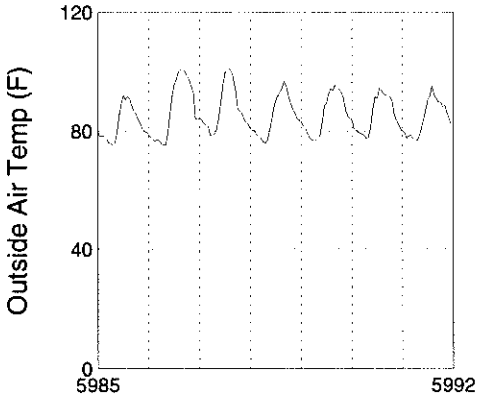

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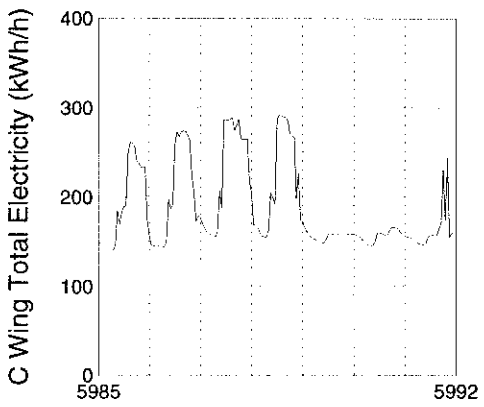

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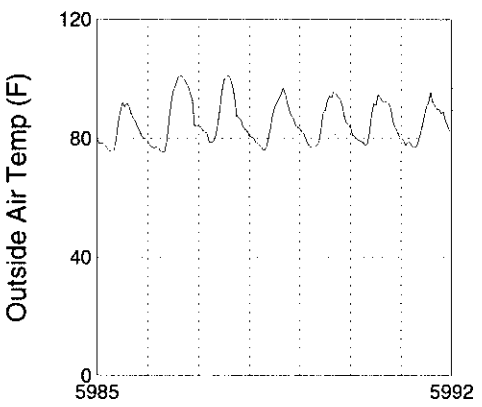

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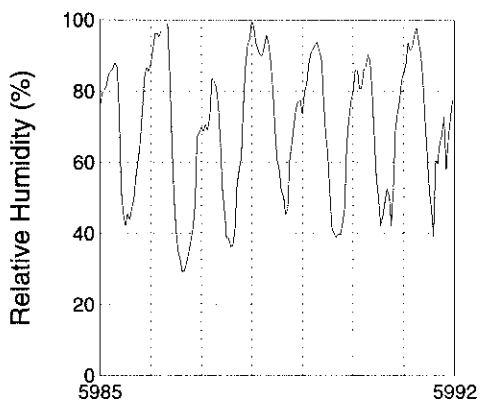

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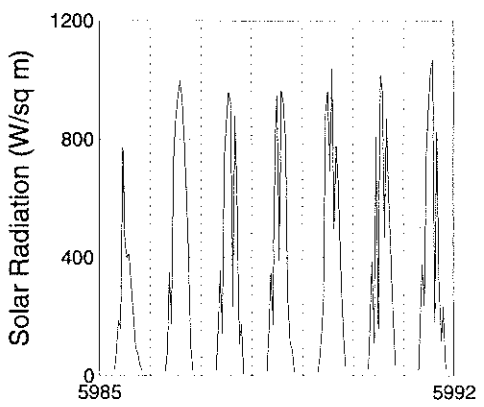

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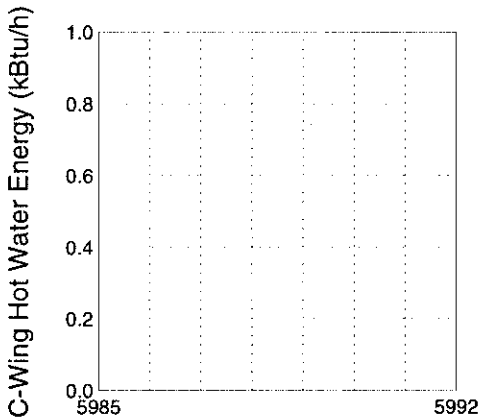

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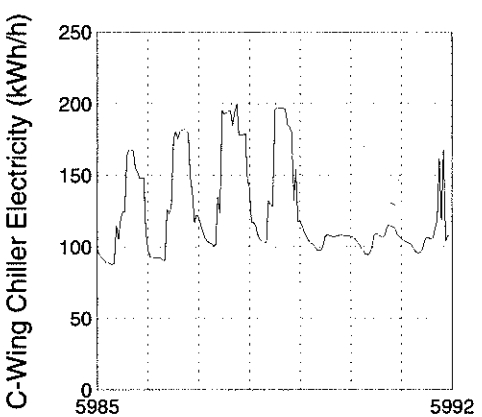

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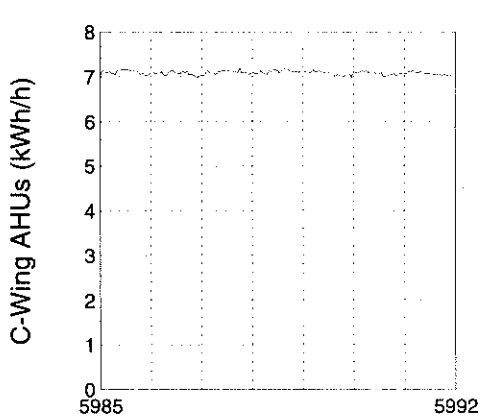

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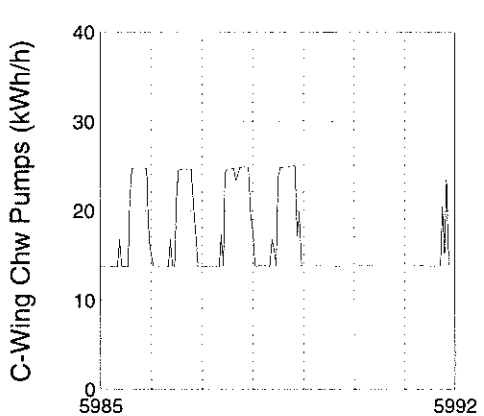

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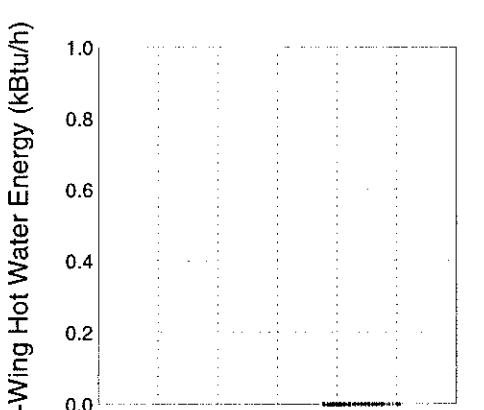
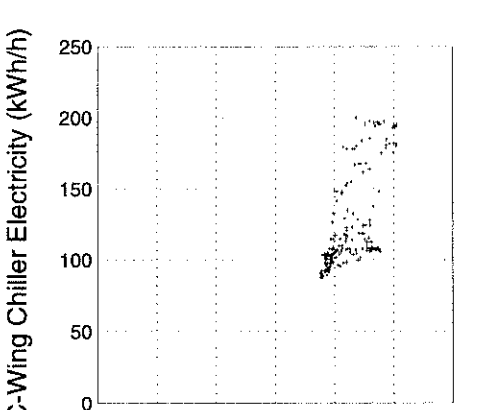
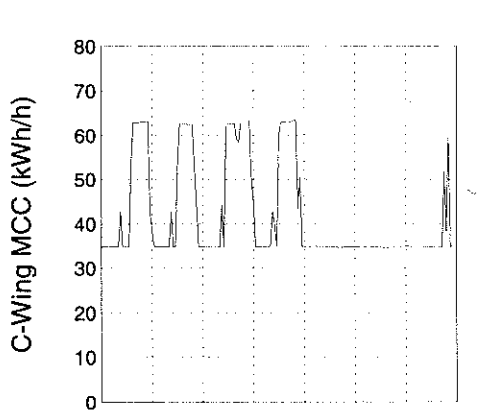


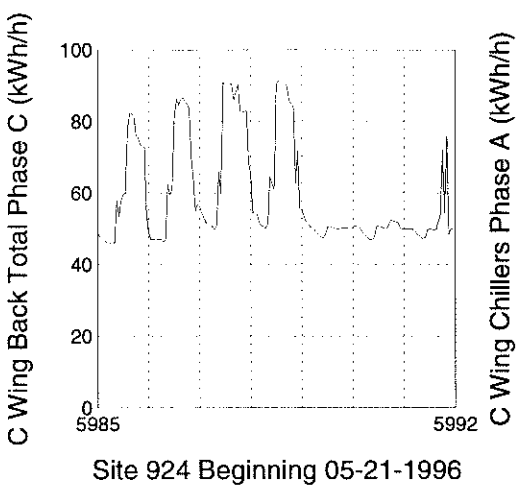
Outside Air Temp (F)

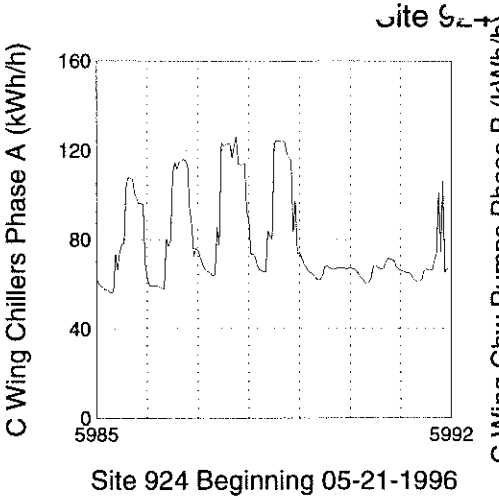


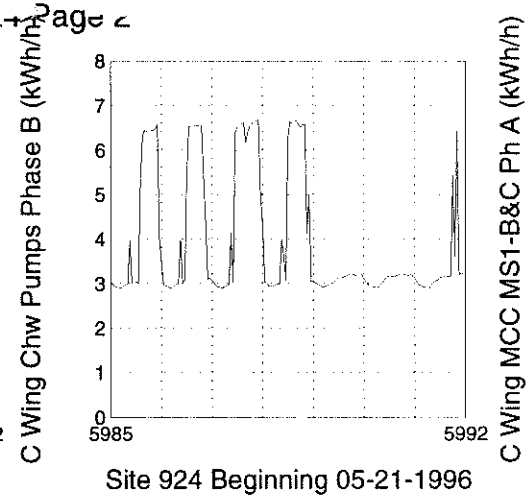
Outside Air Temp (F)

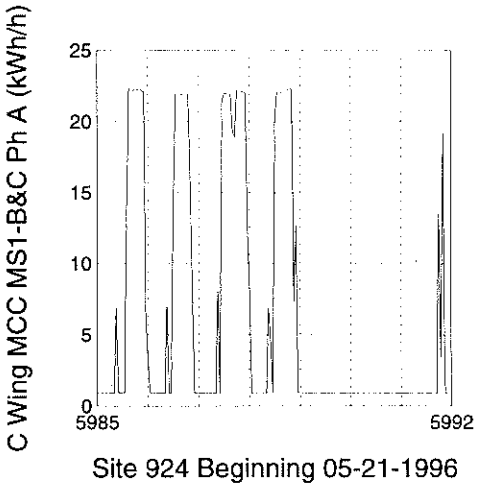


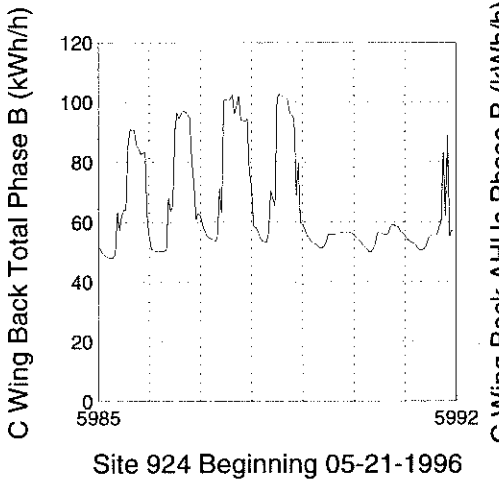
Site 924 Beginning 05-21-1996

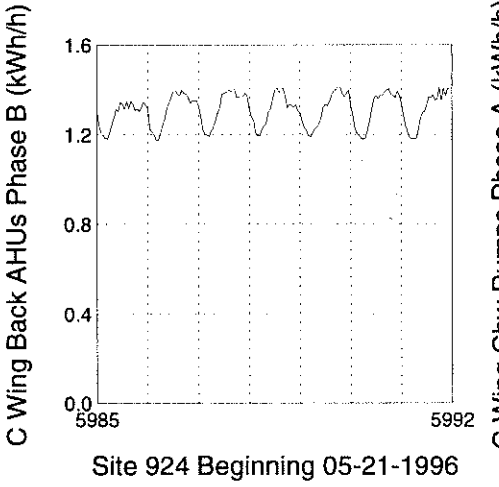

C Wing Back Total Phase C (kWh/h)
100
80
60
40
20
0
5985
5992
Site 924 Beginning 05-21-1996

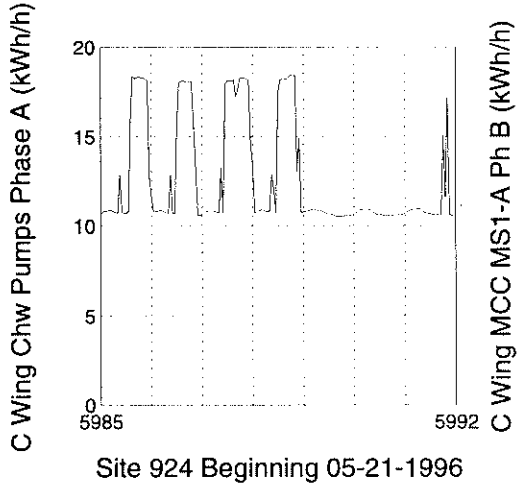

C Wing Chillers Phase A (kWh/h)
160
120
80
40
0
5985
5992
Site 924 Beginning 05-21-1996

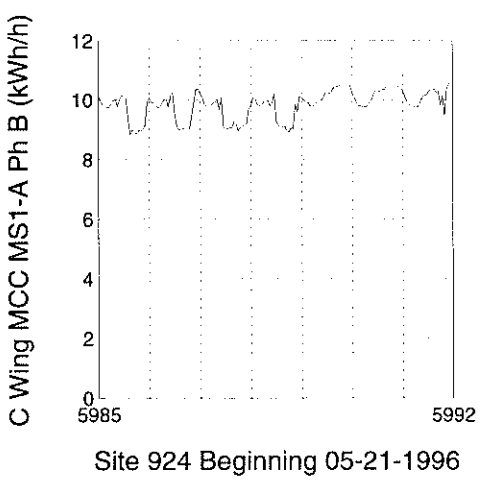

C Wing Chw Pumps Phase B (kWh/h)
8
7
6
5
4
3
2
1
0
5985
5992
Site 924 Beginning 05-21-1996

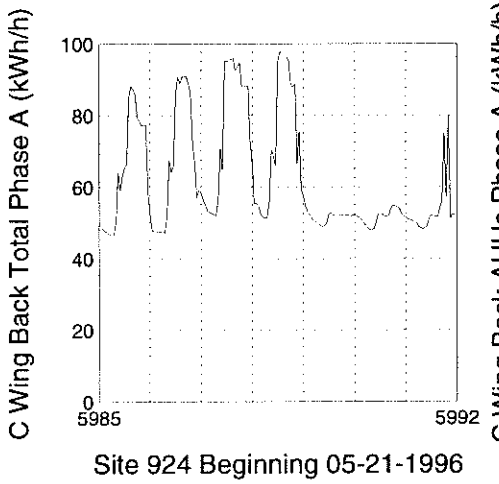

C Wing MCC MS1-B&C Ph A (kWh/h)
25
20
15
10
5
0
5985
5992
Site 924 Beginning 05-21-1996

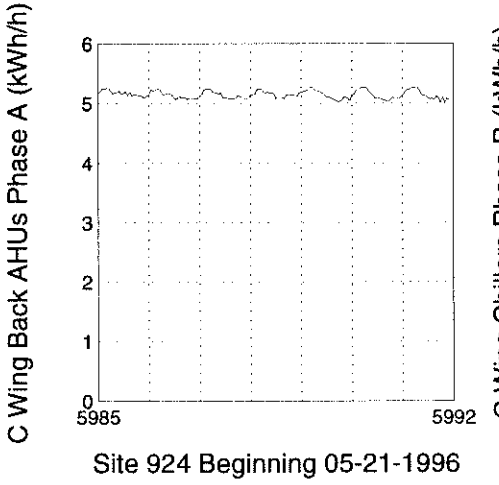

C Wing Back Total Phase B (kWh/h)
120
100
80
60
40
20
0
5985
5992
Site 924 Beginning 05-21-1996

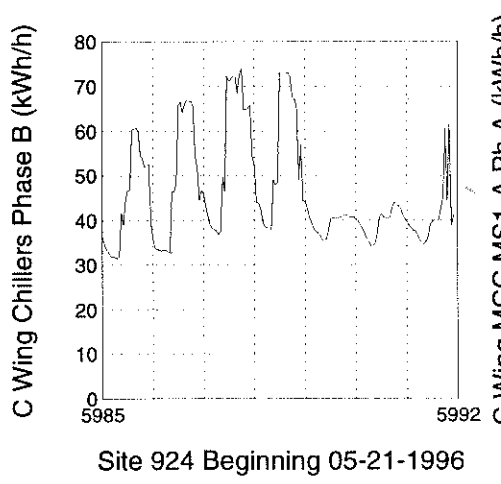

C Wing Back AHUs Phase B (kWh/h)
1.6
1.2
0.8
0.4
0.0
5985
5992
Site 924 Beginning 05-21-1996

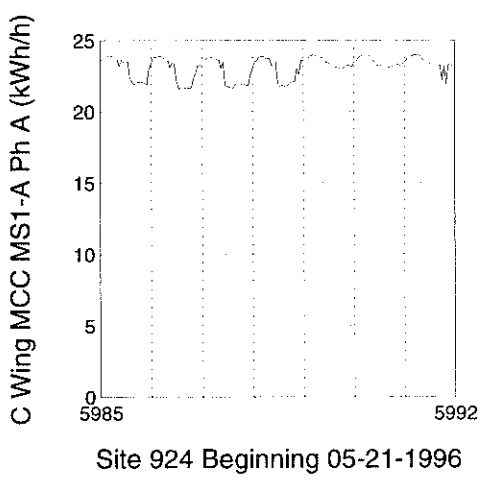

C Wing Chw Pumps Phase A (kWh/h)
20
15
10
5
0
5985
5992
Site 924 Beginning 05-21-1996

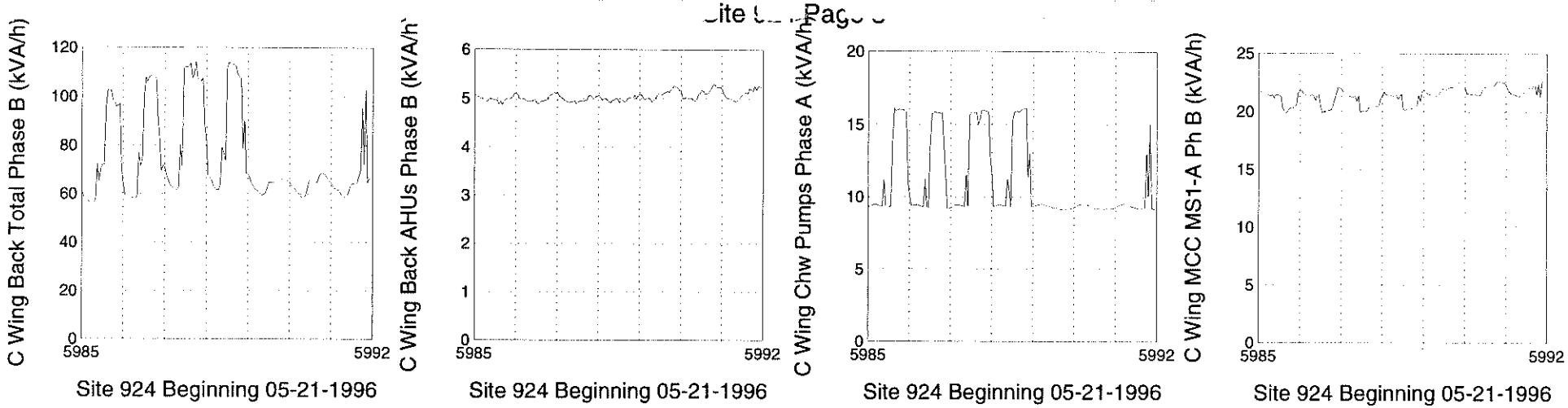

C Wing MCC MS1-A Ph B (kWh/h)
12
10
8
6
4
2
0
5985
5992
Site 924 Beginning 05-21-1996

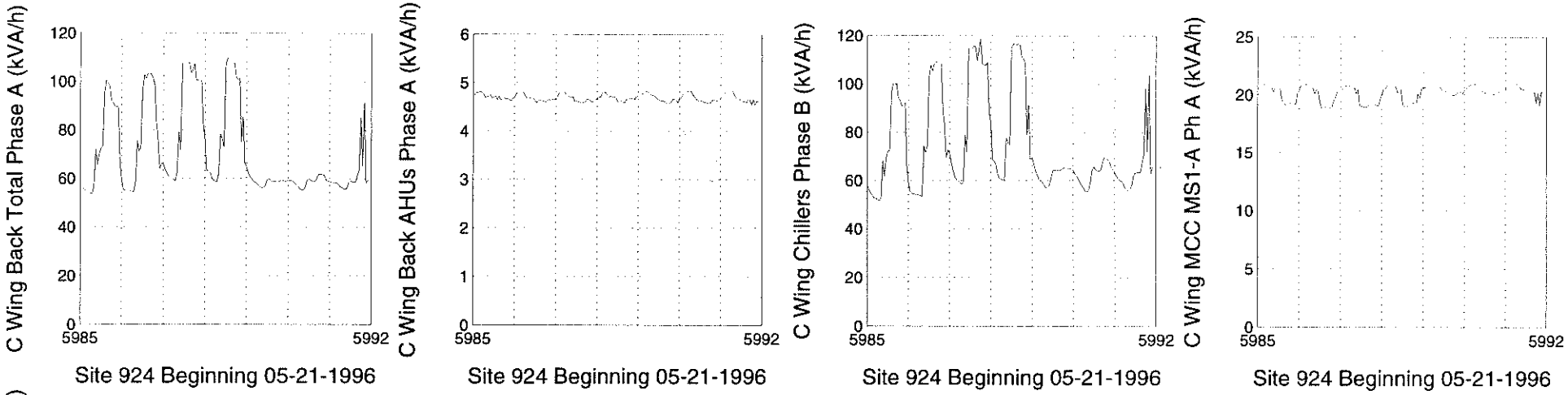

C Wing Back Total Phase A (kWh/h)
100
80
60
40
20
0
5985
5992
Site 924 Beginning 05-21-1996

