

**FINAL SUBMITTAL**

**VOLUME III  
APPENDIX G, PART 2**

**FEASIBILITY STUDY FOR EXPANSION OF  
ENERGY MONITORING AND CONTROL SYSTEM (EMCS)  
FORT DRUM, NEW YORK**

Prepared for

**NORFOLK DISTRICT  
CORPS OF ENGINEERS, CENAO-EN-MC  
803 FRONT STREET, NORFOLK, VIRGINIA 23510**

Under

**U.S. ARMY ENGINEER DISTRICT, MOBILE  
INDEFINITE DELIVERY A-E CONTRACT  
CONTRACT NO. DACA01-94-D-0033  
DELIVERY ORDER NO. 0006**

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By

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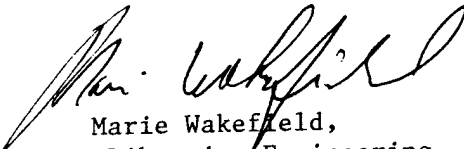


DEPARTMENT OF THE ARMY  
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS  
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Marie Wakefield,  
Librarian Engineering

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## LIST OF ABBREVIATIONS

AC	-	air conditioning
ACC	-	anticipated contract cost
ACCU	-	air cooled condensing unit
ACM	-	asbestos containing material
ACU(s)	-	auxiliary control unit(s)
AHU	-	air handling unit
AI	-	analog input
AO	-	analog output
ASCII	-	American Standard Code for Information Interchange
ASHRAE	-	American Society of Heating, Refrigeration, and Air conditioning Engineers
B/C	-	benefit-to-cost ratio
BCD	-	binary coded decimal
BLDG	-	building
BEACON	-	Building Energy Simulation Program
Btu	-	British thermal units
Btuh	-	British thermal units per hour
B/W	-	black and white
C	-	Celsius
CCC	-	central communications controller
ccf	-	one hundred (100) cubic feet
CCU	-	central control unit

cf	-	cubic foot, cubic feet
cfm	-	cubic feet per minute
CLM	-	command line mnemonic
CLMI	-	command line mnemonic interpreter
COE	-	Corps of Engineers
COS	-	central operator station
CPU	-	central processing unit
CRT	-	cathode ray tube
CU(s)	-	control unit(s)
CWE	-	current working estimate
d	-	day(s)
DCP	-	duty cycle program
DEH	-	Directorate of Engineering and Housing
DHW	-	direct memory access
DI	-	digital input
DO	-	digital output
DOD	-	Department of Defense
DPW	-	Department of Public Works
DTM	-	data transmission media
DX	-	direct expansion
E/C	-	energy-to-cost ratio
ECIP	-	Energy Conservation Investment Program
ECO	-	energy conservation opportunity

EEAP	-	energy engineering analysis program
eff	-	efficiency
elec.	-	electricity
EMC	-	EMC Engineers, Inc.
EMCS	-	energy monitoring and control system
EMI	-	electromagnetic interference
ESCO	-	energy service company
EZ-DOE	-	Building Energy Simulation Program
F	-	Fahrenheit
FO	-	fiber optic(s)
ft	-	foot, feet
ft <sup>2</sup>	-	square feet
FY	-	fiscal year
gal	-	gallon(s)
hp	-	horsepower
hr	-	hours(s)
H & V	-	heating and ventilating
HVAC	-	heating, ventilation, and air conditioning
in.	-	inch(es)
I/O	-	input/output
kBtu	-	one thousand British thermal units
kcf	-	one thousand cubic feet

klb	-	one thousand pounds
kva	-	kilovolt - ampere
kW	-	kilowatt, one thousand watts
kWh	-	kilowatt-hour, one thousand watt-hours
lb	-	pound(s)
LCCA	-	life cycle cost analysis
LCCID	-	life cycle cost in design
LED	-	light emitting diode
LPG	-	liquefied petroleum gas
MAU	-	make-up air unit
MBtu	-	one million Btu
MCR	-	master control room
MHz	-	megahertz
Mh	-	man-hours(s)
mo	-	months(s)
MW	-	megawatt, one million watts
MWh	-	megawatt-hour, one million watt-hours
MZAHU	-	Multizone air handling unit
NA	-	Not active or Not applicable
NG	-	natural gas
NOAA	-	National Oceanic and Atmospheric Administration
no.	-	number
OA	-	outside air

O&M	-	operation and maintenance
PC	-	personal computer
PM	-	preventative maintenance
PROM	-	programmable read-only memory
psi(a)(g)	-	pounds per square inch (absolute) (gage)
RAM	-	random access memory
RCU(s)	-	remote control unit(s)
RTC	-	real-time clock
RTDOS/E	-	real-time disk operating system /executive
S&A	-	Supervision and Administration
scfm	-	sea-level cubic feet per minute
SES	-	shared energy savings
SIOH	-	supervision, inspection, and overhead
SIR	-	savings-to-investment ratio
SPW	-	single present worth
sq.ft.	-	square feet
st/sp	-	start/stop
stm	-	steam
SZAHU	-	single zone air handling unit
t	-	ton
temp	-	temperature
TRY	-	test reference year

UA	-	overall heat transfer coefficient (Btu/hr/ft <sup>2</sup> /°F)
UCU(s)	-	unitary control unit(s)
UH	-	unit heater
UMCS	-	utility monitoring and control system
UPW	-	uniform present worth
VAV	-	variable air volume
wk	-	week(s)
yr	-	year(s)

**ENERGY CALCULATIONS**

BUILDING 10200

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10200

Building Sq.Ft.: 11,248

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

EMC NO.: 1406-006

DATE: 09-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 09-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10200  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	147.5	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>147.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>159.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10200