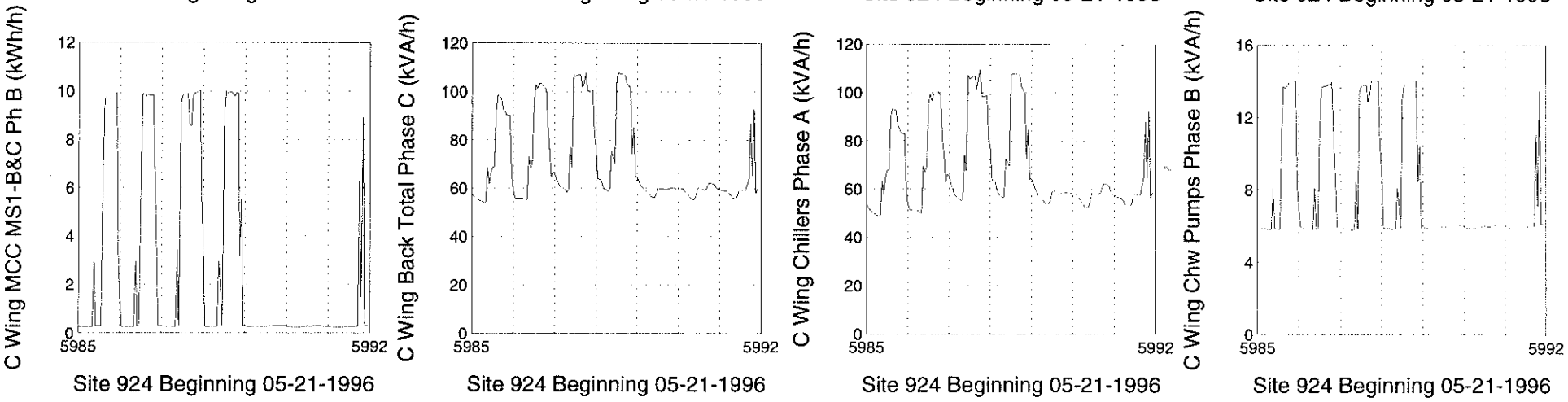

C Wing Back AHUs Phase A (kWh/h)
6
5
4
3
2
1
0
5985
5992
Site 924 Beginning 05-21-1996

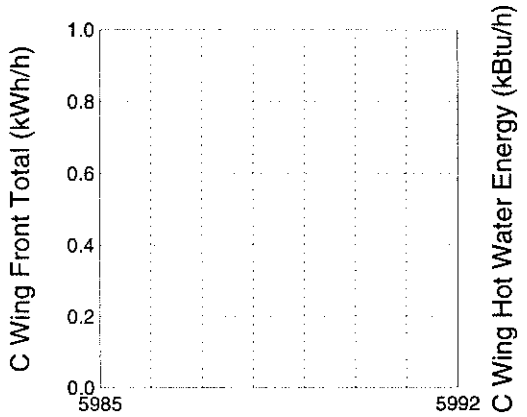

C Wing Chillers Phase B (kWh/h)
80
70
60
50
40
30
20
10
0
5985
5992
Site 924 Beginning 05-21-1996


C Wing MCC MS1-A Ph A (kWh/h)
25
20
15
10
5
0
5985
5992
Site 924 Beginning 05-21-1996


C Wing Back Total Phase B (kVA/h)
C Wing Back AHUs Phase B (kVA/h)
C Wing Chw Pumps Phase A (kVA/h)
C Wing MCC MS1-A Ph B (kVA/h)
5985
5992
Site 924 Beginning 05-21-1996


C Wing Back Total Phase A (kVA/h)
C Wing Back AHUs Phase A (kVA/h)
C Wing Chillers Phase B (kVA/h)
C Wing MCC MS1-A Ph A (kVA/h)
5985
5992
Site 924 Beginning 05-21-1996


C Wing MCC MS1-B&C Ph B (kWh/h)
C Wing Back Total Phase C (kVA/h)
C Wing Chillers Phase A (kVA/h)
C Wing Chw Pumps Phase B (kVA/h)
5985
5992
Site 924 Beginning 05-21-1996



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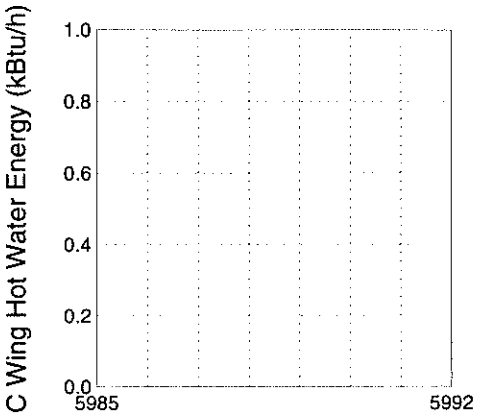
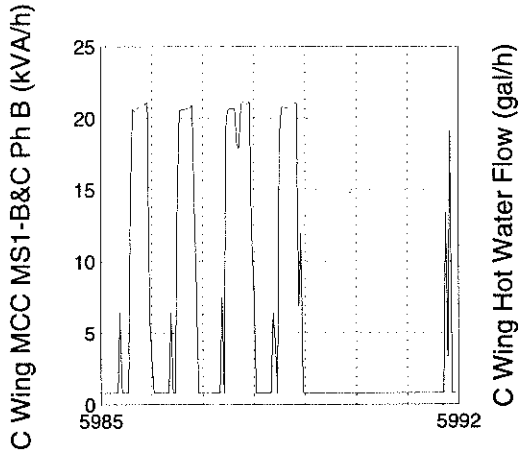
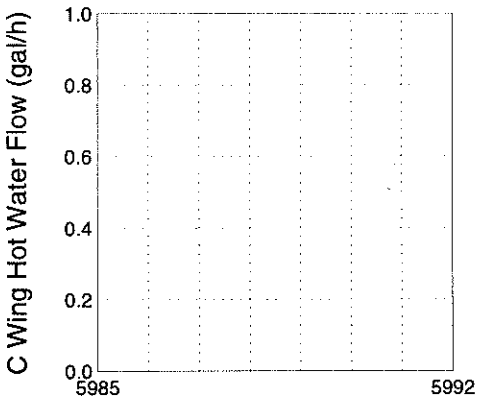


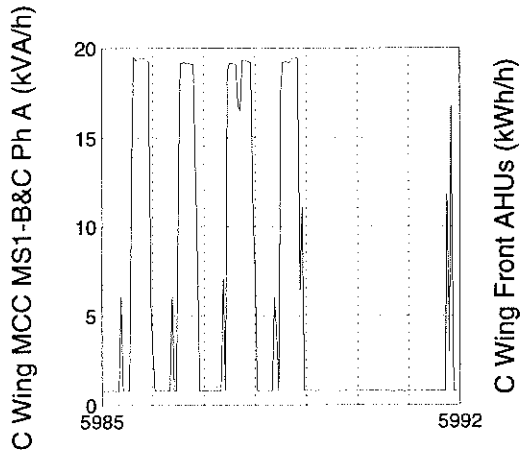
Site 924 Beginning 05-21-1996



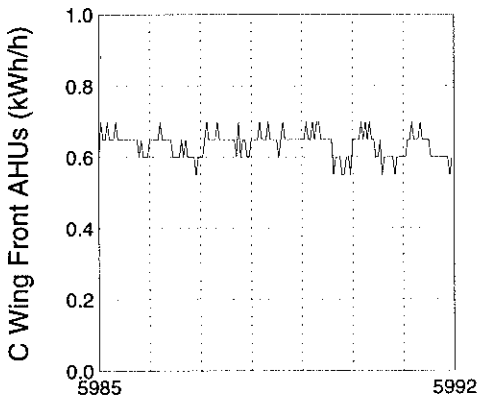
Site 924 Beginning 05-21-1996



Site 924 Beginning 05-21-1996



Site 924 Beginning 05-21-1996



Site 924 Beginning 05-21-1996

APPENDIX D

Data Points Monitored by Facility EMCS

PASSWORD CLEARANCE GRANTED
H,LOG,,,,HCI

FOR : OLM 06:23 29 FEB 1996 FROM : SC1
REQUESTED BY : OLM 06:24 29 FEB 1996 FROM : SC1

HVAC - FIELD DATA POINTS PGM DAY 5 THU 29 FEB 1996 06:24 PAGE : 0001

FOR: KIRK MAN BUILDING B1 1ST FL B SOU

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	71.9	DEG	CSP	COOLING SP	60.0	DEG
HOT	DECK TEMP	72.3	DEG	HSP	HEATING SP	90.0	DEG
MIX	AIR TEMP	73.3	DEG	MSP	MIXED AIR SP	90.0	DEG
T1	ROOM B138	74.0	DEG	1SP	ROOM B138 SP	74.0	DEG
T2	HALL WEST	68.6	DEG	2SP	HALL WEST SP	76.0	DEG
T3	ROOM B143	72.4	DEG	3SP	ROOM B143 SP	72.0	DEG
T4	ROOM B139	75.5	DEG	4SP	ROOM B139 SP	74.0	DEG
T5	ROOM B133	73.9	DEG	5SP	ROOM B133 SP	74.0	DEG
T6	ROOM B131	74.5	DEG	6SP	ROOM B131 SP	74.0	DEG
T7	ROOM B125	75.2	DEG	7SP	ROOM B125 SP	74.0	DEG

FOR: KIRK MAN BUILDING B2 2ND FL B SOU

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	73.1	DEG	CSP	COOLING SP	55.0	DEG
HOT	DECK TEMP	77.6	DEG	HSP	HEATING SP	70.0	DEG
MIX	AIR TEMP	72.9	DEG	MSP	MIXED AIR SP	65.0	DEG
T1	ROOM B238A	74.8	DEG	1SP	ROOM B235 SP	76.0	DEG
T2	WEST HALLWAY	71.5	DEG	2SP	WEST HALL SP	74.0	DEG
T3	ROOM B241	74.0	DEG	3SP	ROOM B241 SP	74.0	DEG
T4	ROOM B239	73.3	DEG	4SP	ROOM B239 SP	76.0	DEG
T5	ROOM B231	70.6	DEG	5SP	ROOM B231 SP	74.0	DEG
T6	EAST HALLWAY	73.1	DEG	6SP	EAST HALL SP	74.0	DEG

FOR: KIRK MAN BUILDING B3 3RD FL B SOU

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	70.0	DEG	CSP	COOLING SP	55.0	DEG
HOT	DECK TEMP	72.3	DEG	HSP	HEATING SP	75.0	DEG
MIX	AIR TEMP	67.7	DEG	MSP	MIXED AIR SP	90.0	DEG
T1	ROOM B338	69.4	DEG	1SP	RM 1 SET PT	75.0	DEG
T2	WEST HALLWAY	69.6	DEG	2SP	RM 2 SET PT	74.0	DEG
T3	ROOM B341	70.9	DEG	3SP	RM 3 SET PT	74.0	DEG
T4	ROOM B337	74.7	DEG	4SP	RM 4 SET PT	75.0	DEG
T5	ROOM B333	69.3	DEG	5SP	RM 5 SET PT	70.0	DEG
T6	ROOM B333A	68.7	DEG	6SP	ROOM B333A S	70.0	DEG
T7	EAST HALLWAY	83.0	DEG	7SP	EAST HALL SP	74.0	DEG

FOR: KIRK MAN BUILDING B4 4TH FL B SOU

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	70.9	DEG	CSP	COOLING SP	55.0	DEG
HOT	DECK TEMP	70.3	DEG	HSP	HEATING SP	75.0	DEG
MIX	AIR TEMP	70.7	DEG	MSP	MIXED AIR SP	90.0	DEG
T1	ROOM B438	72.2	DEG	1SP	RM 1 SET PT	71.0	DEG
T2	WEST HALLWAY	70.6	DEG	2SP	RM 2 SET PT	74.0	DEG
T3	ROOM B443C	70.8	DEG	3SP	RM 3 SET PT	74.0	DEG
T4	ROOM B441	72.2	DEG	4SP	RM 4 SET PT	74.0	DEG
T5	ROOM B439A	72.1	DEG	5SP	RM 5 SET PT	72.0	DEG
T6	ROOM B435	71.6	DEG	6SP	RM 6 SET PT	74.0	DEG

T9	ROOM B430	71.7	DEG	9SP	RM 9 SET PT	74.0	DEG

FOR: KIRK MAN BUILDING B5 1ST FL B CEN

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	

COL	DECK TEMP	64.1	DEG	CSP	COOLING SP	65.0	DEG
HOT	DECK TEMP	64.8	DEG	HSP	HEATING SP	95.0	DEG
MIX	AIR TEMP	71.5	DEG	MSP	MIXED AIR SP	90.0	DEG
T1	ROOM B101	72.2	DEG	1SP	RM B101 SP	80.0	DEG
T2	ROOM B136	70.2	DEG	2SP	RM B136 SP	74.0	DEG
T3	ROOM B114	71.2	DEG	3SP	ROOM B114	80.0	DEG
T4	ROOM B115	70.8	DEG	4SP	ROOM B115 SP	72.0	DEG

FOR: KIRK MAN BUILDING B6 2ND FL B CEN

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	65.0	DEG	CSP	COOLING SP	55.0	DEG
HOT	DECK TEMP	71.3	DEG	HSP	HEATING SP	90.0	DEG
MIX	AIR TEMP	70.6	DEG	MSP	MIXED AIR SP	90.0	DEG
T1	ROOM B255	73.4	DEG	1SP	RM B255 SP	74.0	DEG
T2	ROOM B251	70.5	DEG	2SP	RM B251 SP	74.0	DEG
T3	ROOM B214A	70.6	DEG	3SP	RM B214A SP	74.0	DEG
T4	ROOM B211	67.1	DEG	4SP	RM B211 SP	74.0	DEG

FOR: KIRK MAN BUILDING B7 3RD FL B CEN

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	69.7	DEG	CSP	COOLING SP	55.0	DEG
HOT	DECK TEMP	70.3	DEG	HSP	HEATING SP	90.0	DEG
T1	ROOM B357	70.1	DEG	1SP	RM B357 SP	70.0	DEG
T2	ROOM B355	70.4	DEG	2SP	RM B355 SP	74.0	DEG
T3	ROOM B310	69.1	DEG	3SP	RM B310 SP	60.0	DEG
T4	ROOM B315	69.8	DEG	4SP	RM B315 SP	78.0	DEG
T5	ROOM B309	74.0	DEG	5SP	RM B309 SP	74.0	DEG
RET	AIR TEMP	70.2	DEG				

FOR: KIRK MAN BUILDING B8 4TH FL B CEN

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	75.8	DEG	CSP	COOLING SP	65.0	DEG
HOT	DECK TEMP	72.3	DEG	HSP	HEATING SP	100.0	DEG
T1	ROOM B409	74.0	DEG	1SP	RM B409 SP	74.0	DEG
T2	ROOM B419	76.2	DEG	2SP	RM B419 SP	75.0	DEG
T3	ROOM B410	74.4	DEG	3SP	RM B410 SP	75.0	DEG
T4	ROOM B455	74.1	DEG	4SP	RM B455 SP	74.0	DEG
T5	ROOM B457	74.1	DEG	5SP	RM B457 SP	74.0	DEG
RET	AIR TEMP	70.4	DEG				

FOR: KIRK MAN BUILDING B9 1ST FL B NW

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	64.2	DEG	CSP	COOLING SP	55.0	DEG
HOT	DECK TEMP	71.1	DEG	HSP	HEATING SP	75.0	DEG
T1	ROOM B801	70.1	DEG	1SP	RM B801 SP	78.0	DEG
T2	ROOM B156	70.8	DEG	2SP	RM B156 SP	78.0	DEG
T5	ROOM B160	69.8	DEG	5SP	RM B160 SP	73.0	DEG
RET	AIR TEMP	70.0	DEG				

FOR: KIRK MAN BUILDING B10 2ND FL B NW

I FAN	START STOP	ON	MC	* FIL	FILTER COND	DTY	
COL	DECK TEMP	73.0	DEG	CSP	COOLING SP	55.0	DEG
HOT	DECK TEMP	75.6	DEG	HSP	HEATING SP	80.0	DEG

FOR: KIRK MAN BUILDING B11 3RD FL B NW

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	72.5	DEG	CSP	COOLING SP	60.0	DEG
HOT	DECK TEMP	69.4	DEG	HSP	HEATING SP	80.0	DEG
MIX	AIR TEMP	70.4	DEG	MXP	MIXED AIR SP	90.0	DEG
T1	ROOM B367	69.7	DEG	1SP	RM B367 SP	74.0	DEG
T2	ROOM B372	72.4	DEG	2SP	RM B372 SP	74.0	DEG

FOR: KIRK MAN BUILDING B12 4TH FL B NW

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	74.0	DEG	CSP	COOLING SP	65.0	DEG
HOT	DECK TEMP	70.5	DEG	HSP	HEATING SP	80.0	DEG
MIX	AIR TEMP	71.5	DEG	MSP	MIXED AIR SP	90.0	DEG
T1	ROOM B465B	73.5	DEG	1SP	RM B465B SP	76.0	DEG
T2	ROOM B475A	85.9	DEG	2SP	RM B475A SP	76.0	DEG
T3	ROOM B466	70.1	DEG	3SP	RM B466 SP	80.0	DEG

FOR: KIRK MAN BUILDING C2 2ND FL C SOU

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	71.6	DEG	CSP	COOLING SP	65.0	DEG
HOT	DECK TEMP	70.7	DEG	HSP	HEATING SP	90.0	DEG
RET	URN AIR TEMP	74.3	DEG	RSP	RET SETPOINT	75.0	DEG
T1	ROOM C204A	73.6	DEG	1SP	RM C204A SP	75.0	DEG
T2	ROOM C206	74.8	DEG	2SP	RM C206 SP	74.0	DEG
T3	ROOM C207	74.0	DEG	3SP	RM C207 SP	75.0	DEG

FOR: KIRK MAN BUILDING C3 3RD FL C SOU

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	77.9	DEG	CSP	COOLING SP	65.0	DEG
HOT	DECK TEMP	73.5	DEG	HSP	HEATING SP	80.0	DEG
RET	URN AIR TEMP	73.3	DEG	RSP	RET SETPOINT	75.0	DEG
T1	ROOM C302 A	73.8	DEG	1SP	RM C302A SP	75.0	DEG
T2	ROOM C303	74.6	DEG	2SP	RM C303 SP	76.0	DEG
T3	ROOM C308	71.8	DEG	3SP	RM C308 SP	75.0	DEG
T4	ROOM C309	74.1	DEG	4SP	RM C309 SP	75.0	DEG

FOR: KIRK MAN BUILDING C4 2ND FL C NOR

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	73.3	DEG	CSP	COOLING SP	55.0	DEG
HOT	DECK TEMP	71.9	DEG	HSP	HEATING SP	80.0	DEG
RET	URN AIR TEMP	92.2	DEG	RSP	RET SETPOINT	75.0	DEG
T1	RM C212	73.6	DEG	1SP	RM C 212 SP	75.0	DEG
T2	RM C211	72.9	DEG	2SP	RM C211 SP	75.0	DEG

FOR: KIRK MAN BUILDING C5 3RD FL C NOR

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	74.3	DEG	CSP	COOLING SP	65.0	DEG
HOT	DECK TEMP	73.2	DEG	HSP	HEATING SP	80.0	DEG
RET	URN AIR TEMP	79.4	DEG	RSP	RET SETPOINT	72.0	DEG
T1	RM C314	75.7	DEG	1SP	RM C314 SP	75.0	DEG
T2	RM C315	73.2	DEG	2SP	RM C315 SP	75.0	DEG

FOR: KIRK MAN BUILDING C6 4TH FL C NOR

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
COL	DECK TEMP	76.5	DEG	CSP	COOLING SP	65.0	DEG

RET	URN AIR TEMP	74.0	DEG	RSP	RET SETPOINT	90.0	DEG
T1	RM C409	74.8	DEG	1SP	RM C409 SP	75.0	DEG
T2	RM C408	74.7	DEG	2SP	RM C408 SP	75.0	DEG
T3	RM C408A	77.0	DEG	3SP	RM C408A SP	70.0	DEG

FOR: KIRK MAN BUILDING KIT AHU KITCHEN

NOR	SIDE RM TEMP	73.8	DEG	SOU	TH SIDE TEMP	71.4	DEG
SST	FAN SST	ON	MC	DIS	DISCHARGE TE	99.0	DEG
TST	TEST POINTMP	67.9	DEG	NSP	NORTH SP	72.0	DEG
DSP	DISCHARGE SP	50.0	DEG	SSP	SOUTH SP	72.0	DEG
PSP	PREHEAT SP	50.0	DEG	TSP	TEST SP	0.0	DEG
RET	RETURN TEMP	71.2	DEG				

FOR: KIRK MAN BUILDING A1 BASEMENT AHU

FAN	START STOP	ON	MC	FIL	FILTER COND	CLN	
RET	URN AIR TEMP	73.3	DEG	RSP	RAT SETPOINT	73.0	DEG
DIS	DISCHARGE TE	64.1	DEG	STP	STATIC PRESS	0.99	IN
T1	ROOM AB18	66.1	DEG	1SP	ROOM AB18 SP	70.0	DEG
T2	ROOM TEMP 2	72.6	DEG	2SP	ROOM AB04 SP	70.0	DEG

FOR: KIRK MAN BUILDING A2 1ST FL AHU

FIL	FILTER COND	CLN		DIS	CHARGE AIR T	63.0	DEG
RET	URN AIR TEMP	72.9	DEG	T1	ROOM A108	69.7	DEG
1SP	ROOM A108 SP	70.0	DEG	T2	ROOM A118	72.7	DEG
2SP	ROOM A118 SP	70.0	DEG	T3	ROOM A134	75.9	DEG
3SP	ROOM A134 SP	68.0	DEG	T4	ROOM A139	70.8	DEG
4SP	ROOM A139 SP	74.0	DEG	T5	ROOM A129	67.5	DEG
5SP	ROOM A129 SP	74.0	DEG	T6	ROOM A115	68.3	DEG
6SP	ROOM A115 SP	70.0	DEG	T7	ROOM A103	73.0	DEG
7SP	ROOM A103 SP	74.0	DEG	FAN	START STOP	ON	MC
M1	MASTER 1	75.0	DEG	M2	MASTER 2	72.0	DEG
S1	SLAVE 1	55.0	DEG	S2	SLAVE 2	65.0	DEG
SSP	STATIC SP	2.500	WC	STP	STATIC PRESS	2.060	INCH

FOR: KIRK MAN BUILDING A3 2ND FL AHU

FIL	FILTER COND	CLN		DIS	CHARGE AIR T	58.6	DEG
RET	URN AIR TEMP	71.9	DEG	T1	ROOM A208	73.0	DEG
1SP	ROOM A208 SP	72.0	DEG	T2	ROOM A218	71.6	DEG
2SP	ROOM A218 SP	70.0	DEG	T3	ROOM A234	66.2	DEG
3SP	ROOM A234 SP	60.0	DEG	T4	ROOM A237	72.0	DEG
4SP	ROOM A237 SP	70.0	DEG	T5	ROOM A227	70.5	DEG
5SP	ROOM A227 SP	70.0	DEG	T6	ROOM A213G	70.1	DEG
6SP	RM A213G SP	75.0	DEG	T7	ROOM A201	68.2	DEG
7SP	ROOM A201 SP	75.0	DEG	FAN	START STOP	ON	MC
M1	MASTER 1	75.0	DEG	M2	MASTER 2	70.0	DEG
S1	SLAVE 1	55.0	DEG	S2	SLAVE 2	60.0	DEG
SSP	STATIC SP	3.000	WC	STP	STATIC PRESS	2.384	INCH

FOR: KIRK MAN BUILDING A4 3RD FL AHU

* FIL	FILTER COND	CLN		DIS	CHARGE AIR T	60.5	DEG
RET	URN AIR TEMP	68.5	DEG	T1	ROOM A308A	68.6	DEG
1SP	ROOM A308A	74.0	DEG	T2	ROOM A320	65.4	DEG
2SP	ROOM A320 SP	70.0	DEG	T3	ROOM A327	67.9	DEG
3SP	ROOM A327 SP	68.0	DEG	T4	ROOM A334D	73.3	DEG
4SP	RM A334D SP	70.0	DEG	T5	ROOM A339	69.0	DEG
5SP	ROOM A339 SP	60.0	DEG	T6	ROOM A317	71.0	DEG

6SP	ROOM A317 SP	70.0	DEG	T7	ROOM A301	71.0	DEG
7SP	ROOM A301 SP	70.0	DEG	FAN	START STOP	ON	MC

SSP	STATIC SP	2.000	WC	STP	STATIC PRESS	2.820	INCH

FOR: KIRK MAN BUILDING A5 4TH FL AHU

FIL	FILTER COND	CLN		RET	RTN AIR TEMP	70.2	DEG
DIS	CHARGE AIR T	59.1	DEG	T1	ROOM A410	73.3	DEG
1SP	ROOM A410 SP	75.0	DEG	T2	ROOM A419	72.7	DEG
2SP	ROOM A419 SP	70.0	DEG	T3	ROOM A432	68.8	DEG
3SP	ROOM A432 SP	70.0	DEG	T4	ROOM A437	70.6	DEG
4SP	ROOM A437 SP	70.0	DEG	T5	ROOM A427	72.8	DEG
5SP	ROOM A427 SP	74.0	DEG	T6	ROOM A417	75.5	DEG
6SP	ROOM A417 SP	70.0	DEG	T7	ROOM A403	74.3	DEG
7SP	ROOM A403 SP	70.0	DEG	T8	ROOM A424	69.7	DEG
8SP	ROOM A424 SP	70.0	DEG	T9	ROOM A417 DH	71.2	DEG
9SP	GANG HEAT SP	68.0	DEG	FAN	START STOP	ON	MC
M1	MASTER 1	75.0	DEG	M2	MASTER 2	70.0	DEG
S1	SLAVE 1	55.0	DEG	S2	SLAVE 2	60.0	DEG
SSP	STATIC SP	2.500	WC	STP	STATIC PRESS	2.516	INCH

FOR: KIRK MAN BUILDING VAV VAV BOXES

T4A	RM 427A TE	69.5	DEGF	S4A	RM 427A SP	70.0	DEGF
T4B	RM 427B TE	71.7	DEGF	S4B	RM 427B SP	72.0	DEGF
T4C	RM 436 TE	67.3	DEGF	S4C	RM 436 SP	72.0	DEGF
M4A	RM 427A MAX	0.270	" "	N4A	RM 427A MIN	0.050	" "
M4B	RM 427B MAX	0.270	" "	N4B	RM 427B MIN	0.050	" "
M4C	RM 436 MAX	0.150	" "	N4C	RM 436 MIN	0.010	" "
D4A	RM 427A DP	0.051	" "	D4B	RM 427B DP	0.041	" "
D4C	RM 436 DP	0.044	" "				

FOR: KIRK MAN BUILDING ASP A-STATIC

A2	STATIC PRESS	2.060	INCH	A2S	STATIC SP	2.500	WC
S3	STATIC PRESS	2.384	INCH	A3S	STATIC SP	3.000	WC
A4	STATIC PRESS	2.820	INCH	A4S	STATIC SP	2.000	WC
A5	STATIC PRESS	2.516	INCH	A5S	STATIC SP	2.500	WC

FOR: CHLA CHIL PLANT A CA1 CARR CHLR 1

CA1	START STOP	OFF	MC	AMP	AMPERAGE	4.0	AMPS
CWS	CHIL WAT SUP	55.2	DEG	CWR	CHIL WAT RET	48.8	DEG
CDN	DENSER SUP T	70.6	DEG	OAT	AIR TEMP	57.9	DEG
P1	CHILL WATER	ON	MC	P1S	P1 STATUS	ON	
P2	CHILL WATER	ON	MC	P2S	P2 STATUS	ON	
CL1	CT LO STATUS	OFF		CH1	CT HI STATUS	OFF	
CP1	COND PUMP 1	OFF		ALM	CHILLER ALM	NOR	
FLO	CA1/CA2 FLOW	3.	GPM				

FOR: CHLA CHIL PLANT A CA2 CARR CHLR 2

CA2	START STOP	ON	MC	AMP	AMPERAGE	79.2	AMPS
CWS	CHIL WAT SUP	44.9	DEG	CWR	CHIL WAT RET	48.8	DEG
CDN	DENSER SUP T	65.8	DEG	OAT	AIR TEMP	57.9	DEG
P1	CHILL WATER	ON	MC	P1S	P1 STATUS	ON	
P2	CHILL WATER	ON	MC	P2S	P2 STATUS	ON	
CL1	CT LO STATUS	OFF		CH2	CT HI STATUS	OFF	
CP2	COND PUMP 2	ON		ALM	CHILLER ALM	NOR	

T3	CALC TONNAGE	0.5	TONS

FOR: CHLA CHIL PLANT A CHILLER SYSTEM

AV1	SP-ON-DAYS	70.0	DEG	AV2	SP-ON-WK-END	75.0	DEG
CWP	LEAD LAG	P2	MC	LED	CHILLER L/L	CH2	MC

	CA2	START STOP	ON	MC		P1	CHILL WATER	ON	MC
	P2	CHILL WATER	ON	MC		P1S	P1 STATUS	ON	
	P2S	P2 STATUS	ON			CP1	COND PUMP 1	OFF	
	CP2	COND PUMP 2	ON			CS1	CHILL 1 SUP	55.2	DEG
	CS2	CHILL 2 SUP	44.9	DEG		CO1	COND 1 SUP	70.6	DEG
	CO2	COND 2 SUP	65.8	DEG		CWR	CHIL WAT RET	48.8	DEG
*	AVG	AH2/AH3 RET	69.5	DEG LO		GEN	EMERGENCY	OFF	
	FLO	CA1/CA2 FLOW	3.	GPM		TL	TOTAL LOAD	0.5	TONS
	LLL	LEAD/LAG/LOC	LOC						

FOR: CHLC CHIL PLANT C WH1 CHILLER 1

	WH1	START STOP	OFF	II		AMP	AMPERAGE	0.0	KW
	RET	CHL WAT RET	50.2	DEG		CWS	CHL WAT SUP1	53.7	DEG
	CON	COND WAT SUP	73.8	DEG		CP1	COND PUMP 1	OFF	
	P1	CHIL WAT PUM	OFF			CT1	CT STATUS	OFF	
	T1	CALC TONNAGE	0.0	TONS		LED	LEAD/LAG	WH1	MC

FOR: CHLC CHIL PLANT C WH2 CHILLER 2

	WH2	START STOP	OFF	II		AMP	AMPERAGE	3.	AMPS
	RET	CHL WAT RET	50.2	DEG		SUP	CHL WAT SUP2	50.6	DEG
	CON	COND WAT SUP	57.3	DEG		CP2	COND PUMP 2	ON	
	P2	CHIL WAT PUM	OFF			CT2	CT STATUS	OFF	
	T2	CALC TONNAGE	0.0	TONS		LED	LEAD/LAG	WH2	MC

FOR: CHLC CHIL PLANT C TR1 CHILLER 3

	CWS	CHL WAT SUP3	51.3	DEG		CON	COND WAT SUP	70.9	DEG
	CP3	COND PUMP 3	OFF			AMP	AMPERAGE	3.	AMPS
	TR1	START STOP	OFF	MC		CT3	CT STATUS	OFF	
	T3	CALC TONNAGE	0.0	TONS		T3	CALC TONNAGE	0.0	TONS
	SST	SYSTEM SST	OFF	MC					

FOR: CHLC CHIL PLANT C BO1 BOILER

	BO1	BOILER 1 SST	ON	MC		BO2	BOILER 2 SST	OFF	MC
*	HP1	BOILER PUMP	ON	MC		HP2	BOILER PUMP	OFF	MC
	FS1	FLAME STATUS	OFF			FS2	FLAME STATUS	OFF	
	SST	SYSTEM SST	ON	MC		BHI	HI SET POINT	74.9	DEG
	BLO	LOW SETPOINT	73.0	DEG					

FOR: CHLC CHIL PLANT C CHILLER SYSTEM

	OAT	OUTSIDE AIR	55.6	DEG		CP1	COND PUMP 1	OFF	
	CP2	COND PUMP 2	ON			CP3	COND PUMP 3	OFF	
	CS1	CHL WAT SUP1	53.7	DEG		CS2	CHL WAT SUP2	50.6	DEG
	CS3	CHL WAT SUP3	51.3	DEG	*	RET	CHL WAT RET	50.2	DEG LO
	CW1	CON WAT SUP1	73.8	DEG		CW2	CON WAT SUP2	57.3	DEG
	CW3	CON WAT SUP3	70.9	DEG		HOT	WATER SUPPLY	71.4	DEG
	1SP	B1/B3 SP DAY	74.0	DEG		2SP	B1/B3 SP WE	76.0	DEG
	WH1	CHILLER 1	OFF	II		WH2	CHILLER 2	OFF	II
	TR1	CHILLER 3	OFF	MC		BUI	LDING KW	0.0	KW

	AVG	AHU B1 & B3	73.3	DEG		FL3	TRI FLOW	3.	GPM
	FLO	WH1/WH2 FLOW	11.	GPM		TL	TOTAL LOAD	0.0	TONS
	TEM	AVG FOR BOIL	73.9	DEG		CHL	START STOP	ON	
	BHI	HI SET POINT	74.9	DEG		BLO	LOW SETPOINT	73.0	DEG
	TWR	COOL TOWER	ON	II		LED	LEAD/LAG	WH2	MC

FOR: AWNS A-WING CHLR AVG AVERAGE

	CA1	START/STOP	OFF	MC		CA2	START/STOP	ON	MC
	STA	SYSTEM SST	AUT	MC		AVG	AVERAGE	69.5	DEG

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 FOR: CWNG C-WING CHLR    AVG AVERAGE
   AVG  AVERAGE          73.3  DEG          WH1  CHILLER 1         OFF   11
   1SP  B1/B3SP-ON-D     74.0  DEG          2SP  B1/B3SP-ON-W     76.0  DEG
   3SP  B1/B3SP-OF-D     70.0  DEG          4SP  B1/B3SP-OF-W     73.0  DEG
   WH2  START STOP        OFF   11
...END...
  H CHLC CHIL PLANT C CHI LLER SYSTEM  RET CHL WAT RET       51.3 DEG     06:39 29 FEB 1996
* H CHLC CHIL PLANT C CHI LLER SYSTEM  AVG AHU B1 % B3       74.0 DEG  HI 07:08 29 FEB 1996
  H CHLC CHIL PLANT C WH2 CHILLER 2    P2  CHIL WAT PUM       ON          07:08 29 FEB 1996
  H CHLC CHIL PLANT C CHI LLER SYSTEM  WH2 CHILLER 2          ON          07:08 29 FEB 1996
* H CHLC CHIL PLANT C CHI LLER SYSTEM  RET CHL WAT RET       56.7 DEG  HI 07:12 29 FEB 1996
* H CHLC CHIL PLANT C CHI LLER SYSTEM  AVG AHU B1 % B3       74.0 DEG  HI 07:15 29 FEB 1996 ACKNOWLEDGED BY: OLM FROM: SC1-ST1
* H CHLC CHIL PLANT C CHI LLER SYSTEM  RET CHL WAT RET       56.7 DEG  HI 07:15 29 FEB 1996 ACKNOWLEDGED BY: OLM FROM: SC1-ST1
  H CHLC CHIL PLANT C CHI LLER SYSTEM  RET CHL WAT RET       54.7 DEG     07:16 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS       ON          07:22 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS       OFF         07:22 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       HP1 BOILER PUMP        OFF         07:27 29 FEB 1996
H,LOG,CHLC,,,SC1                                                          REQUESTED BY : OLM   07:32  29 FEB 1996  FROM : SC1
H,STO,CHLC,WH2,WH2                                                        REQUESTED BY : OLM   07:33  29 FEB 1996  FROM : SC1
  H CHLC CHIL PLANT C WH2 CHILLER 2    P2  CHIL WAT PUM       OFF         07:33 29 FEB 1996
  H CHLC CHIL PLANT C CHI LLER SYSTEM  WH2 CHILLER 2          OFF         07:34 29 FEB 1996
  H CHLC CHIL PLANT C WH2 CHILLER 2    P2  CHIL WAT PUM       ON          07:44 29 FEB 1996
  H CHLC CHIL PLANT C WH2 CHILLER 2    P2  CHIL WAT PUM       OFF         07:50 29 FEB 1996
* H CHLC CHIL PLANT C CHI LLER SYSTEM  RET CHL WAT RET       56.6 DEG  HI 07:56 29 FEB 1996
  H CHLC CHIL PLANT C WH2 CHILLER 2    P2  CHIL WAT PUM       ON          07:57 29 FEB 1996
  H CHLC CHIL PLANT C CHI LLER SYSTEM  WH2 CHILLER 2          ON          07:57 29 FEB 1996
* H CHLC CHIL PLANT C CHI LLER SYSTEM  RET CHL WAT RET       56.6 DEG  HI 08:04 29 FEB 1996 ACKNOWLEDGED BY: OLM FROM: SC1-ST1