EMC NO.: 1406-006  
 DATE: 09-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	11,248
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
KW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 09-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10200  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	28.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>28.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>30.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10200  
 Building Sq.Ft.: 11,248

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVAV	2,060	
Heating HRSVAV	3,296	
C/H HRSVAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10200  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10200  
 Building Sq.Ft.: 11,248

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10200  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	526.9	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>526.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	40.9	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>568.6</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10205

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10205  
 Building Sq.Ft.: 18,546

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	11
System Name:	CONDENSING UNIT
System Number:	ACC1

### Typical Building Information

Category	Construction	Use	Occ.	Day
11	BRICK	DENTAL CLINIC	700-1600	MON-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	50
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	0.8
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.34E-03	4.34E-03
COAUHC	1.67E-03	1.67E-03
HOAOH	232.16	232.16
HOAOHC	142.48	142.48
COAOC	8.51E-03	8.51E-03
COAOHC	3.26E-03	3.26E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	8.14E-04	8.14E-04
NSUCHC	5.00E-04	5.00E-04
DDCCHC	9.67E-05	9.67E-05
DDCCC	2.52E-04	2.52E-04
DSC	4.35E+03	4.35E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 31-Mar-95

PAGE 2 OF 2

Bldg Number: 10205  
 System Type: 11  
 System Name: CONDENSING UNIT  
 System Number: ACC1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,439.6	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	4.5	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>4.5</b>	<b>4,865.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	478.5	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>4.5</b>	<b>5,344.0</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10205

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,546
System Type	7
System Name:	VAV AHU
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
11	BRICK	DENTAL CLINIC	700-1600	MON-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	20.75
Load Factor	0.8
CFM - HTG	10430
CFM - CLG	17500
% OA	30.00%
% Area	13.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	0.8
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.34E-03	4.34E-03
COAUHC	1.67E-03	1.67E-03
HOAOH	232.16	232.16
HOAOHC	142.48	142.48
COAOC	8.51E-03	8.51E-03
COAOHC	3.26E-03	3.26E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	8.14E-04	8.14E-04
NSUCHC	5.00E-04	5.00E-04
DCCCHC	9.67E-05	9.67E-05
DDCCC	2.52E-04	2.52E-04
DSC	4.35E+03	4.35E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10205  
 System Type 7  
 System Name: VAV AHU  
 System Number: AHU1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	116,476.7	0.0	
Optimum ST/SP	0.0	2,641.2	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	28.1	0.0	0.0	
Night Setback	0.0	0.0	130.4	
<b>Sub Total</b>	<b>28.1</b>	<b>119,117.8</b>	<b>130.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	1,644.1	0.0	
DDC Control	0.0	16,102.0	10.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
<b>TOTAL</b>	<b>28.1</b>	<b>136,863.9</b>	<b>140.9</b>	<b>6</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10205  
 Building Sq.Ft.: 18,546

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HX1

### Typical Building Information

Category	Construction	Use	Occ.	Day
11	BRICK	DENTAL CLINIC	700-1600	MON-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	87.00%
TON CAPC.	0
MBTU CAPC.	0.94283
KW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.34E-03	4.34E-03
COAUHC	1.67E-03	1.67E-03
HOAOH	232.16	232.16
HOAOHC	142.48	142.48
COAOC	8.51E-03	8.51E-03
COAOHC	3.26E-03	3.26E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	8.14E-04	8.14E-04
NSUCHC	5.00E-04	5.00E-04
DDCCHC	9.67E-05	9.67E-05
DDCCC	2.52E-04	2.52E-04
DSC	4.35E+03	4.35E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10205  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HX1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,703.1	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	872.4	
<b>Sub Total</b>	<b>0.0</b>	<b>2,865.2</b>	<b>872.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	70.2	
HW OA Reset	0.0	0.0	7.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,865.2</b>	<b>949.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10205

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,546
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HX2

### Typical Building Information

Category	Construction	Use	Occ.	Day
11	BRICK	DENTAL CLINIC	700-1600	MON-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.333333
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	4.34E-03	4.34E-03
COAUHC	1.67E-03	1.67E-03
HOAOH	232.16	232.16
HOAOHC	142.48	142.48
COAOC	8.51E-03	8.51E-03
COAOHC	3.26E-03	3.26E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	8.14E-04	8.14E-04
NSUHC	5.00E-04	5.00E-04
DDCCHC	9.67E-05	9.67E-05
DDCCC	2.52E-04	2.52E-04
DSC	4.35E+03	4.35E+03
NSC	5.41E+04	5.41E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10205  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HX2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	959.3	0.0	
Optimum ST/SP	0.0	57.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>1,016.8</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,016.8</b>	<b>2.3</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10207

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10207

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,199
System Type	4
System Name:	SINGLE ZONE AHU
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	2100	2100	2100	2100	2100	2100	2100

INPUTS	INPUT
Motor HP	3.1
Load Factor	0.8
CFM - HTG	2500
CFM - CLG	2500
% OA	35.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
KW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	2,100
Heating HRSON	2,112	3,360
C/H HRSON	3,441	5,475
Cooling HRSVA	780	
Heating HRSVA	1,248	
C/H HRSVA	2,034	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10207  
 System Type: 4  
 System Name: SINGLE ZONE AHU  
 System Number: AHU1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,403.0	0.0	
Optimum ST/SP	0.0	440.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	4.7	0.0	0.0	
Night Setback	0.0	0.0	87.5	
<b>Sub Total</b>	<b>4.7</b>	<b>11,843.0</b>	<b>87.5</b>	
Economizer	0.0	982.7	0.0	
Ventilation/Recirculation	0.0	614.2	10.7	
DDC Control	0.0	0.0	32.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>4.7</b>	<b>13,439.9</b>	<b>130.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10207