PASSWORD CLEARANCE TIMED OUT                                              FOR : OLM   09:40  29 FEB 1996  FROM : SC1
PASSWORD CLEARANCE GRANTED                                                FOR : EH    11:00  29 FEB 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                          REQUESTED BY : EH   11:01  29 FEB 1996  FROM : SC1
H,STO,CHLA,CA1,P1                                                         REQUESTED BY : EH   11:19  29 FEB 1996  FROM : SC1
  H CHLA CHIL PLANT A CHI LLER SYSTEM  P1S P1 STATUS          OFF         11:19 29 FEB 1996
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  P1S P1 STATUS          OFF         11:19 29 FEB 1996
H,LOG,AWNG,AVG,,SC1                                                       REQUESTED BY : EH   12:00  29 FEB 1996  FROM : SC1
H,LOG,CHLA,CA2,,SC1                                                       REQUESTED BY : EH   12:04  29 FEB 1996  FROM : SC1
H,STO,CHLA,CA2,CA2                                                        REQUESTED BY : EH   12:04  29 FEB 1996  FROM : SC1
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CA2 START STOP         OFF         12:05 29 FEB 1996
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  P2S PS STATUS          OFF         12:05 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1          12:06 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2          12:07 29 FEB 1996
* H CHLA CHIL PLANT A CA2 CARR CHLR 2  ALM CHILLER ALM        ALM         12:08 29 FEB 1996
 A WING CHILLER NO.2 FAILED TO START CHECK CHILLER & SAFETY'S
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  P2S PS STATUS          ON          12:08 29 FEB 1996
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  CP1 COND PUMP 1        ON          12:09 29 FEB 1996
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  CP1 COND PUMP 1        OFF         12:10 29 FEB 1996
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  P2S PS STATUS          OFF         12:10 29 FEB 1996
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF         12:10 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        OFF         12:10 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1          12:11 29 FEB 1996
* H CHLA CHIL PLANT A CA2 CARR CHLR 2  ALM CHILLER ALM        ALM         12:12 29 FEB 1996 ACKNOWLEDGED BY: EH  FROM: SC1-ST1
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF         12:12 29 FEB 1996 ACKNOWLEDGED BY: EH  FROM: SC1-ST1
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2          12:12 29 FEB 1996
H,LOG,CHLA,,,SC1                                                          REQUESTED BY : EH   12:13  29 FEB 1996  FROM : SC1
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1          12:13 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2          12:14 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        ON          12:15 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        ON          12:15 29 FEB 1996
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF         12:15 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        OFF         12:15 29 FEB 1996
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* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF          12:15 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        OFF          12:15 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1           12:15 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2           12:16 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        ON           12:16 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        ON           12:16 29 FEB 1996
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF          12:16 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        OFF          12:17 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        ON           12:17 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        ON           12:17 29 FEB 1996
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF          12:17 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        OFF          12:17 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        ON           12:17 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        ON           12:17 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1           12:17 29 FEB 1996