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,199
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	1500	1500	1500	1500	1500	1500	1500

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	4500
CFM - CLG	4500
% OA	35.00%
% Area	26.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	1,260
Heating HRSON	2,112	2,016
C/H HRSON	3,441	3,285
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10207  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	151.7	
<b>Sub Total</b>	<b>10.8</b>	<b>1,012.1</b>	<b>151.7</b>	
Economizer	0.0	1,768.9	0.0	
Ventilation/Recirculation	0.0	1,105.5	0.0	
DDC Control	0.0	0.0	56.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>3,886.4</b>	<b>207.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10207  
 Building Sq.Ft.: 18,199

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	2100	2100	2100	2100	2100	2100	2100

INPUTS	INPUT	
Motor HP	7.5	
Load Factor	0.8	
CFM - HTG	6100	
CFM - CLG	6100	
% OA	35.00%	
% Area	36.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	83.10%	83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	2,100
Heating HRSON	2,112	3,360
C/H HRSON	3,441	5,475
Cooling HRSAB	780	
Heating HRSAB	1,248	
C/H HRSAB	2,034	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10207  
 System Type 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU3

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	27,156.9	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	210.0	
<b>Sub Total</b>	<b>10.8</b>	<b>28,169.0</b>	<b>210.0</b>	
Economizer	0.0	2,397.8	0.0	
Ventilation/Recirculation	0.0	1,498.5	0.0	
DDC Control	0.0	0.0	77.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>32,065.4</b>	<b>287.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10207

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,199
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	2100	2100	2100	2100	2100	2100	2100

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	4000
CFM - CLG	4000
% OA	35.00%
% Area	23.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	2,100
Heating HRSON	2,112	3,360
C/H HRSON	3,441	5,475
Cooling HRSVA	780	
Heating HRSVA	1,248	
C/H HRSVA	2,034	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10207  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	21,576.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	134.2	
<b>Sub Total</b>	<b>10.8</b>	<b>22,588.7</b>	<b>134.2</b>	
Economizer	0.0	1,572.3	0.0	
Ventilation/Recirculation	0.0	982.6	17.1	
DDC Control	0.0	0.0	49.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>25,143.7</b>	<b>200.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10207

Building Sq.Ft.: 18,199

System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B1

EMC NO.: 1406-006

DATE: 31-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.8216
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	3,360
Heating HRSON	2,464	5,376
C/H HRSON	4,015	8,760
Cooling HRSAV	1,820	
Heating HRSAV	2,912	
C/H HRSAV	4,745	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10207  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,453.7	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,741.3</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.6	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,741.3</b>	<b>7.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10207

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,199
System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B2

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.8216
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	3,360
Heating HRSON	2,464	5,376
C/H HRSON	4,015	8,760
Cooling HRSAV	1,820	
Heating HRSAV	2,912	
C/H HRSAV	4,745	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 31-Mar-95

PAGE 2 OF 2

Bldg Number: 10207  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,453.7	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,741.3</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.6	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,741.3</b>	<b>7.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10207

Building Sq.Ft.: 18,199

System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B3

EMC NO.: 1406-006

DATE: 31-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.8216
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	3,360
Heating HRSON	2,464	5,376
C/H HRSON	4,015	8,760
Cooling HRSAB	1,820	
Heating HRSAB	2,912	
C/H HRSAB	4,745	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10207  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,453.7	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,741.3</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.6	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,741.3</b>	<b>7.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10207  
 Building Sq.Ft.: 18,199

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	8
System Name:	CHILLER AND PUMPS
System Number:	WC1

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	73
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	0.8
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	3,360
Heating HRSON	2,464	5,376
C/H HRSON	4,015	8,760
Cooling HRSAB	1,820	
Heating HRSAB	2,912	
C/H HRSAB	4,745	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10207  
 System Type: 8  
 System Name: CHILLER AND PUMPS  
 System Number: WC1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	9,797.8	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>10.8</b>	<b>10,809.9</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	698.6	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>11,508.5</b>	<b>0.0</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10210

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10210  
 Building Sq.Ft.: 12,448

EMC NO.: 1406-006  
 DATE: 09-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
KW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 09-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10210  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>175.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10210

Building Sq.Ft.: 12,448

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

EMC NO.: 1406-006

DATE: 09-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCW/LC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 09-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10210  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10210

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,448

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10210  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10210

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,448
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10210  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.2	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.2</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10212

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,212

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 51,794

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	2	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.5123	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	78.00%	78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 01-Apr-95  
PAGE 2 OF 2

Bldg Number: 10,212  
System Type: 9  
System Name: CONVERTER AND PUMPS  
System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>3.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,212  
 Building Sq.Ft.: 51,794

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 10,212

System Type: 12

System Name: BASEBOARD RADIATION

System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10212

EMC NO.: 1406-006

DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	4779	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCCI	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212

EMC NO.: 1406-006

DATE: 12-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4566
CFM - CLG	0
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSWBMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	750	
CFM - CLG	0	
% OA	100.00%	
% Area	12.75%	
TON CAPC.	0	
MBTU CAPC.	0	
KW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212  
 Building Sq.Ft.: 34,184

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>79.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10212  
 Building Sq.Ft.: 34,184

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	1350	
CFM - CLG	0	
% OA	100.00%	
% Area	19.30%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10212  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>79.9</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10214

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10214

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	48,916
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10214  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,214

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	48,916
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
KW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,214  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10214

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,240

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10214  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10214

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,240
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10214  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10214  
 Building Sq.Ft.: 12,240

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10214  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10214

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/MLC  
 PAGE 1 OF 2

Building Sq.Ft.:	36,712
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10214  
 System Type 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	87.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>87.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10214  
 Building Sq.Ft.: 36,712

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10214  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	87.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>87.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10220

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10220

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,448
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10220  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>175.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10220

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,448

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10220  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10220

Building Sq.Ft.: 12,448

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10220  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10220

EMC NO.: 1406-006

DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,448
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10220  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.2	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.2</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10222

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10222

Building Sq.Ft.: 51,794

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0*
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,900	3,360
Heating HRSON	3,040	5,376
C/H HRSON	4,954	8,760
Cooling HRSAV	1,460	
Heating HRSAV	2,336	
C/H HRSAV	3,806	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

\*ESTIMATED PUMP ON 50% OF UNOCCUPIED HOURS

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,572.8	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>3,860.3</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>3,860.3</b>	<b>2.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,222  
 Building Sq.Ft.: 51,794

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,222  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10222

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	4566	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10222

EMC NO.: 1406-006

DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVAV	2,060	
Heating HRSVAV	3,296	
C/H HRSVAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00E+00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10222

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10222

EMC NO.: 1406-006

DATE: 01-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10222  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 02-Apr-95  
PAGE 2 OF 2

Bldg Number: 10222  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10222  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10222

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 17,610

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10222  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSWBMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10222

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	34,184
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	26.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRE HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>79.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10222

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	34,184
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1350
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRE HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10222  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>79.9</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10224

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10224  
 Building Sq.Ft.: 48,961

EMC NO.: 1406-006  
 DATE: 14-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	14.77
HOAOHC	110.07	9.07
COAOC	0.00E+00	2.10E-05
COAOHC	0.00E+00	8.04E-06
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	1.26E-05
NSUCHC	0.00E+00	7.74E-06
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	8.71E+03
NSC	4.86E+04	5.97E+04
FV	0	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 14-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10224  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,224  
 Building Sq.Ft.: 48,916

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,224  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10224

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,240
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	770	
CFM - CLG	0	
% OA	100.00%	
% Area	17.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10224  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10224  
 Building Sq.Ft.: 12,240

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10224  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10224

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,240
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10224  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	101.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10224

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	36,712
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVAV	0	
Heating HRSVAV	0	
C/H HRSVAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10224  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	87.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>87.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10224  
 Building Sq.Ft.: 36,712

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10224  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	87.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>87.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10230

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10230

EMC NO.: 1406-006  
 DATE: 09-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,448
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 09-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10230  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>175.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10230

Building Sq.Ft.: 12,448

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

EMC NO.: 1406-006

DATE: 09-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP		1
Load Factor		0.8
CFM - HTG		210
CFM - CLG		0
% OA		100.00%
% Area		4.00%
TON CAPC.		0
MBTU CAPC.		0
kW/Ton		0
MOSON		12
EFF		1
LOOK-UP VALUE	EFFHP	69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 09-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10230  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10230

Building Sq.Ft.: 12,448

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10230  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10230

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,448
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10230  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.2	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.2</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10232

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,232

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	51,794
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.5123
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,232  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>3.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,232  
 Building Sq.Ft.: 51,794

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.75	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.9801	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,232  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED PRESENT	
	HR/YR	HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	14
System Name:	VENTILATION
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1

LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 12-Apr-95

PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	14
System Name:	VENTILATION
System Number:	AHU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4779
CFM - CLG	0
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 12-Apr-95

PAGE 2 OF 2

Bldg Number: 10232  
System Type: 14  
System Name: VENTILATION  
System Number: AHU-4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00%   65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 17,610

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	34,184
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	80.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>80.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10232  
 Building Sq.Ft.: 34,184

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1350
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10132  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	77.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>77.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10234

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,234  
 Building Sq.Ft.: 57,581

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/LC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.5123
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 01-Apr-95  
PAGE 2 OF 2

Bldg Number: 10,234  
System Type: 9  
System Name: CONVERTER AND PUMPS  
System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>3.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,234

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	57,581
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT		
Motor HP	0.75		
Load Factor	0.8		
CFM - HTG	0		
CFM - CLG	0		
% OA	0.00%		
% Area	0.00%		
TON CAPC.	0		
MBTU CAPC.	0.9801		
kW/Ton	0		
MOSON	7		
EFF	1		
LOOK-UP VALUE	EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,234  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,578
System Type	14
System Name:	VENTILATION
System Number:	AHU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kw/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,578
System Type	14
System Name:	VENTILATION
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/MLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,578
System Type	14
System Name:	VENTILATION
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	4779	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234  
 Building Sq.Ft.: 19,578

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	14
System Name:	VENTILATION
System Number:	AHU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4779
CFM - CLG	0
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234  
 Building Sq.Ft.: 19,578

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kw/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	121.4	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>121.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>136.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 19,578

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	121.4	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>121.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>136.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234  
 Building Sq.Ft.: 19,578

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	121.4	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>121.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>136.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 19,578

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	750	
CFM - CLG	0	
% OA	100.00%	
% Area	12.75%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	121.4	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>121.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>136.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234  
 Building Sq.Ft.: 38,003

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10234

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	88.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>88.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10234

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	38,003
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1350
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10234  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	88.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>88.9</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10250

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10250

EMC NO.: 1406-006

DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,553
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	8000
CFM - CLG	0
% OA	100.00%
% Area	17.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAHU	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 10250  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,789.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.4	
<b>Sub Total</b>	<b>0.0</b>	<b>12,801.7</b>	<b>174.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,801.7</b>	<b>237.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10250