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF          12:17 29 FEB 1996 ACKNOWLEDGED BY: EH  FROM: SC1-ST1
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF          12:18 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        OFF          12:18 29 FEB 1996
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF          12:18 29 FEB 1996 ACKNOWLEDGED BY: EH  FROM: SC1-ST1
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2           12:18 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1           12:20 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2           12:21 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1           12:22 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2           12:23 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1           12:24 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2           12:25 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1           12:26 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2           12:27 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1           12:28 29 FEB 1996
* H CHLA CHIL PLANT A CA1 CARR CHLR 1  ALM CHILLER ALM        ALM          12:28 29 FEB 1996
 A WING CHILLER NO.1 FAILED TO START CHECK CHILLER & SAFETY'S
  H CHLA CHIL PLANT A CHI LLER SYSTEM  P1S P1 STATUS           ON           12:28 29 FEB 1996
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  P1S P1 STATUS           ON           12:28 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CA2 START STOP          ON           12:29 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        ON           12:31 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        ON           12:31 29 FEB 1996
* H CHLA CHIL PLANT A CA1 CARR CHLR 1  ALM CHILLER ALM        ALM          12:37 29 FEB 1996 ACKNOWLEDGED BY: EH  FROM: SC1-ST1
H,LOG,KIRK,A2,,SC1                                                        REQUESTED BY : EH    12:43  29 FEB 1996  FROM : SC1
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  ALM CHILLER ALM        NOR          12:48 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  ALM CHILLER ALM        NOR          12:49 29 FEB 1996 ACKNOWLEDGED BY: EH  FROM: SC1-ST1
* H CWNG C-WING CHLR  AVG AVERAGE      AVG AVERAGE          75.0 DEG  HI 14:08 29 FEB 1996
* H CWNG C-WING CHLR  AVG AVERAGE      AVG AVERAGE          75.0 DEG  HI 14:15 29 FEB 1996 ACKNOWLEDGED BY: EH  FROM: SC1-ST1
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     ON           14:18 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     OFF          14:18 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS2 FLAME STATUS     ON           14:21 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS2 FLAME STATUS     OFF          14:21 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     ON           14:22 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     OFF          14:22 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     ON           14:30 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     OFF          14:30 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     ON           15:33 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     OFF          15:33 29 FEB 1996
PASSWORD CLEARANCE TIMED OUT                                                      FOR : EH    15:40  29 FEB 1996  FROM : SC1
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     ON           15:43 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     OFF          15:45 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     ON           15:48 29 FEB 1996
  H CHLC CHIL PLANT C BOI BOILER       FS1 FLAME STATUS     OFF          15:48 29 FEB 1996
  H CHLC CHIL PLANT C CHI LLER SYSTEM  WH2 CHILLER 2        OFF          16:07 29 FEB 1996
  H CHLC CHIL PLANT C WH2 CHILLER 2    P2  CHIL WAT PUM     OFF          16:07 29 FEB 1996
PASSWORD CLEARANCE GRANTED                                                        FOR : JE    16:09  29 FEB 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                          REQUESTED BY : JE    16:09  29 FEB 1996  FROM : SC1
H,STD,CHLA,CA2,CA2                                                        REQUESTED BY : JE    16:12  29 FEB 1996  FROM : SC1
H,STA,AVNG,AVG,STA                                                        REQUESTED BY : JE    16:12  29 FEB 1996  FROM : SC1
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CA2 START STOP          OFF          16:12 29 FEB 1996
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* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF        16:13 29 FEB 1996 ACKNOWLEDGED BY: JE  FROM: SC1-ST1
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        ON         16:13 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        ON         16:13 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  P1S P1 STATUS          OFF        16:13 29 FEB 1996
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  P1S P1 STATUS          OFF        16:13 29 FEB 1996
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF        16:13 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        OFF        16:13 29 FEB 1996
* H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        OFF        16:13 29 FEB 1996 ACKNOWLEDGED BY: JE  FROM: SC1-ST1
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:14 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:15 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:16 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:17 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:18 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:19 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:21 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:22 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:23 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:24 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:25 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:27 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:28 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:29 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:30 29 FEB 1996
* H CHLA CHIL PLANT A CA2 CARR CHLR 2  ALM CHILLER ALM        ALM        16:31 29 FEB 1996
 A WING CHILLER NO.2 FAILED TO START CHECK CHILLER & SAFETYS
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:31 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:32 29 FEB 1996
* H CHLA CHIL PLANT A CA2 CARR CHLR 2  ALM CHILLER ALM        ALM        16:33 29 FEB 1996 ACKNOWLEDGED BY: JE  FROM: SC1-ST1
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:34 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:35 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:36 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:37 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:38 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:39 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:40 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:41 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:43 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:44 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:45 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:46 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:47 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:48 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P1         16:49 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CWP LEAD LAG           P2         16:50 29 FEB 1996
  H CHLA CHIL PLANT A CA1 CARR CHLR 1  P2S PS STATUS          ON         16:51 29 FEB 1996
  H CHLA CHIL PLANT A CHI LLER SYSTEM  CP2 COND PUMP 2        ON         16:51 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CP2 COND PUMP 2        ON         16:51 29 FEB 1996
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  CA2 START STOP         ON         16:52 29 FEB 1996
PASSWORD CLEARANCE TIMED OUT                                            FOR : JE    17:02  29 FEB 1996  FROM : SC1
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  ALM CHILLER ALM        NOR        17:11 29 FEB 1996
PASSWORD CLEARANCE GRANTED                                              FOR : EC    17:11  29 FEB 1996  FROM : SC1
  H CHLA CHIL PLANT A CA2 CARR CHLR 2  ALM CHILLER ALM        NOR        17:11 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
PASSWORD CLEARANCE TIMED OUT                                            FOR : EC    17:40  29 FEB 1996  FROM : SC1
PASSWORD CLEARANCE GRANTED                                              FOR : EC    17:55  29 FEB 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                        REQUESTED BY : EC    17:59  29 FEB 1996  FROM : SC1