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,553
System Type	2
System Name:	H&V UNIT
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	5265
CFM - CLG	0
% OA	25.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSVA	938	
Heating HRSVA	1,501	
C/H HRSVA	2,445	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10250  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,042.8	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	296.2	
<b>Sub Total</b>	<b>0.0</b>	<b>15,122.3</b>	<b>296.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	107.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>15,122.3</b>	<b>403.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10250

EMC NO.: 1406-006

DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 18,553

System Type	2
System Name:	H&V UNIT
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4670
CFM - CLG	0
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRS AV	938	
Heating HRS AV	1,501	
C/H HRS AV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10250  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,001.1	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	261.3	
<b>Sub Total</b>	<b>0.0</b>	<b>18,308.0</b>	<b>261.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	94.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>18,308.0</b>	<b>355.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10250

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,553
System Type	2
System Name:	H&V UNIT
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7430
CFM - CLG	0
% OA	5.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
KW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10250  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,236.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	418.1	
<b>Sub Total</b>	<b>0.0</b>	<b>27,177.0</b>	<b>418.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	151.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>27,177.0</b>	<b>569.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10250

EMC NO.: 1406-006

DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,553
System Type	2
System Name:	H&V UNIT
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10250  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,725.7	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.2	
<b>Sub Total</b>	<b>0.0</b>	<b>11,550.2</b>	<b>174.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	62.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>11,550.2</b>	<b>237.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10250

Building Sq.Ft.: 18,553

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAV	840	
Heating HRSAV	1,344	
C/H HRSAV	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10250  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	27.9	
<b>Sub Total</b>	<b>0.0</b>	<b>7,181.9</b>	<b>27.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>7,181.9</b>	<b>37.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10250  
 Building Sq.Ft.: 18,553

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSVA	840	
Heating HRSVA	1,344	
C/H HRSVA	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10250  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,349.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	128.9	
<b>Sub Total</b>	<b>0.0</b>	<b>3,637.0</b>	<b>128.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	46.6	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>3,637.0</b>	<b>186.7</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10270

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,984
System Type	2
System Name:	H&V UNIT
System Number:	HV1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.1	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>24.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>30.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSWBMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 25,984

System Type	2
System Name:	H&V UNIT
System Number:	HV2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.1	
<b>Sub Total</b>	<b>0.0</b>	<b>101,035.1</b>	<b>24.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>101,035.1</b>	<b>30.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,984
System Type	2
System Name:	H&V UNIT
System Number:	HV3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.1	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>24.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>30.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,984
System Type	2
System Name:	H&V UNIT
System Number:	HV4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.0	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>12.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>15.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 25,984

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.4	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>18.1</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,984
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>7.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>9.1</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,984
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.4	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>18.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,984
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.4	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>18.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM BLDG: 10270

Building Sq.Ft.: 25,984

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-5

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>7.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>9.1</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10270

Building Sq.Ft.: 25,984

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU6

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.0	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>12.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.1</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270  
 Building Sq.Ft.: 25,984

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-7

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	4.8	
<b>Sub Total</b>	<b>0.0</b>	<b>29,644.0</b>	<b>4.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>29,644.0</b>	<b>6.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,984
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HTP1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	5	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	24.00%	
TON CAPC.	0	
MBTU CAPC.	3.587	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	81.60%	81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	57.7	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>57.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.7	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>99.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10270  
 Building Sq.Ft.: 25,984

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10270  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>34.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10270

EMC NO.: 1406-006

DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 25,984

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	5	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	4.258	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	81.60%	81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 05-Apr-95  
PAGE 2 OF 2

Bldg Number: 10270  
System Type 9  
System Name: CONVERTER AND PUMPS  
System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>31.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10412

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,412

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	54,872
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT		
Motor HP		2	
Load Factor		0.8	
CFM - HTG		0	
CFM - CLG		0	
% OA		0.00%	
% Area		0.00%	
TON CAPC.		0	
MBTU CAPC.		0.5123	
kW/Ton		0	
MOSON		7	
EFF		1	
LOOK-UP VALUE	EFFHP	78.00%	78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,412  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>3.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,412  
 Building Sq.Ft.: 59,078

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,412  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,656
System Type	14
System Name:	VENTILATION
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10412  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,656
System Type	VENTILATION
System Name:	AHU2
System Number:	

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95  
PAGE 2 OF 2

Bldg Number: 10412  
System Type: 14  
System Name: VENTILATION  
System Number: AHU2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412  
 Building Sq.Ft.: 18,656

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	14
System Name:	VENTILATION
System Number:	AHU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4566
CFM - CLG	0
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10412  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,656
System Type	14
System Name:	VENTILATION
System Number:	AHU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4779
CFM - CLG	0
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00%   79.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 12-Apr-95  
PAGE 2 OF 2

Bldg Number: 10412  
System Type: 14  
System Name: VENTILATION  
System Number: AHU-4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,656
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10412  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	115.7	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>115.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>129.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,656
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESEnt HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10412  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	115.7	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>115.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>129.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,656
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVAV	2,060	
Heating HRSVAV	3,296	
C/H HRSVAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10412  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	115.7	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>115.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>129.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412  
 Building Sq.Ft.: 18,656

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10412

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	115.7	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>115.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>129.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10412  
 Building Sq.Ft.: 38,216

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10412  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	84.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>84.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10412

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	38,216
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT		
Motor HP	0.33		
Load Factor	0.8		
CFM - HTG	1350		
CFM - CLG	0		
% OA	100.00%		
% Area	19.30%		
TON CAPC.	0		
MBTU CAPC.	0		
kW/Ton	0		
MOSON	12		
EFF	1		
LOOK-UP VALUE	EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

	CONSTANT	LOOK-UP	INPUT
HOAUH		0.00	0.00
HOAUHC		0.00	0.00
COAUC	0.00E+00		0.00E+00
COAUHC	0.00E+00		0.00E+00
HOAOH		0.00	0.00
HOAOHC		0.00	0.00
COAOC	0.00E+00		0.00E+00
COAOHC	0.00E+00		0.00E+00
DC DUTY		0.00	0.00
DC DEMAN		0.17	0.17
ECC	0.00E+00		0.00E+00
ECHC	0.00E+00		0.00E+00
NSUCC	0.00E+00		0.00E+00
NSUCHC	0.00E+00		0.00E+00
DDCCHC	0.00E+00		0.00E+00
DDCCC	0.00E+00		0.00E+00
DSC	1.40E+04		1.40E+04
NSC	0.00E+00		0.00E+00
FV		0	0
CHWR		9.57	9.57
OAR		7.40	7.40
OPT		0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10412  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	84.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>84.8</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10400

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10400

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	11,249
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10400  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	147.6	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>147.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>159.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10400

Building Sq.Ft.: 11,249

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10400  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	28.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>28.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>30.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10400

Building Sq.Ft.: 11,249

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10400  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10400  
 Building Sq.Ft.: 11,249

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 04-Apr-95  
PAGE 2 OF 2

Bldg Number: 10400  
System Type: 12  
System Name: BASEBOARD RADIATION  
System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	527.0	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>527.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	40.9	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>568.7</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10410

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10410

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10410  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>176.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10410

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVAV	2,060	
Heating HRSVAV	3,296	
C/H HRSVAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10410  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10410

Building Sq.Ft.: 12,450

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10410  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10410

Building Sq.Ft.: 12,450

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 10410  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.3</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10414

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,414  
 Building Sq.Ft.: 59,078

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.5123
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,414  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>3.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,414  
 Building Sq.Ft.: 59,078

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAHU	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,414  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	20,087
System Type	14
System Name:	VENTILATION
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	20,087
System Type	14
System Name:	VENTILATION
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10111  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	20,087
System Type	14
System Name:	VENTILATION
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	4566	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	20,087
System Type	14
System Name:	VENTILATION
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414  
 Building Sq.Ft.: 20,087

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	124.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>124.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>139.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	20,087
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	124.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>124.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>139.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	20,087
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	124.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>124.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>139.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414  
 Building Sq.Ft.: 20,087

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	124.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>124.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>139.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	38,991
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	91.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>91.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10414  
 Building Sq.Ft.: 38,991

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1350
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10414  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	91.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>91.3</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10420

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10420

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,450

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10420  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>176.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10420

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,450

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10420  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10420

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10420  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10420

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10420  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.3</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10422

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,422  
 Building Sq.Ft.: 47,300

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,422  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,422  
 Building Sq.Ft.: 47,300

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/CLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,422  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10422

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	11,825
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10422  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	97.8	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>97.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10422  
 Building Sq.Ft.: 11,825

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10422  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	97.8	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>97.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10422  
 Building Sq.Ft.: 11,825

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10422  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	97.8	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>97.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10422

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	35,475
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10422  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	84.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>84.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10422  
 Building Sq.Ft.: 35,475

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/LC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10422  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	84.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>84.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10450

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10450

Building Sq.Ft.: 9,486

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	8000
CFM - CLG	0
% OA	100.00%
% Area	17.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10450  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	13,165.1	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.4	
<b>Sub Total</b>	<b>0.0</b>	<b>14,177.2</b>	<b>174.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>14,177.2</b>	<b>237.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10450

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	9,486
System Type	2
System Name:	H&V UNIT
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	8	
Load Factor	0.8	
CFM - HTG	5265	
CFM - CLG	0	
% OA	25.00%	
% Area	17.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	83.10%	83.10%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10450  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,042.8	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	151.4	
<b>Sub Total</b>	<b>0.0</b>	<b>15,122.3</b>	<b>151.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	54.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>15,122.3</b>	<b>206.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10450

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 9,486

System Type	2
System Name:	H&V UNIT
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	10	
Load Factor	0.8	
CFM - HTG	4670	
CFM - CLG	0	
% OA	100.00%	
% Area	15.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	85.80%	85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10450  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,001.1	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	133.6	
<b>Sub Total</b>	<b>0.0</b>	<b>18,308.0</b>	<b>133.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	48.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>18,308.0</b>	<b>181.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10450

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCWLC  
 PAGE 1 OF 2

Building Sq.Ft.:	9,486
System Type	2
System Name:	H&V UNIT
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	15	
Load Factor	0.8	
CFM - HTG	7430	
CFM - CLG	0	
% OA	5.00%	
% Area	24.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	86.70%	86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAH	0.00	0.00
HOAHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAHC	39.67	39.67
HOAHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10450  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,236.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	213.8	
<b>Sub Total</b>	<b>0.0</b>	<b>27,177.0</b>	<b>213.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	77.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>27,177.0</b>	<b>291.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10450

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	9,486
System Type	2
System Name:	H&V UNIT
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10450  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,725.7	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	89.1	
<b>Sub Total</b>	<b>0.0</b>	<b>11,550.2</b>	<b>89.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	32.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>11,550.2</b>	<b>121.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10450

Building Sq.Ft.: 9,486

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10450  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.3	
<b>Sub Total</b>	<b>0.0</b>	<b>7,181.9</b>	<b>14.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>7,181.9</b>	<b>19.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10450

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 9,486

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10450  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,349.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	65.9	
<b>Sub Total</b>	<b>0.0</b>	<b>3,637.0</b>	<b>65.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	23.8	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>3,637.0</b>	<b>100.9</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10470