* S DOOR ALARMS       ALM STATUS       D2  MAIN LOBBY     SEC/OPE     18:00 29 FEB 1996
* S DOOR ALARMS       ALM STATUS       D3  GUARD STATIO   SEC/OPE     18:00 29 FEB 1996
* S DOOR ALARMS       ALM STATUS       D4  E. STAIRWELL   SEC/OPE     18:00 29 FEB 1996
* S DOOR ALARMS       ALM STATUS       D5  OLD LOAD DOC   SEC/OPE     18:00 29 FEB 1996
* S DOOR ALARMS       ALM STATUS       D9  N STAIR B WG   SEC/OPE     18:00 29 FEB 1996
* S DOOR ALARMS       ALM STATUS       D10 OLD MACH RMN   SEC/OPE     18:00 29 FEB 1996
* S DOOR ALARMS       ALM STATUS       D11 N STAIR C WG   SEC/OPE     18:00 29 FEB 1996
* S DOOR ALARMS       ALM STATUS       D12 OLD MACH RMW   SEC/OPE     18:00 29 FEB 1996
* S DOOR ALARMS       ALM STATUS       D13 WEST ENTRANC   SEC/OPE     18:00 29 FEB 1996
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* S DOOR ALARMS       ALM STATUS      D4  E. STAIRWELL   SEC/OPE        18:00 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
* S DOOR ALARMS       ALM STATUS      D5  OLD LOAD DOC   SEC/OPE        18:00 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
* S DOOR ALARMS       ALM STATUS      D9  N STAIR B WG   SEC/OPE        18:00 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
* S DOOR ALARMS       ALM STATUS      D10 OLD MACH RMN   SEC/OPE        18:00 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
* S DOOR ALARMS       ALM STATUS      D11 N STAIR C WG   SEC/OPE        18:00 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
* S DOOR ALARMS       ALM STATUS      D12 OLD MACH RMW   SEC/OPE        18:00 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
* S DOOR ALARMS       ALM STATUS      D13 WEST ENTRANC   SEC/OPE        18:00 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
* S DOOR ALARMS       ALM STATUS      D20 RM AB31 SUPP   SEC/OPE        18:05 29 FEB 1996
* S DOOR ALARMS       ALM STATUS      D21 GLS DR BASEM   SEC/OPE        18:05 29 FEB 1996
* S DOOR ALARMS       ALM STATUS      D20 RM AB31 SUPP   SEC/OPE        18:25 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
  S DOOR ALARMS       ALM STATUS      D21 GLS DR BASEM   ACC/OPE        19:25 29 FEB 1996 ACKNOWLEDGED BY: EC  FROM: SC1-ST1
PASSWORD CLEARANCE TIMED OUT                                                FOR : EC    18:54  29 FEB 1996  FROM : SC1
PASSWORD CLEARANCE GRANTED                                                  FOR : EC    19:38  29 FEB 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                         REQUESTED BY : EC    19:38  29 FEB 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                         REQUESTED BY : EC    19:38  29 FEB 1996  FROM : SC1
PASSWORD CLEARANCE TIMED OUT                                                FOR : EC    20:07  29 FEB 1996  FROM : SC1
PASSWORD CLEARANCE GRANTED                                                  FOR : EC    21:32  29 FEB 1996  FROM : SC1
PASSWORD CLEARANCE TIMED OUT                                                FOR : EC    22:01  29 FEB 1996  FROM : SC1
PASSWORD CLEARANCE GRANTED                                                  FOR : EC    23:01  29 FEB 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                         REQUESTED BY : EC    23:01  29 FEB 1996  FROM : SC1
PASSWORD CLEARANCE TIMED OUT                                                FOR : EC    23:30  29 FEB 1996  FROM : SC1
  H CHLC CHIL PLANT C CHI LLER SYSTEM  LED LEAD/LAG          WH1        00:02  1 MAR 1996
PASSWORD CLEARANCE GRANTED                                                  FOR : EC    01:01   1 MAR 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                         REQUESTED BY : EC    01:02   1 MAR 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                         REQUESTED BY : EC    01:02   1 MAR 1996  FROM : SC1
PASSWORD CLEARANCE TIMED OUT                                                FOR : EC    01:31   1 MAR 1996  FROM : SC1
PASSWORD CLEARANCE GRANTED                                                  FOR : LLB   02:01   1 MAR 1996  FROM : SC1
PASSWORD CLEARANCE TERMINATED                                               FOR : LLB   02:01   1 MAR 1996  FROM : SC1
PASSWORD CLEARANCE GRANTED                                                  FOR : LLB   02:01   1 MAR 1996  FROM : SC1