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	2
System Name:	H&V UNIT
System Number:	HV1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	29.8	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>29.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	7.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>37.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	2
System Name:	H&V UNIT
System Number:	HV2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	29.8	
<b>Sub Total</b>	<b>0.0</b>	<b>101,035.1</b>	<b>29.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	7.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>101,035.1</b>	<b>37.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	2
System Name:	H&V UNIT
System Number:	HV3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	29.8	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>29.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	7.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>37.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 11-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	2
System Name:	H&V UNIT
System Number:	HV4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 11-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.9	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>14.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>18.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10470

Building Sq.Ft.: 32,213

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	17.9	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>17.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>22.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	8.9	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>8.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>11.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95  
PAGE 2 OF 2

Bldg Number: 10470  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	17.9	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>17.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>22.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.: 32,213

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10470  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	17.9	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>17.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>22.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-5

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	8.9	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>8.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>11.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10470

Building Sq.Ft.: 32,213

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU6

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSWB/BMG

CHECKED BY: KCM/MLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.9	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>18.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-7

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95  
PAGE 2 OF 2

Bldg Number: 10470  
System Type 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	6.0	
<b>Sub Total</b>	<b>0.0</b>	<b>29,644.0</b>	<b>6.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>29,644.0</b>	<b>7.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10470

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HTP1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	71.6	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>71.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	18.3	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>116.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10470

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/MLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10470  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>34.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10470

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,213
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 05-Apr-95  
PAGE 2 OF 2

Bldg Number: 10470  
System Type: 9  
System Name: CONVERTER AND PUMPS  
System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>31.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10480

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10480

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 28,057

System Type	2
System Name:	H&V UNIT
System Number:	HV1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	22.5	
Load Factor	0.8	
CFM - HTG	11135	
CFM - CLG	0	
% OA	33.00%	
% Area	10.00%	
TON CAPC.	0	
MBTU CAPC.	0	
KW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	88.10%	88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	26.0	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>26.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>32.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	28,057
System Type	2
System Name:	H&V UNIT
System Number:	HV2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	26.0	
<b>Sub Total</b>	<b>0.0</b>	<b>101,035.1</b>	<b>26.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>101,035.1</b>	<b>32.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10480

EMC NO.: 1406-006

DATE: 04-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 28,057

System Type	2
System Name:	H&V UNIT
System Number:	HV3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	26.0	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>26.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>32.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10480

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 28,057

System Type	2
System Name:	H&V UNIT
System Number:	HV4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	13.0	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>13.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>16.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480  
 Building Sq.Ft.: 28,057

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.6	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>19.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480  
 Building Sq.Ft.: 28,057

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10480

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.8	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>7.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>9.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480  
 Building Sq.Ft.: 28,057

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.6	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>19.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480  
 Building Sq.Ft.: 28,057

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.6	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>19.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480  
 Building Sq.Ft.: 28,057

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-5

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVAV	2,040	
Heating HRSVAV	3,264	
C/H HRSVAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.8	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>7.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>9.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480

EMC NO.: 1406-006

DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 28,057

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	13.0	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>13.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>16.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480  
 Building Sq.Ft.: 28,057

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-7

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	5.2	
<b>Sub Total</b>	<b>0.0</b>	<b>29,644.0</b>	<b>5.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>29,644.0</b>	<b>6.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	28,057
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HTP1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
KW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	62.3	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>62.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.9	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>104.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	28,057
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
KW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>34.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10480

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	28,057
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10480  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>31.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10500

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10500  
 Building Sq.Ft.: 11,249

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10500  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	147.6	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>147.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>159.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10500  
 Building Sq.Ft.: 11,249

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/M/LC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10500  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	28.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>28.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>30.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10500

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10500  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10500  
 Building Sq.Ft.: 11,249

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10500  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	527.0	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>527.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	40.9	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>568.7</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10502

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10502

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,199
System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B1

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.8216
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	3,360
Heating HRSON	2,464	5,376
C/H HRSON	4,015	8,760
Cooling HRSAB	1,820	
Heating HRSAB	2,912	
C/H HRSAB	4,745	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10502  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,453.7	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,741.3</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.6	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,741.3</b>	<b>7.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10502  
 Building Sq.Ft.: 18,199

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/MLC  
 PAGE 1 OF 2

System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B2

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.8216
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	3,360
Heating HRSON	2,464	5,376
C/H HRSON	4,015	8,760
Cooling HRSAB	1,820	
Heating HRSAB	2,912	
C/H HRSAB	4,745	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10502  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,453.7	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,741.3</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.6	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,741.3</b>	<b>7.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10502

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,199
System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B3

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.8216
kW/Ton	0
MOSON	7
EFF	0.8
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	3,360
Heating HRSON	2,464	5,376
C/H HRSON	4,015	8,760
Cooling HRS AV	1,820	
Heating HRS AV	2,912	
C/H HRS AV	4,745	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10502  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,453.7	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,741.3</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.6	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,741.3</b>	<b>7.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10502  
 Building Sq.Ft.: 18,199

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	4
System Name:	SINGLE ZONE AHU
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	2100	2100	2100	2100	2100	2100	2100