H,LOG,CHLA,,,SC1                                                         REQUESTED BY : LLB   02:01   1 MAR 1996  FROM : SC1
PASSWORD CLEARANCE TERMINATED                                               FOR : LLB   02:01   1 MAR 1996  FROM : SC1
  H CWNG C-WING CHLR  AVG AVERAGE      AVG AVERAGE          73.9 DEG     02:18  1 MAR 1996
* H KIRK MAN BUILDING B4  4TH FL B SOU T2  WEST HALLWAY     69.5 DEG  LO 02:55  1 MAR 1996
PASSWORD CLEARANCE GRANTED                                                  FOR : LLB   02:55   1 MAR 1996  FROM : SC1
* H KIRK MAN BUILDING B4  4TH FL B SOU T2  WEST HALLWAY     69.5 DEG  LO 02:55  1 MAR 1996 ACKNOWLEDGED BY: LLB FROM: SC1-ST1
PASSWORD CLEARANCE TERMINATED                                               FOR : LLB   02:55   1 MAR 1996  FROM : SC1
```

APPENDIX E

Schematics and Data for A & B-Wing AHUs

A - WING

A - Basement

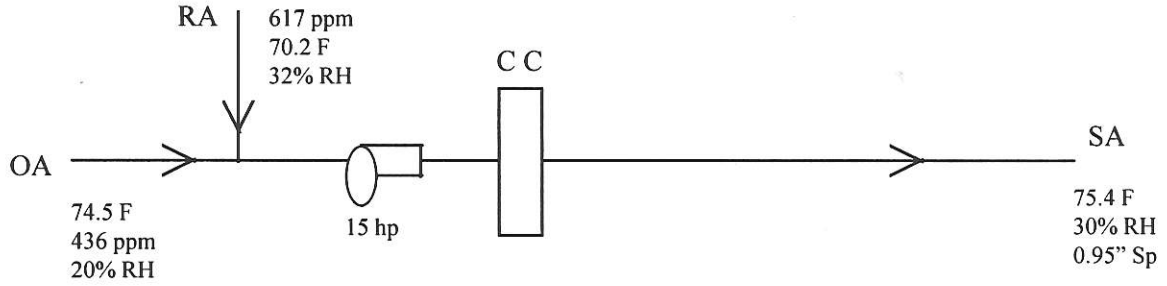


Fig. E-1

A-1 (first floor)

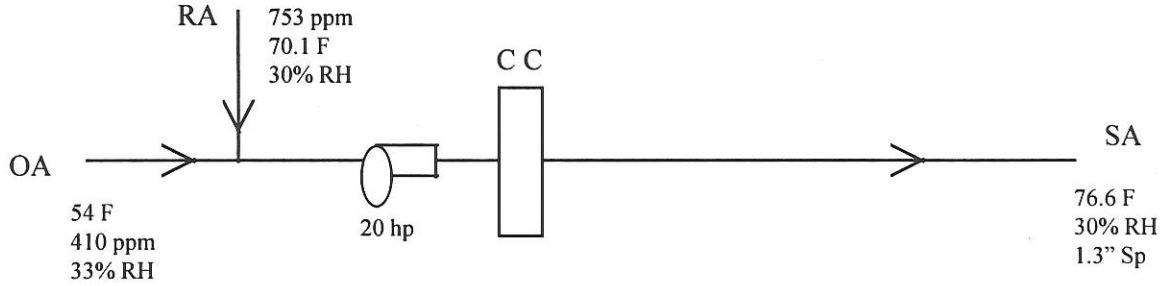


Fig. E-2

A-2 (second floor)

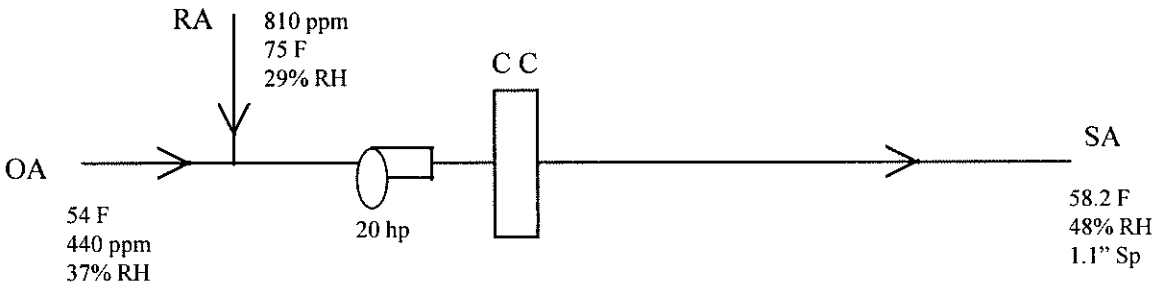


Fig. E-3

A-3 (third floor)

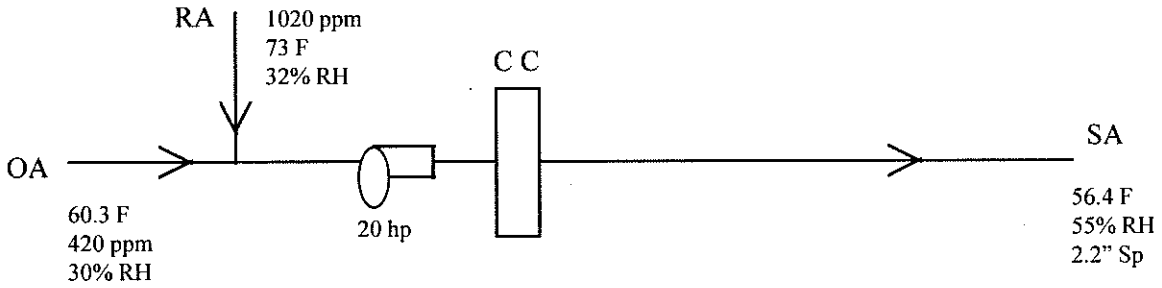


Fig. E-4

A-4 (fourth floor)

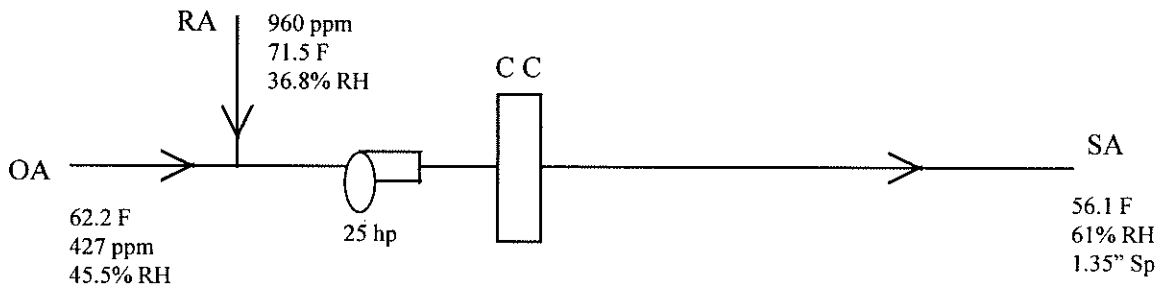


Fig. E-5

1st Floor B Wing

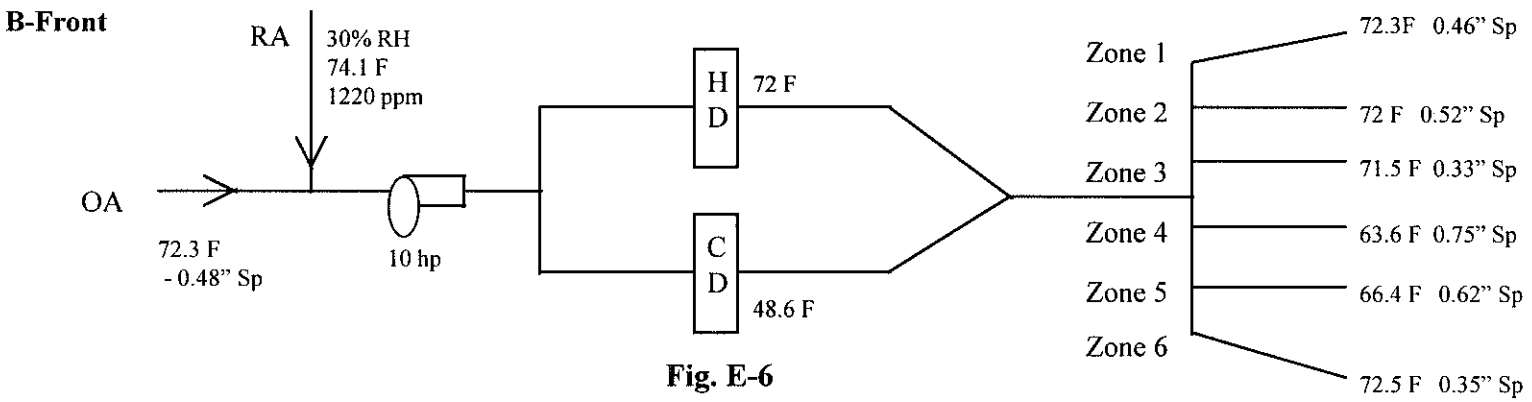


Fig. E-6

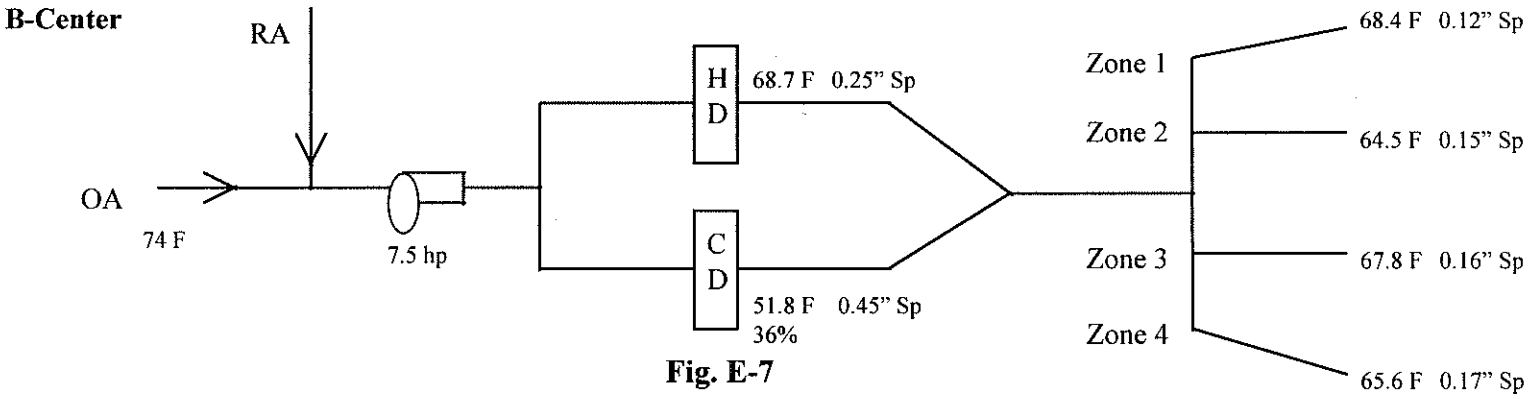


Fig. E-7

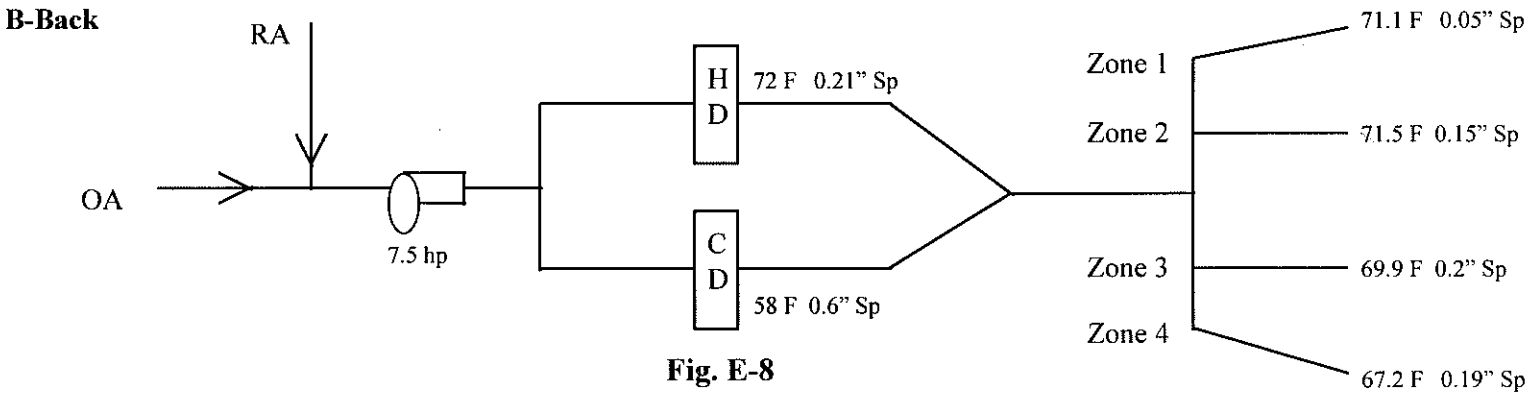


Fig. E-8

2nd Floor B Wing

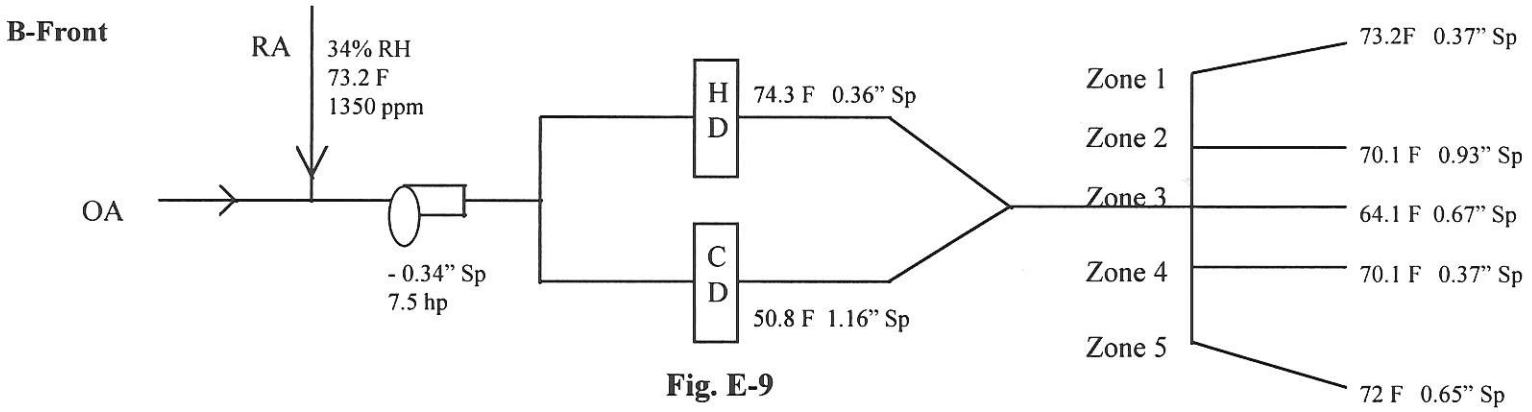


Fig. E-9

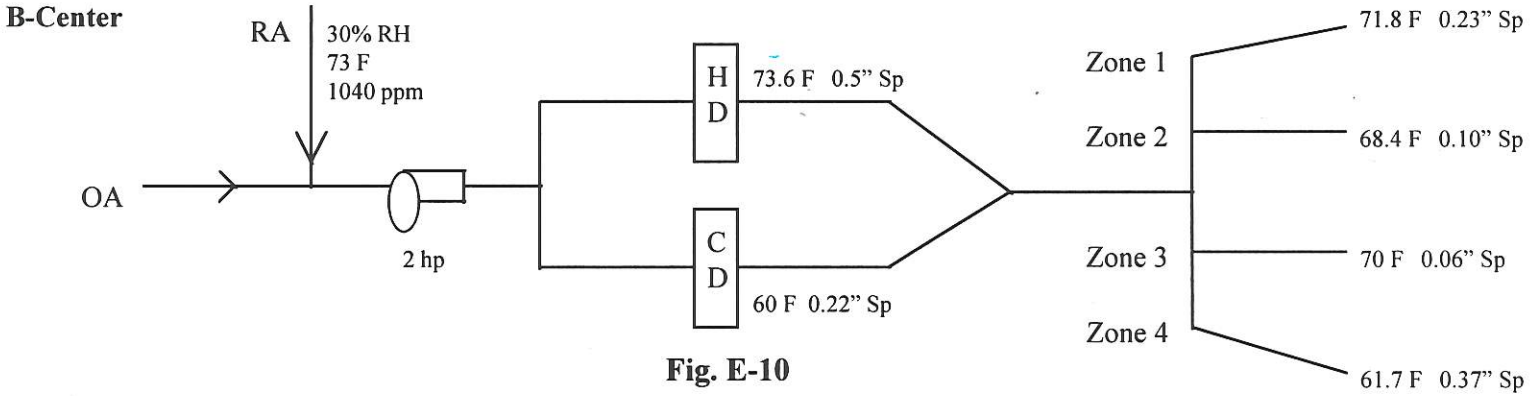


Fig. E-10

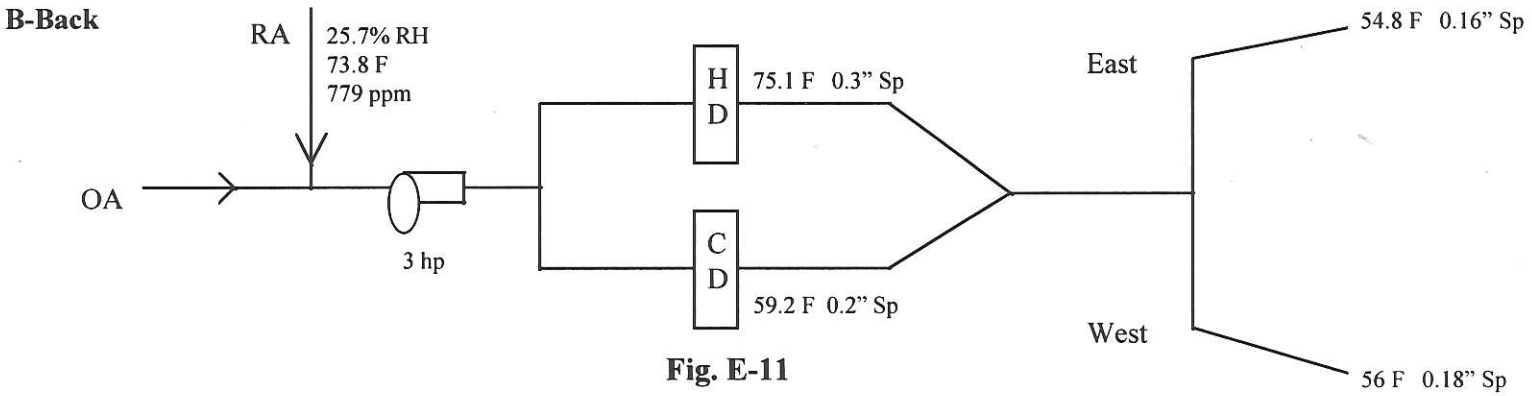


Fig. E-11

3rd Floor B Wing

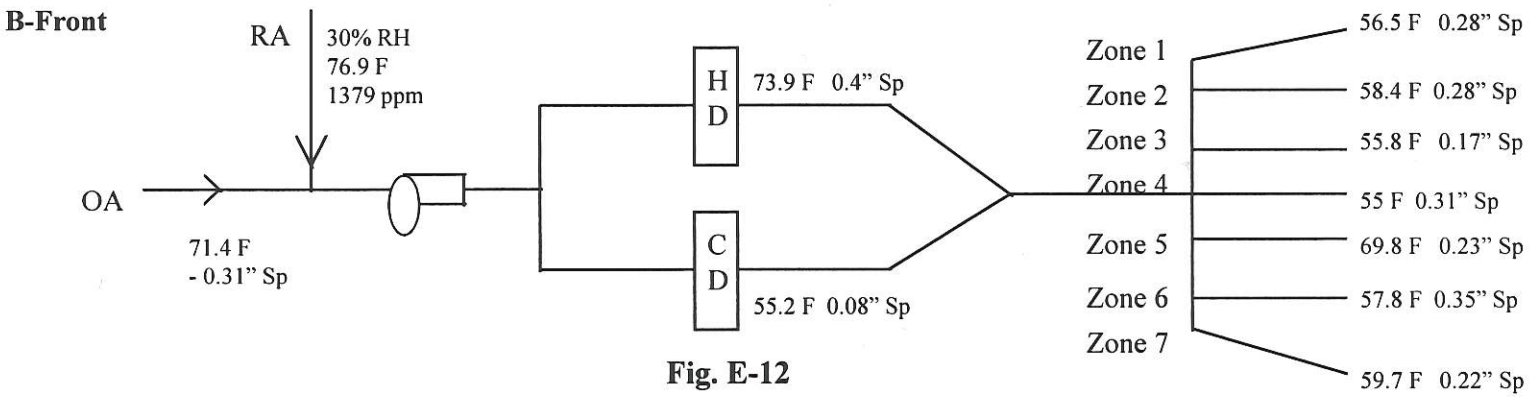


Fig. E-12

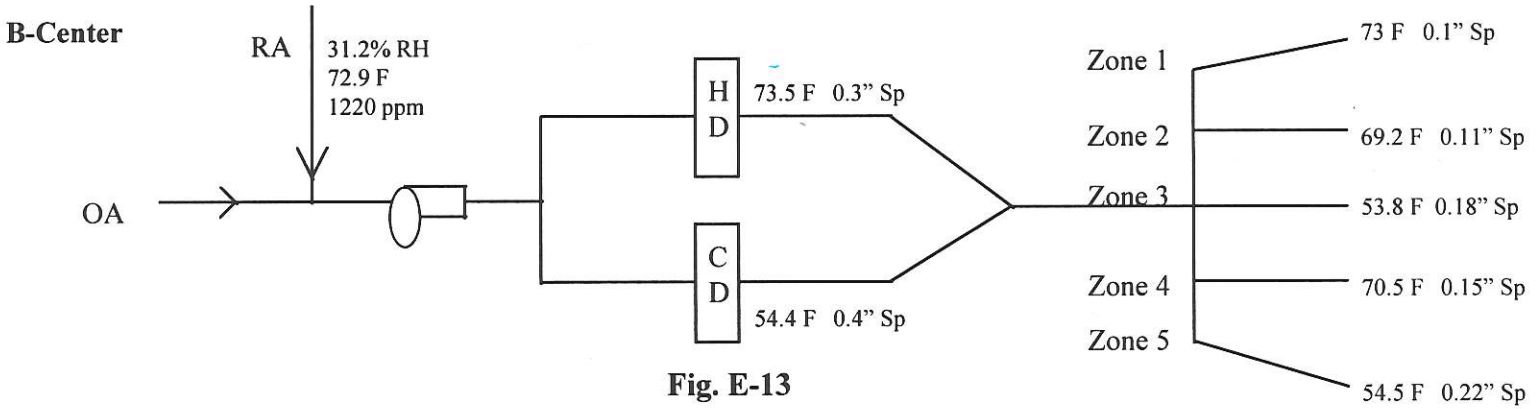


Fig. E-13

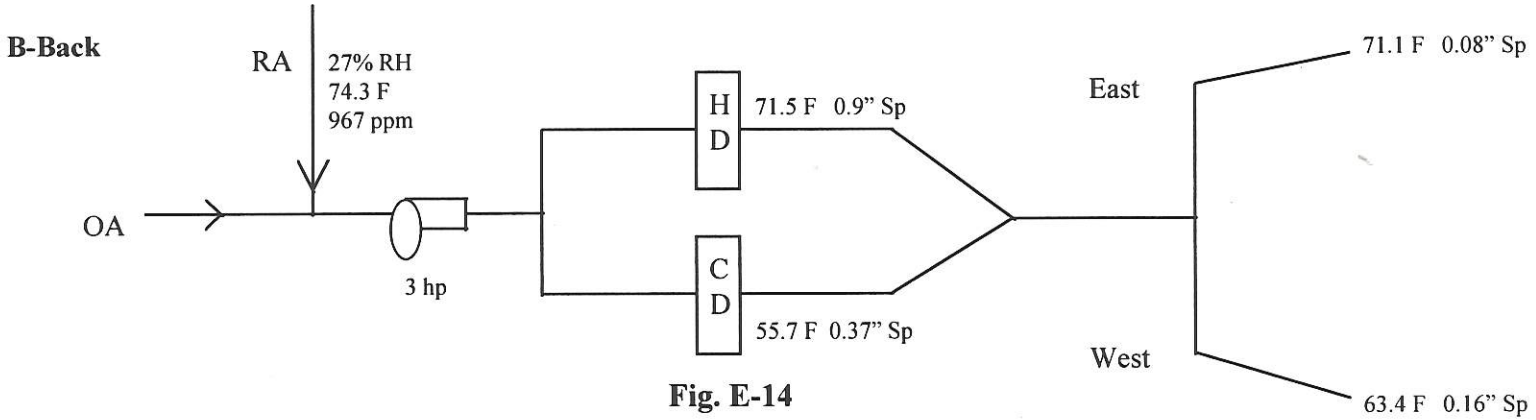


Fig. E-14

4th Floor B Wing

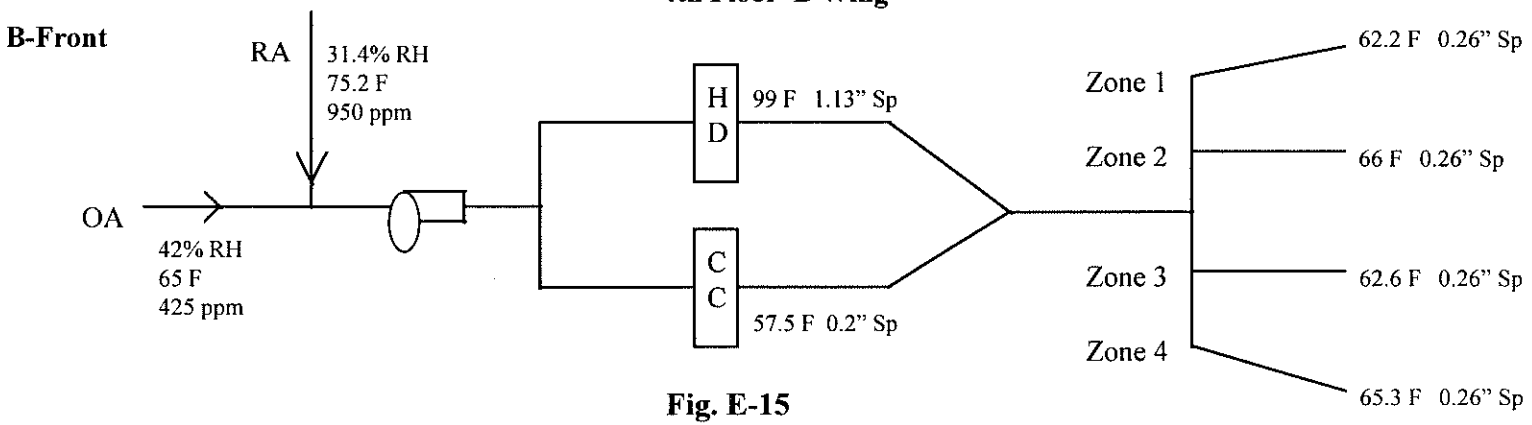


Fig. E-15

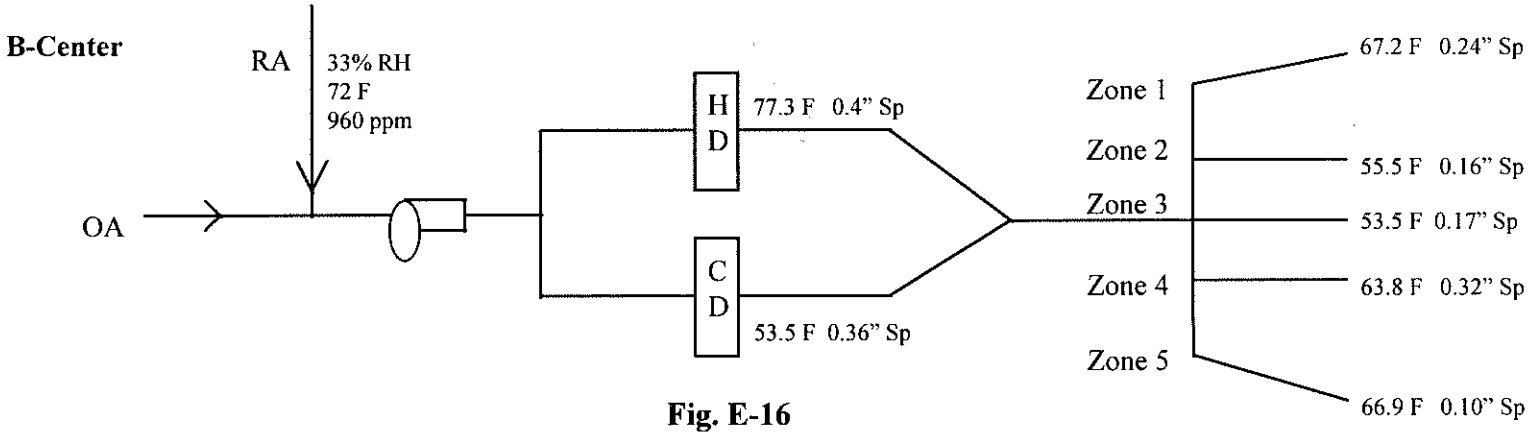


Fig. E-16

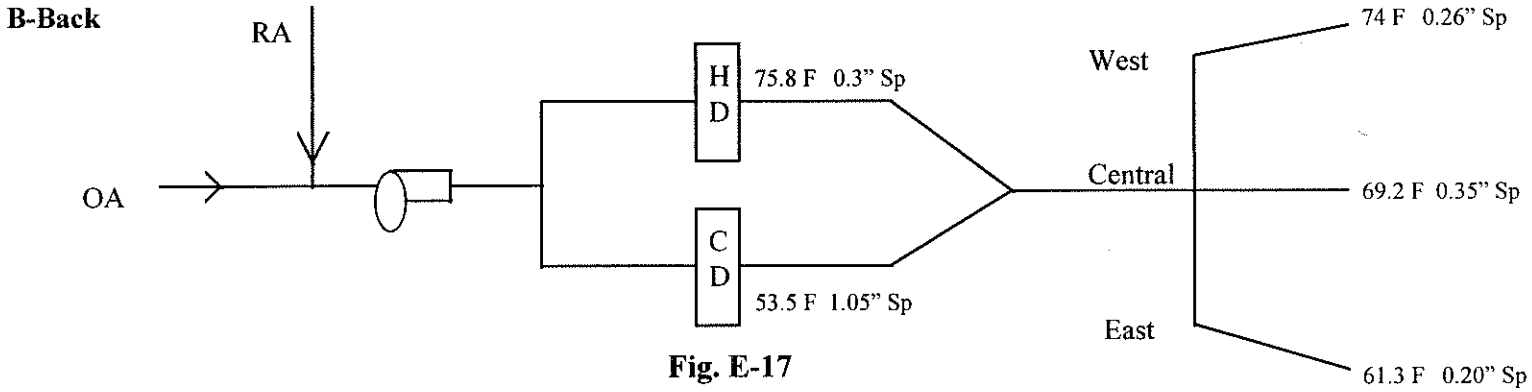
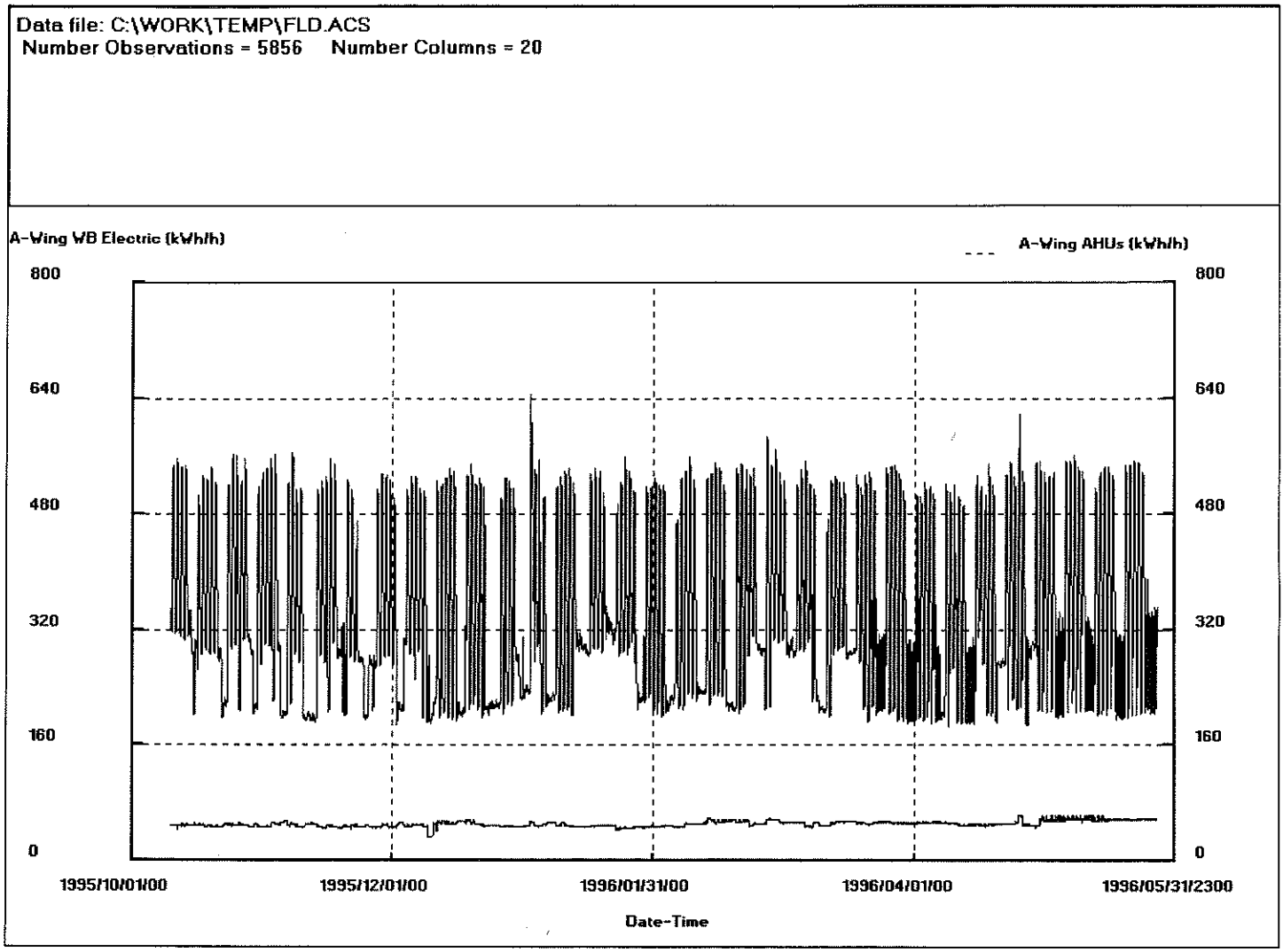


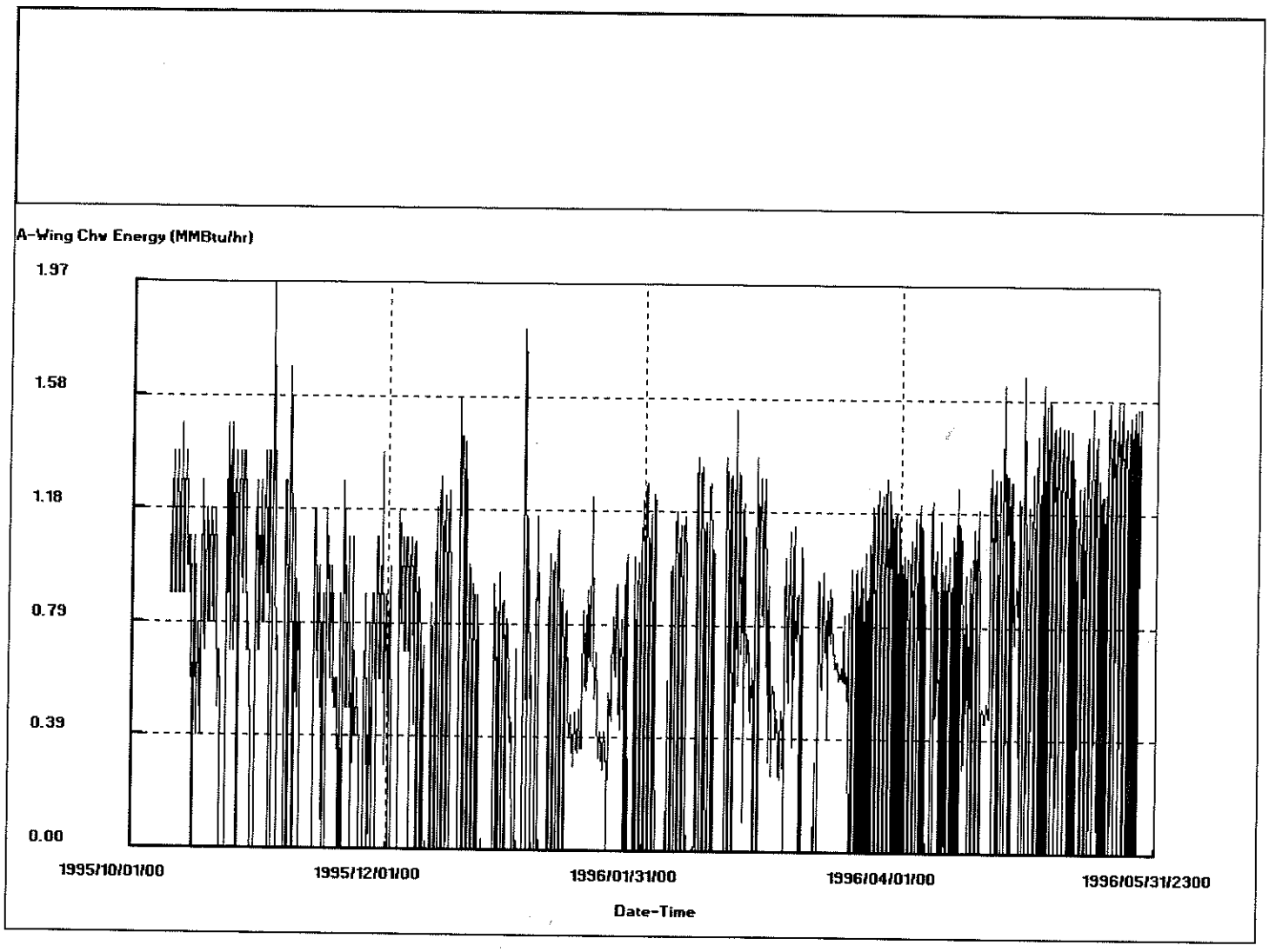
Fig. E-17

APPENDIX F

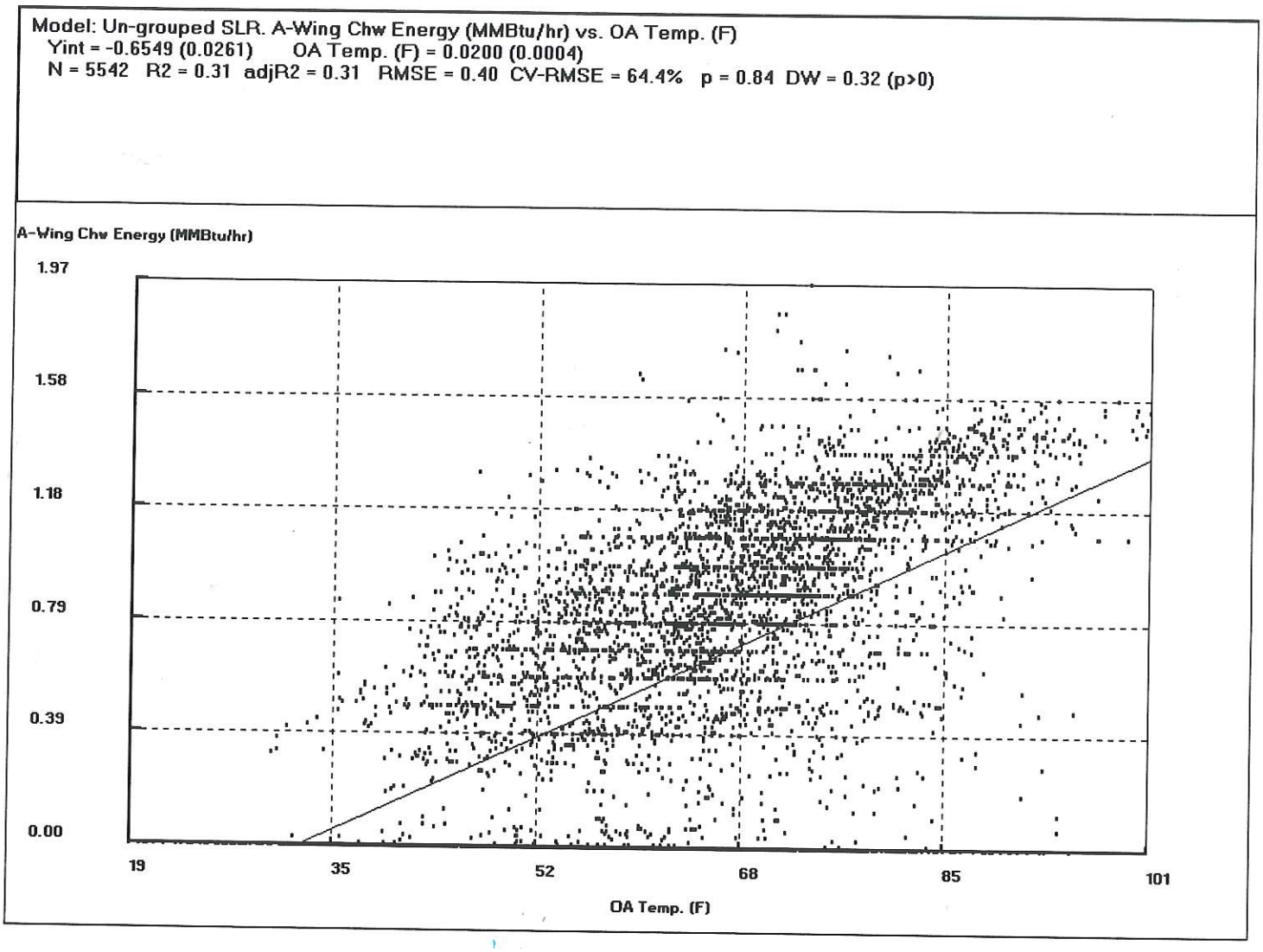
Data Plots for A, B and C Wings from October 1995 to May 1996



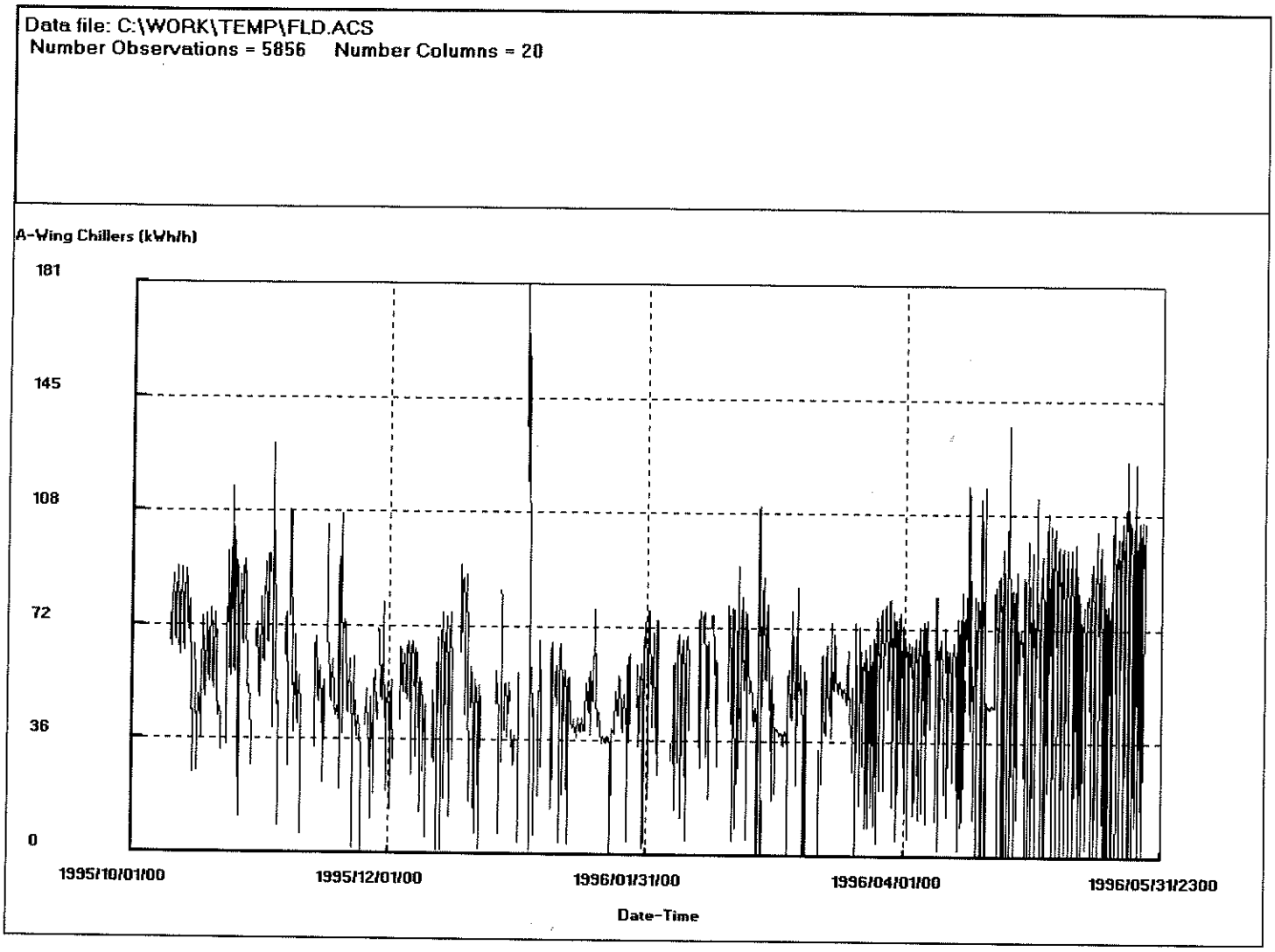
F-1. Time Series Plot of A-Wing Whole Building Electricity Consumption (kWh/h).



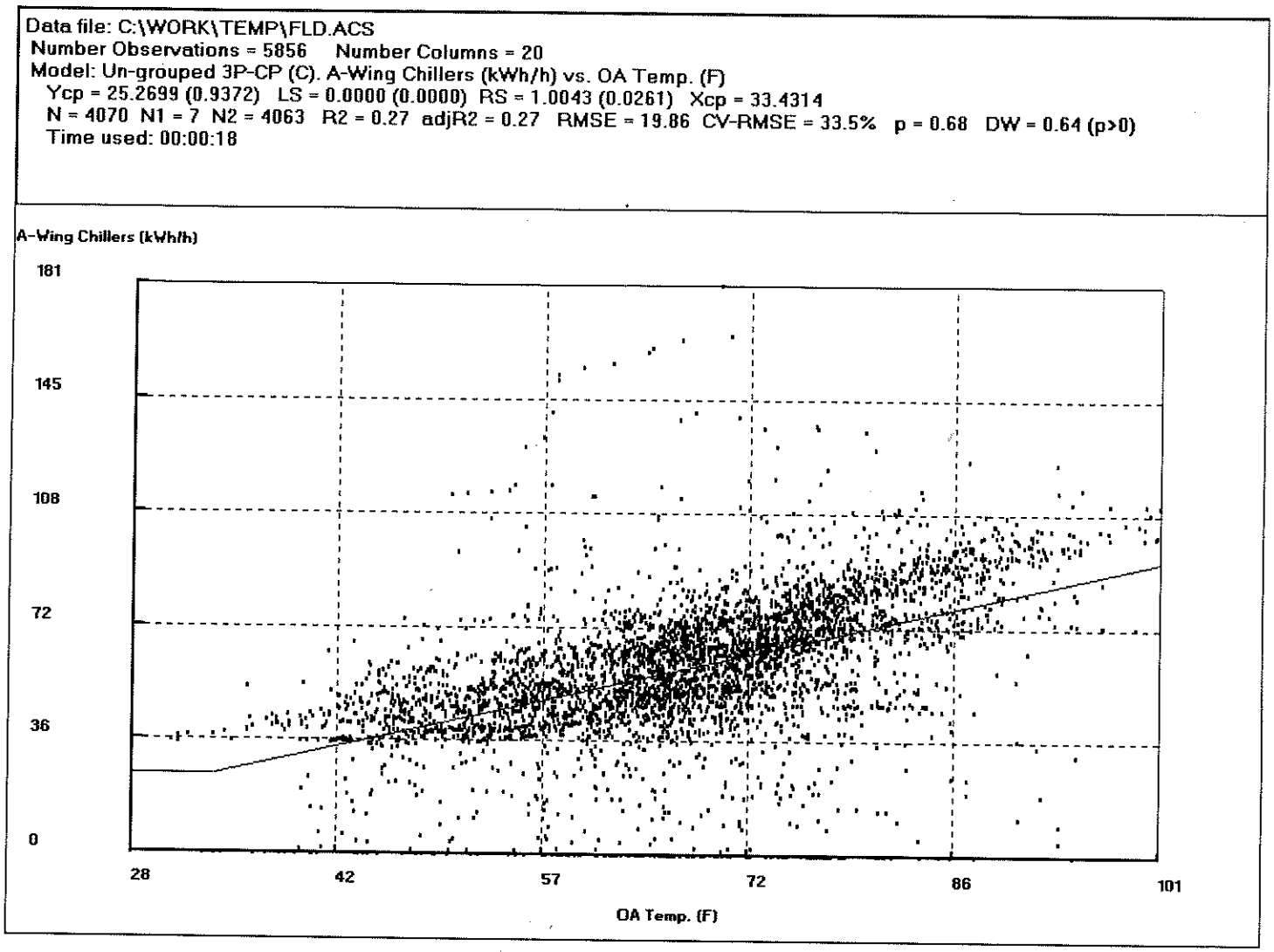
F-2. Time Series Plot of A-Wing Chilled Water Energy Consumption (MMBtu/h).



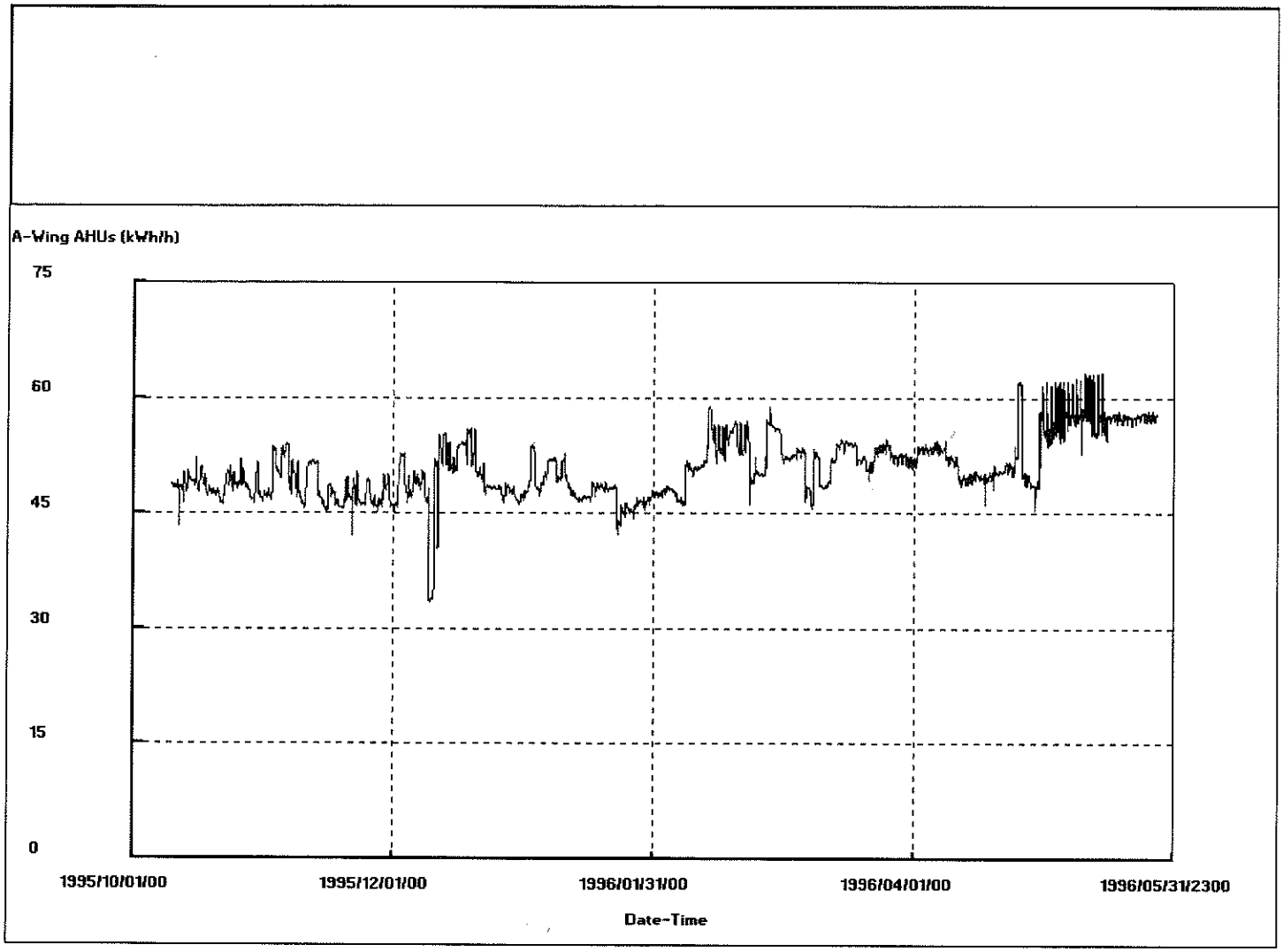
F-3. Scatter Plot of A-Wing Chilled Water Energy Consumption (MMBtu/h) Vs Outside Air Temperature (F).



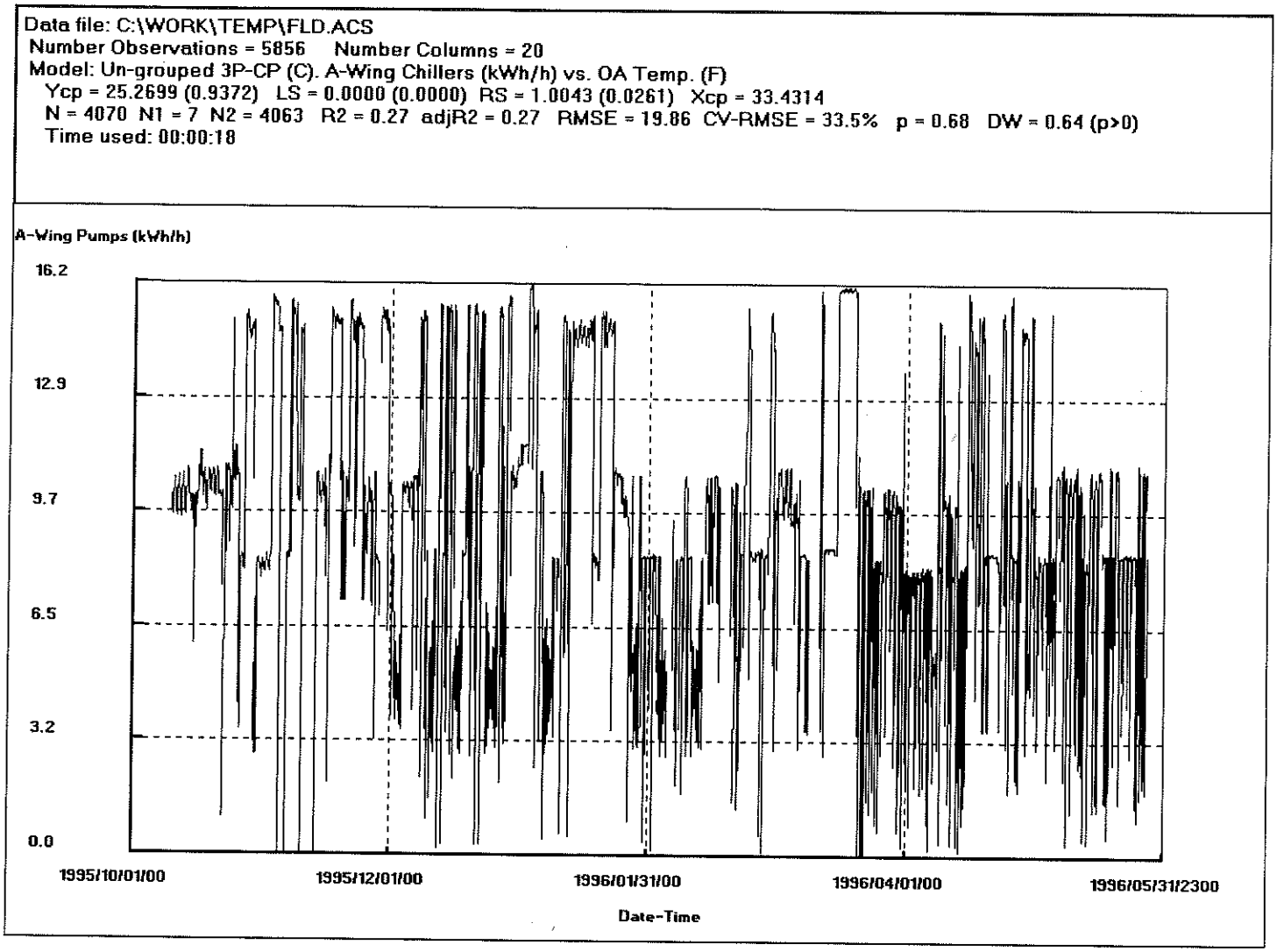
F-4. Time Series Plot of A-Wing Chiller Electricity Consumption (kWh/h).



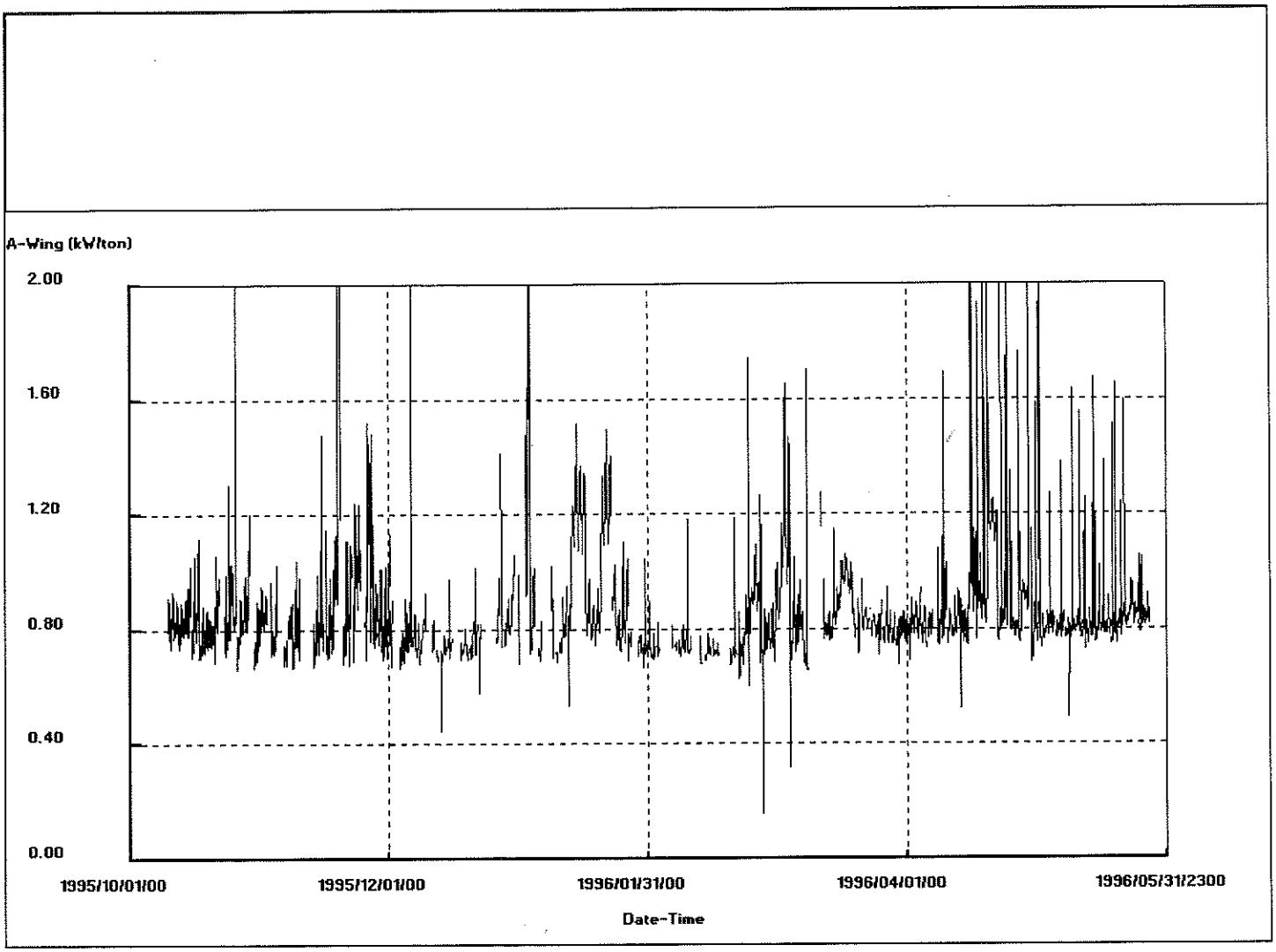
F-5. Scatter Plot of A-Wing Chiller Electricity Consumption (kWh/h) Vs Outside Air Temperature (F).



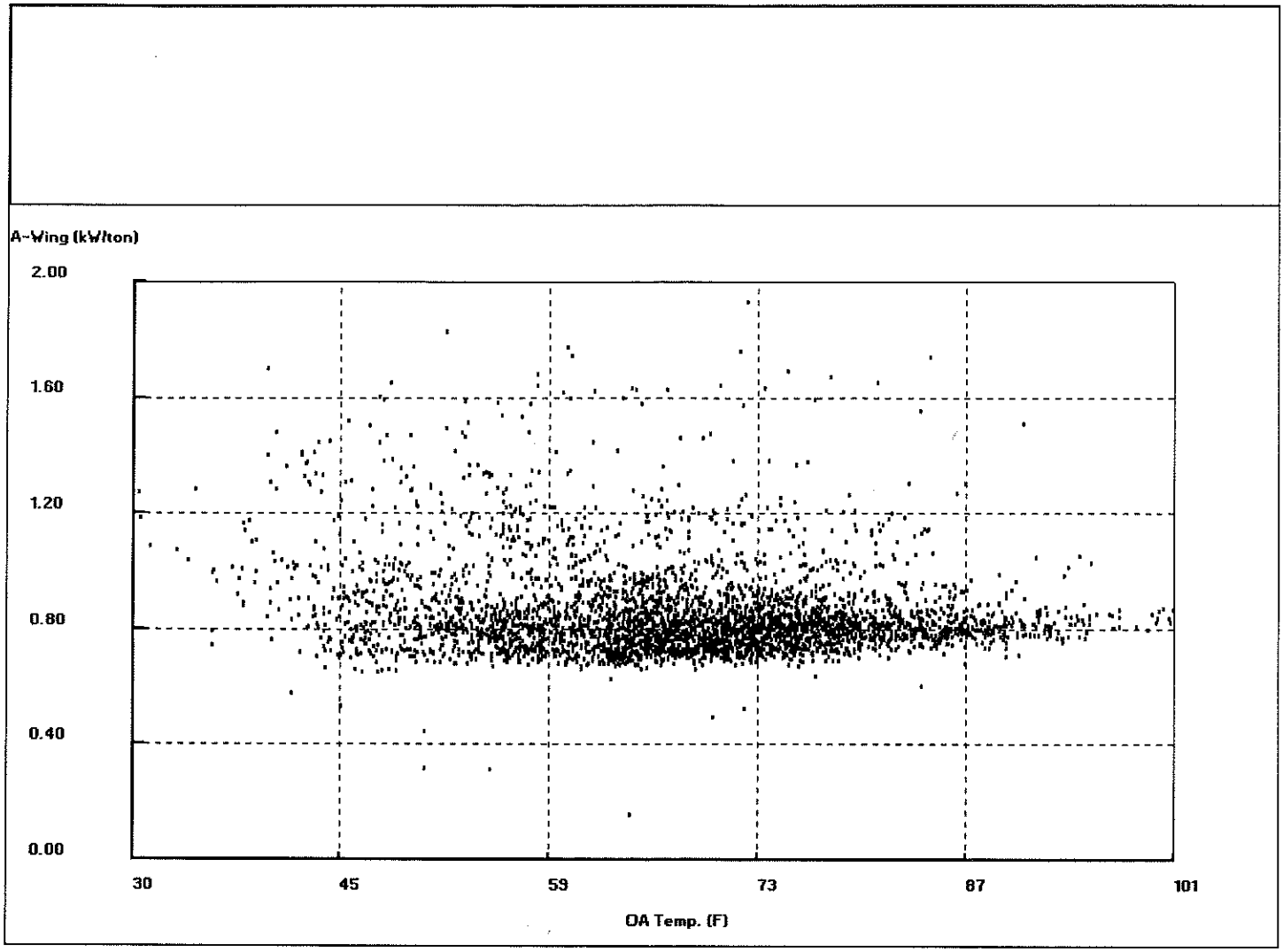
F-6. Time Series Plot of A-Wing AHUs Electricity Consumption (kWh/h).



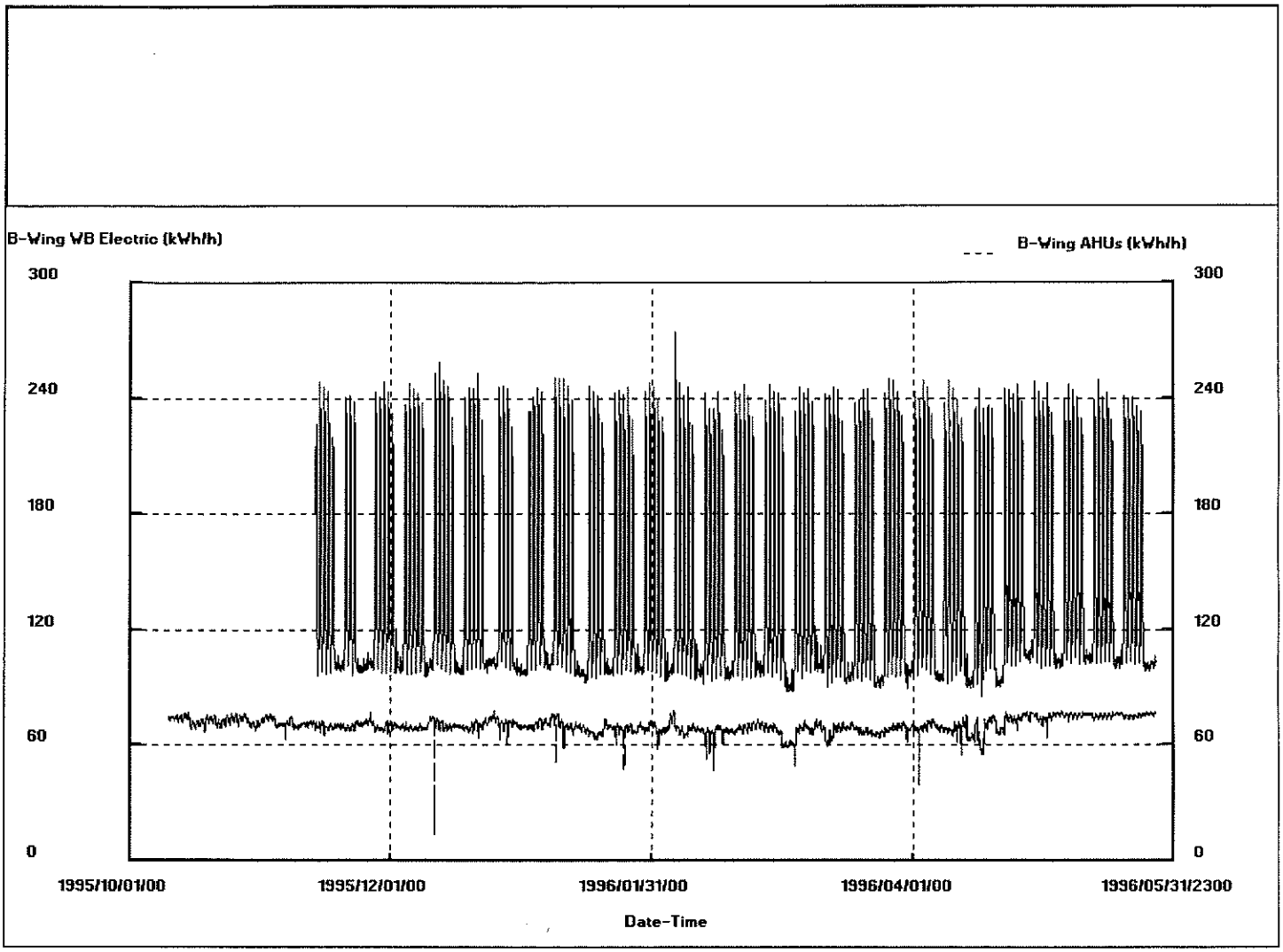
F-7. Time Series Plot of A-Wing Chilled Water Pumps Electricity Consumption (kWh/h).



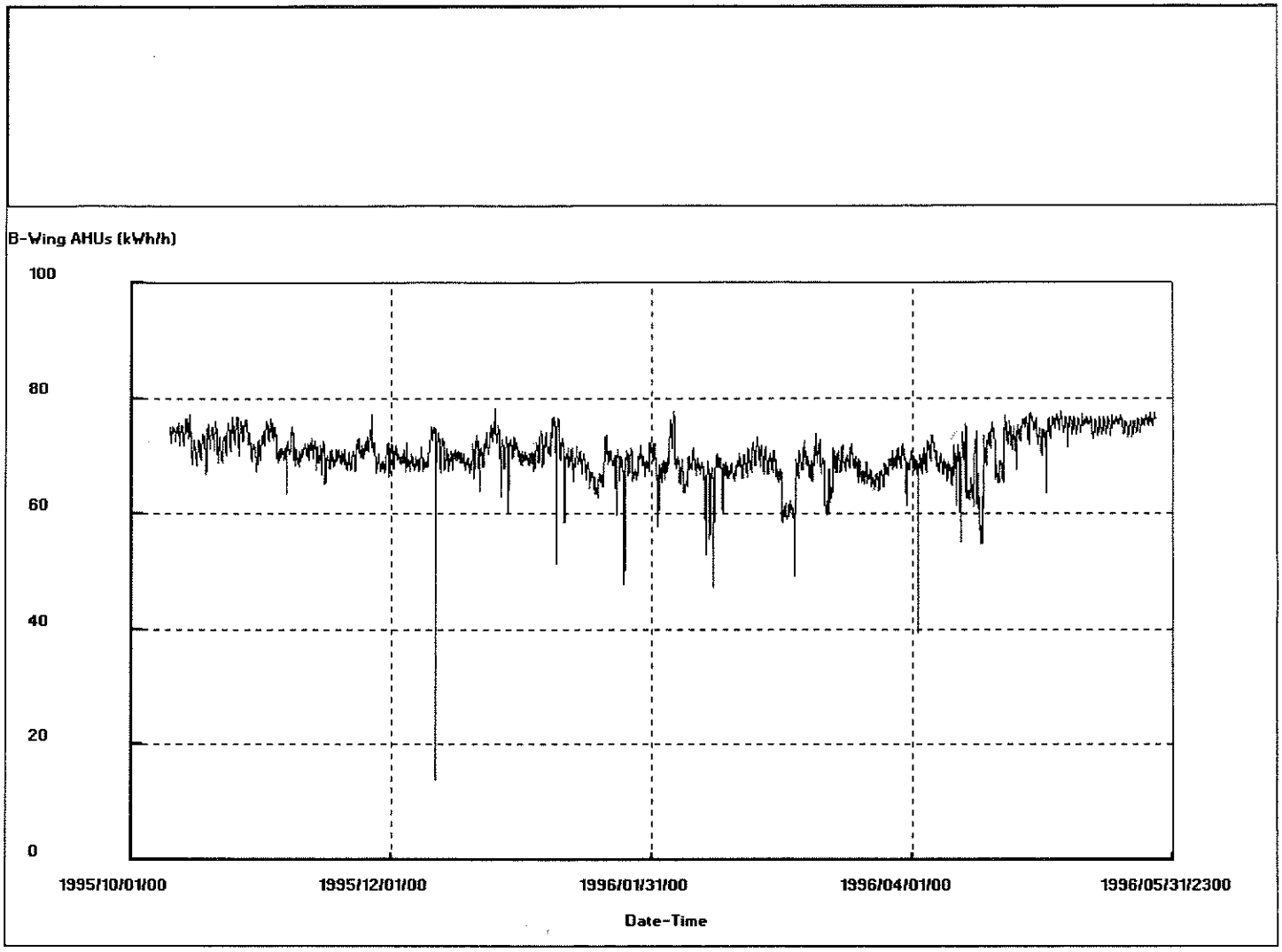
F-8. Chiller Efficiency (kW/Ton) for A-Wing Chiller.



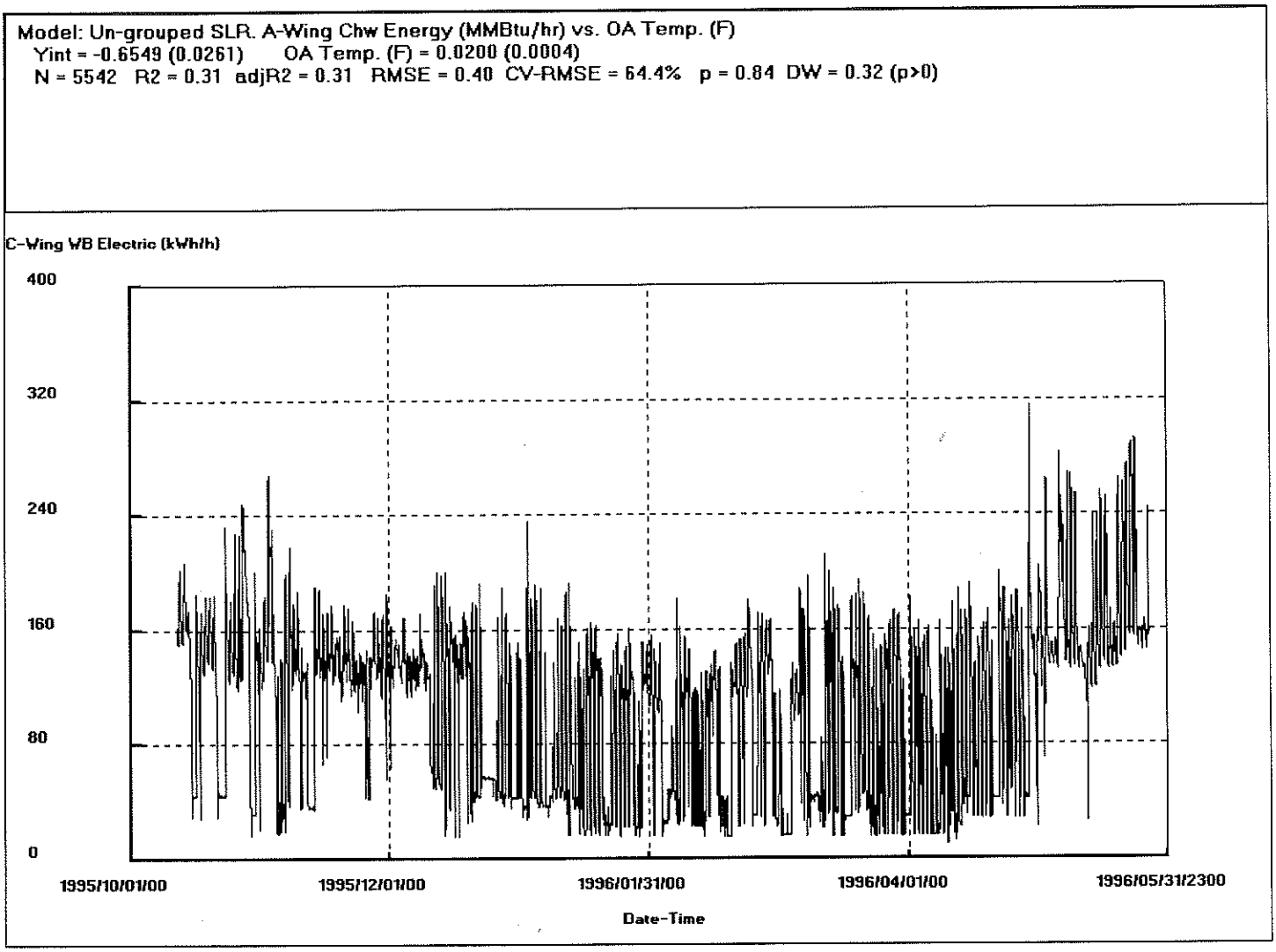
F-9. Scatter Plot of A-Wing Hot Chiller kW/Ton Vs Outside Air Temperature (F).



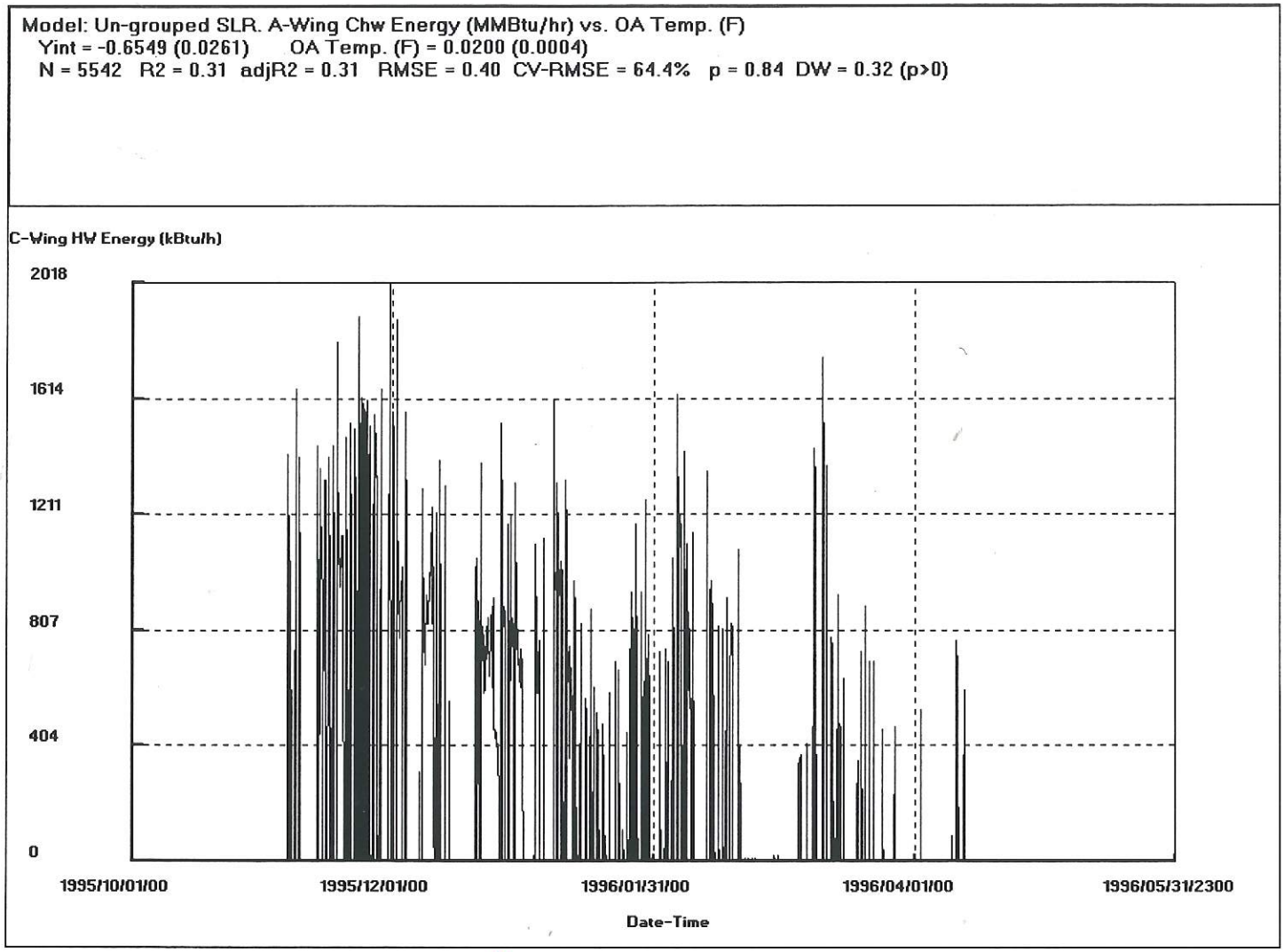
F-10. Time Series Plot of B-Wing Whole Building Electricity Consumption (kWh/h).



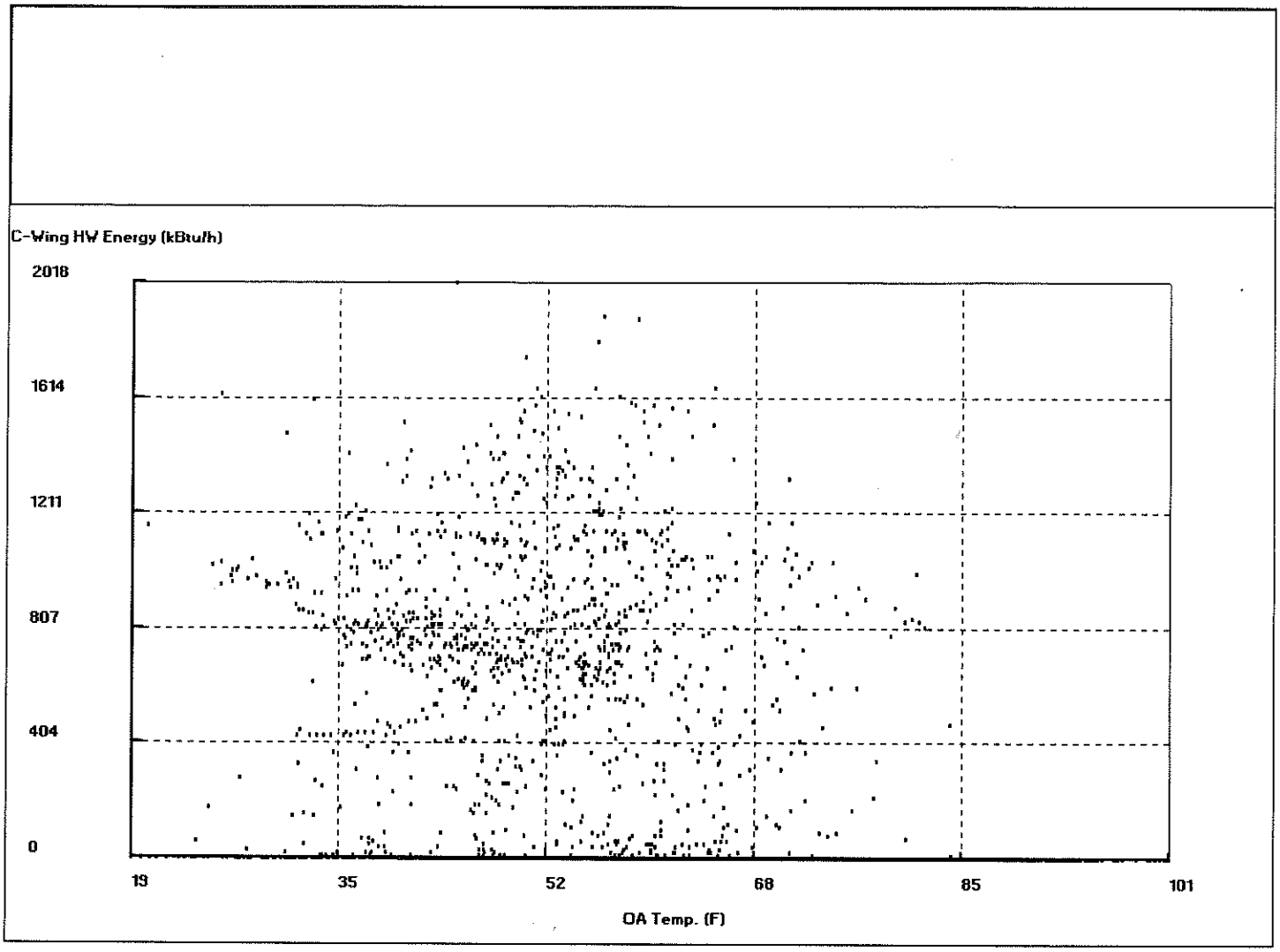
F-11. Time Series Plot of B-Wing AHUs Electricity Consumption (kWh/h).



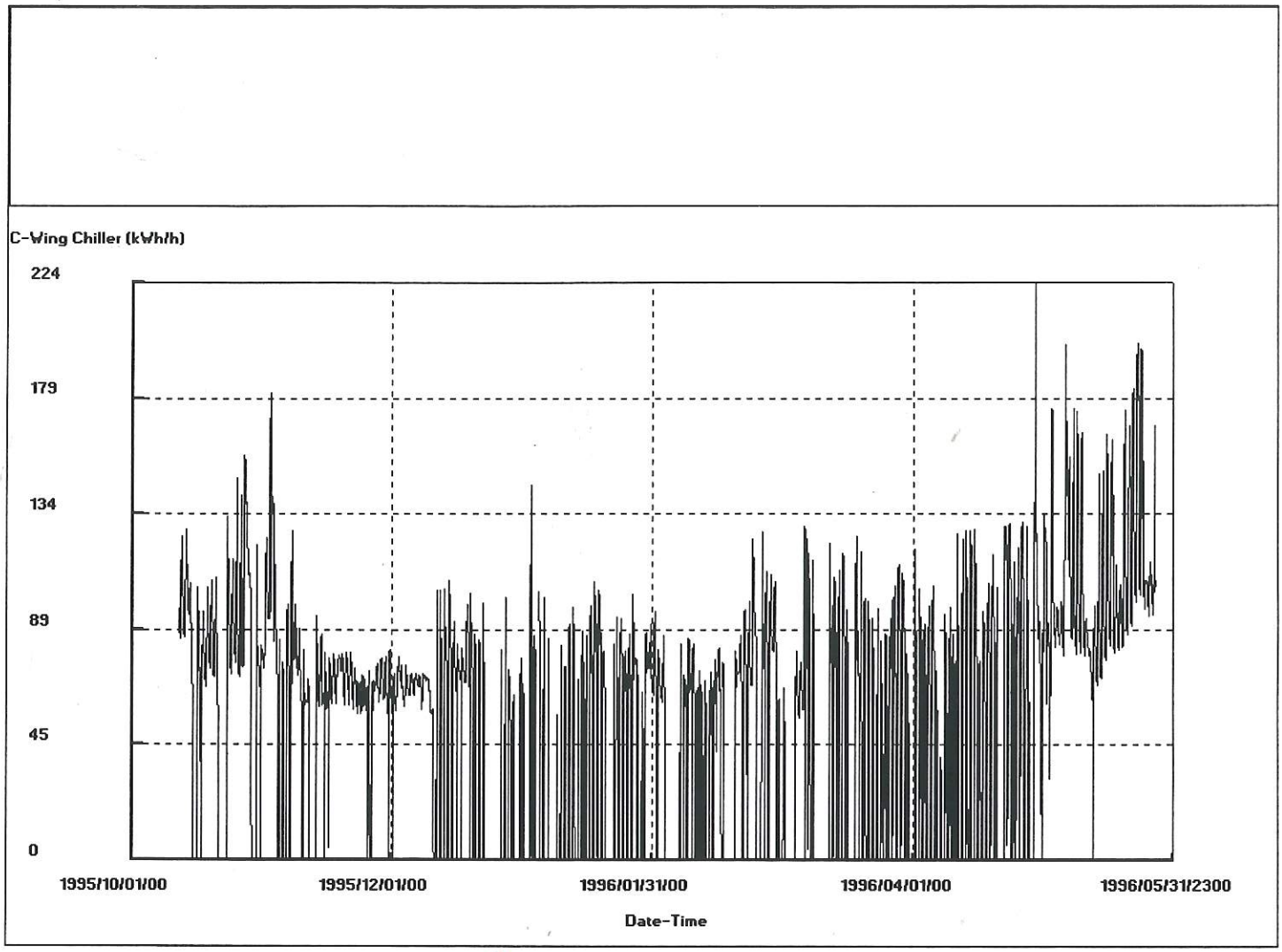
F-12. Time Series Plot of C-Wing Whole Building Electricity Consumption (kWh/h).



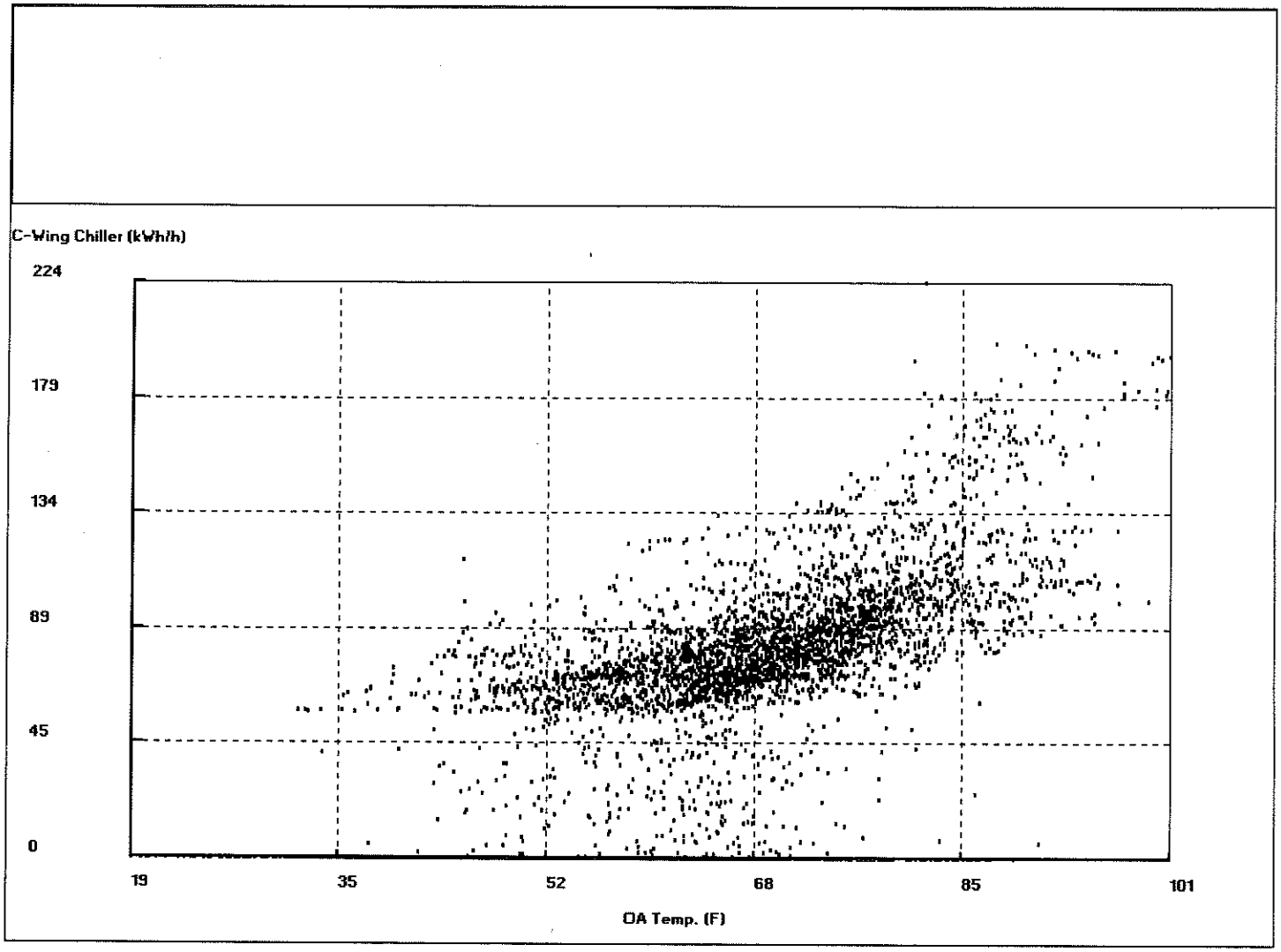
F-13. Time Series Plot of C-Wing Hot Water Energy Consumption (kBtu/h).



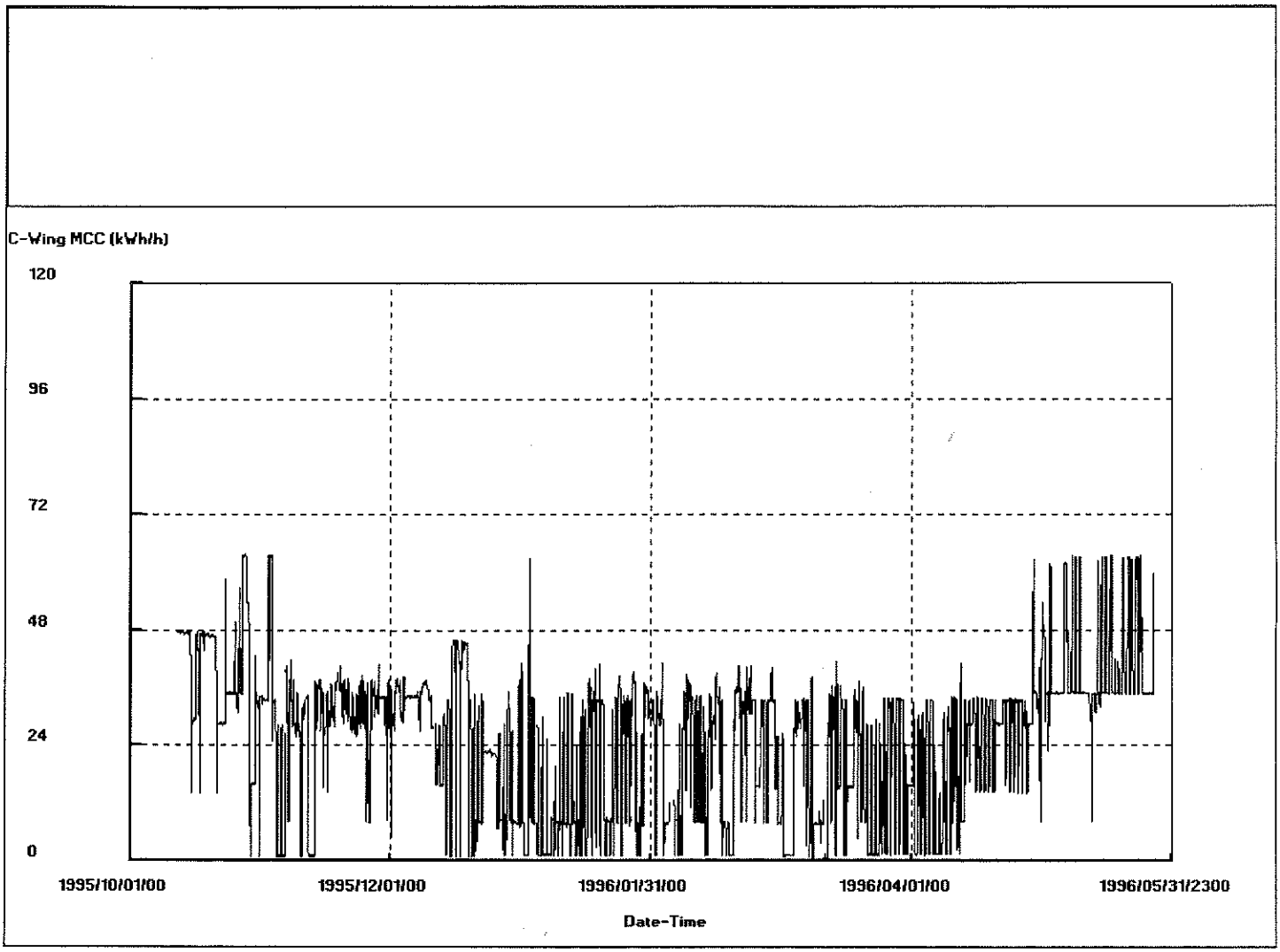
F-14. Scatter Plot of C-Wing Hot Water Energy Consumption (kBtu/h) Vs Outside Air Temperature (F).



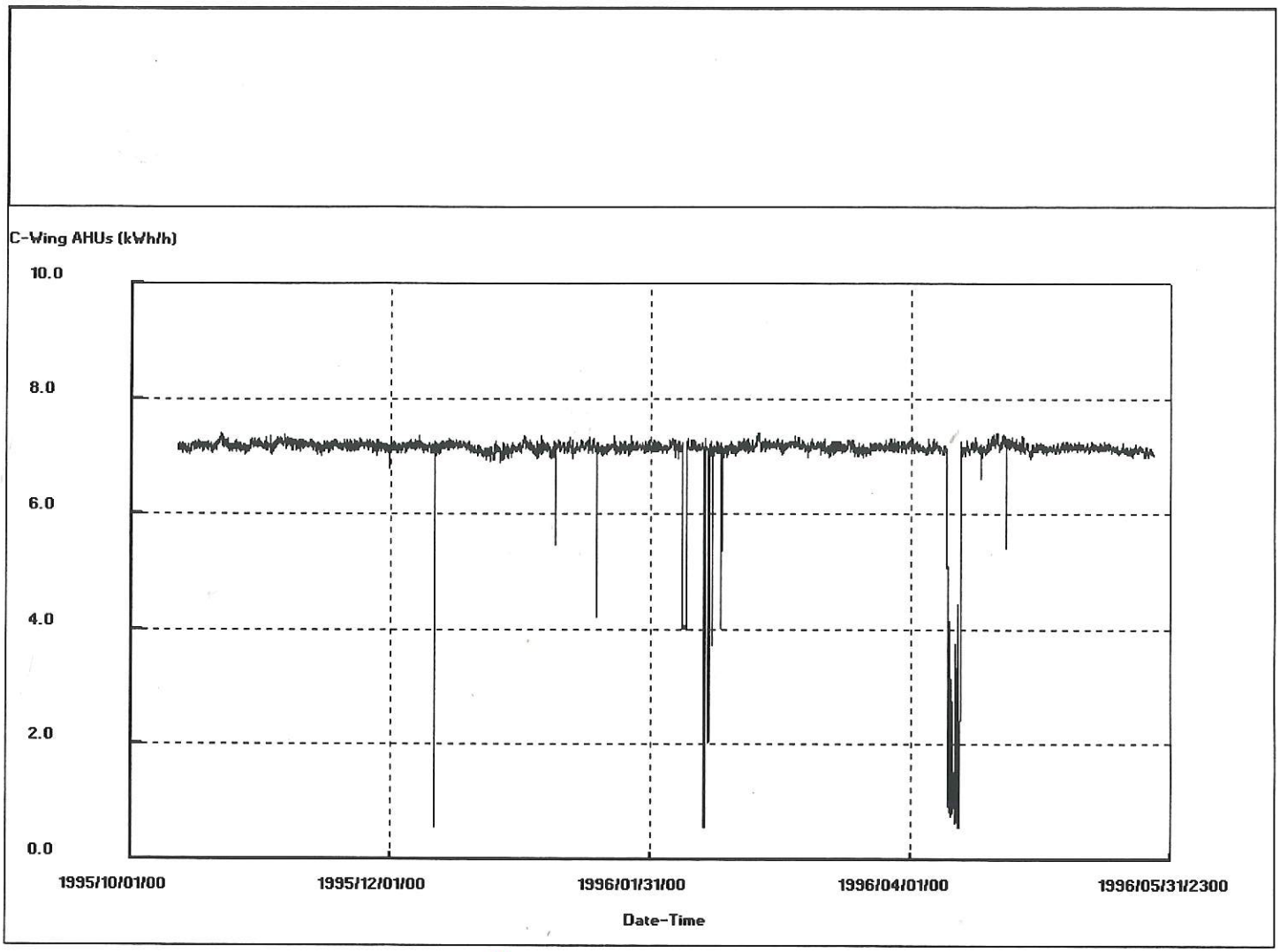
F-15. Time Series Plot of C-Wing Chiller Electricity Consumption (kWh/h).



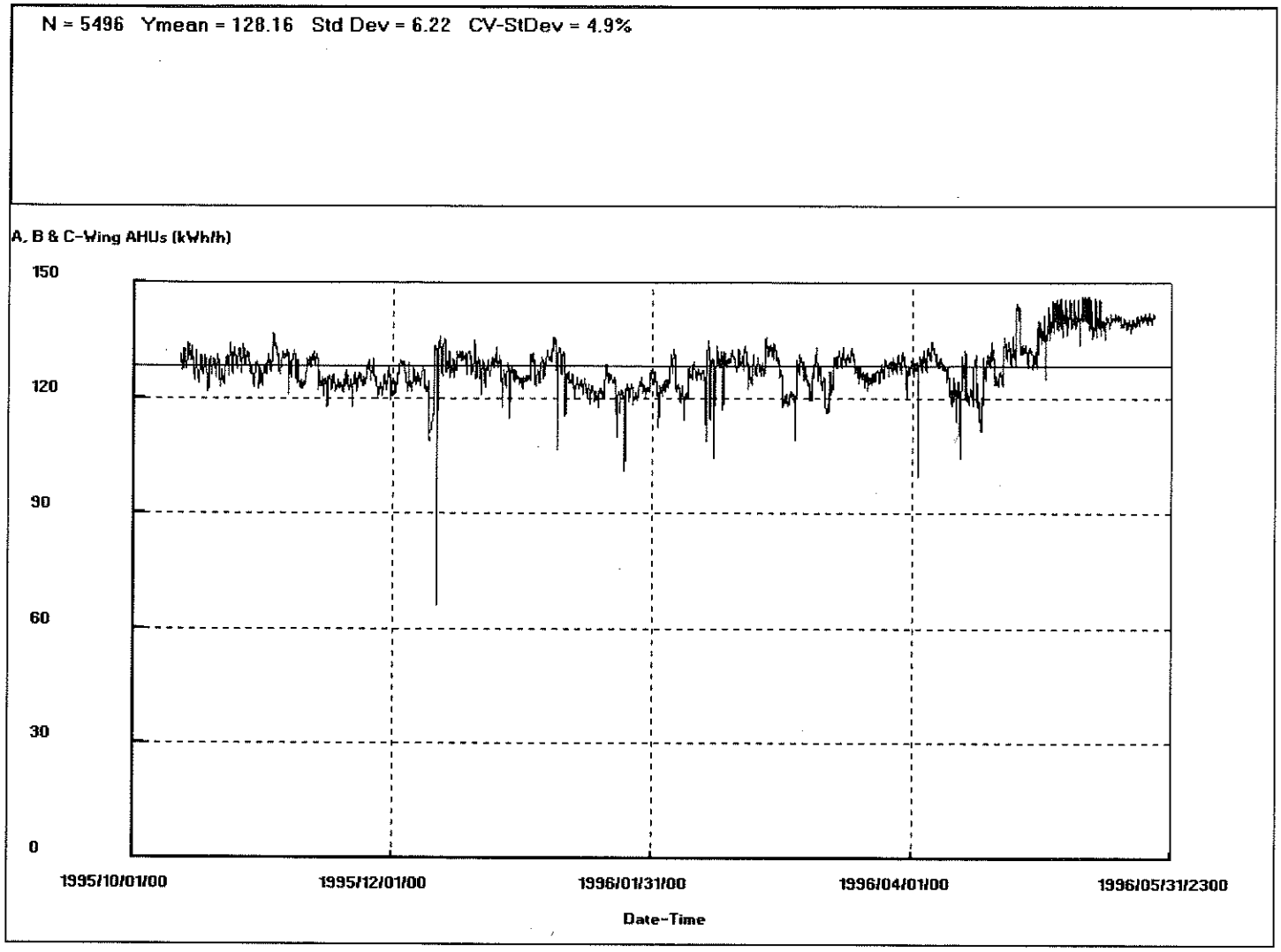
F-16. Scatter Plot of C-Wing Chiller Electricity Consumption (kWh/h) Vs Outside Air Temperature (F).



F-17. Time Series Plot of C-Wing MCC Electricity Consumption (kWh/h).



F-18. Time Series Plot of C-Wing AHUs Electricity Consumption (kWh/h).



F-19. Time Series Plot of A, B & C-Wing AHUs (combined) Electricity Consumption (kWh/h).