INPUTS	INPUT	
Motor HP	3.1	
Load Factor	0.8	
CFM - HTG	2500	
CFM - CLG	2500	
% OA	35.00%	
% Area	15.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	2,100
Heating HRSON	2,464	3,360
C/H HRSON	4,015	5,475
Cooling HRSAB	560	
Heating HRSAB	896	
C/H HRSAB	1,460	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAHC	0.00	0.00
COAUH	9.73E-03	9.73E-03
COAHC	3.73E-03	3.73E-03
HOAHO	46.22	46.22
HOAHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10502  
 System Type: 4  
 System Name: SINGLE ZONE AHU  
 System Number: AHU1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,186.8	0.0	
Optimum ST/SP	0.0	440.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	4.7	0.0	0.0	
Night Setback	0.0	0.0	87.5	
<b>Sub Total</b>	<b>4.7</b>	<b>8,626.8</b>	<b>87.5</b>	
Economizer	0.0	1,146.5	0.0	
Ventilation/Recirculation	0.0	614.2	0.0	
DDC Control	0.0	0.0	32.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>4.7</b>	<b>10,387.5</b>	<b>119.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10502  
 Building Sq.Ft.: 18,199

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	1500	1500	1500	1500	1500	1500	1500

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	4500
CFM - CLG	4500
% OA	35.00%
% Area	26.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	1,260
Heating HRSON	2,464	2,016
C/H HRSON	4,015	3,285
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	0	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10502  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	151.7	
<b>Sub Total</b>	<b>10.8</b>	<b>1,012.1</b>	<b>151.7</b>	
Economizer	0.0	2,063.7	0.0	
Ventilation/Recirculation	0.0	1,105.5	22.5	
DDC Control	0.0	0.0	56.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>4,181.3</b>	<b>230.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10502

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,199
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	2100	2100	2100	2100	2100	2100	2100

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	6100
CFM - CLG	6100
% OA	35.00%
% Area	36.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	2,100
Heating HRSON	2,464	3,360
C/H HRSON	4,015	5,475
Cooling HRSAV	560	
Heating HRSAV	896	
C/H HRSAV	1,460	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10502  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU3

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	19,497.3	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	210.0	
<b>Sub Total</b>	<b>10.8</b>	<b>20,509.4</b>	<b>210.0</b>	
Economizer	0.0	2,797.5	0.0	
Ventilation/Recirculation	0.0	1,498.5	0.0	
DDC Control	0.0	0.0	77.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>24,805.4</b>	<b>287.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10502  
 Building Sq.Ft.: 18,199

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	600	600	600	600	600	600	600
Stop Time	2100	2100	2100	2100	2100	2100	2100

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	4000
CFM - CLG	4000
% OA	35.00%
% Area	23.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	2,100
Heating HRSON	2,464	3,360
C/H HRSON	4,015	5,475
Cooling HRSAB	560	
Heating HRSAB	896	
C/H HRSAB	1,460	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10502  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	15,490.9	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	134.2	
<b>Sub Total</b>	<b>10.8</b>	<b>16,503.0</b>	<b>134.2</b>	
Economizer	0.0	1,834.4	0.0	
Ventilation/Recirculation	0.0	982.6	20.0	
DDC Control	0.0	0.0	49.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>19,320.0</b>	<b>203.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10502  
 Building Sq.Ft.: 18,199

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	8
System Name:	CHILLER AND PUMPS
System Number:	WC1

### Typical Building Information

Category	Construction	Use	Occ.	Day
12	BRICK	EXCHANGE/CLUB	0800-300	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1600	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	73
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	0.8
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,540	3,360
Heating HRSON	2,464	5,376
C/H HRSON	4,015	8,760
Cooling HRSAB	1,820	
Heating HRSAB	2,912	
C/H HRSAB	4,745	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	9.73E-03	9.73E-03
COAUHC	3.73E-03	3.73E-03
HOAOH	46.22	46.22
HOAOHC	28.36	28.36
COAOC	5.73E-03	5.73E-03
COAOHC	2.20E-03	2.20E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	2.98E-04	2.98E-04
ECHC	1.14E-04	1.14E-04
NSUCC	2.13E-03	2.13E-03
NSUCHC	1.31E-03	1.31E-03
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+04	1.18E+04
NSC	3.21E+04	3.21E+04
FV	64	64
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10502  
 System Type: 8  
 System Name: CHILLER AND PUMPS  
 System Number: WC1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	9,797.8	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>10.8</b>	<b>10,809.9</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	698.6	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>11,508.5</b>	<b>0.0</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10506

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10506

EMC NO.: 1406-006  
 DATE: 30-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,386
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
13	BRICK	CLINIC W/O BEDS	0700-1600	MON-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	9300
CFM - CLG	11500
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	0.78
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.11E-03	2.11E-03
COAUHC	8.08E-04	8.08E-04
HOAOH	227.68	227.68
HOAOHC	139.72	139.72
COAOC	3.35E-03	3.35E-03
COAOHC	1.29E-03	1.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.77E-04	2.77E-04
NSUCHC	1.70E-04	1.70E-04
DCCCHC	1.32E-04	1.32E-04
DDCCC	3.44E-04	3.44E-04
DSC	3.81E+03	3.81E+03
NSC	2.59E+04	2.59E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 30-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10506  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	78,056.1	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	10.8	0.0	0.0	
Night Setback	0.0	0.0	71.5	
<b>Sub Total</b>	<b>10.8</b>	<b>79,068.1</b>	<b>71.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	13,613.8	10.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>10.8</b>	<b>92,682.0</b>	<b>82.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10506

EMC NO.: 1406-006  
 DATE: 30-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,386
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
13	BRICK	CLINIC W/O BEDS	0700-1600	MON-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.1836
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.11E-03	2.11E-03
COAUHC	8.08E-04	8.08E-04
HOAOH	227.68	227.68
HOAOHC	139.72	139.72
COAOC	3.35E-03	3.35E-03
COAOHC	1.29E-03	1.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.77E-04	2.77E-04
NSUCHC	1.70E-04	1.70E-04
DDCCHC	1.32E-04	1.32E-04
DDCCC	3.44E-04	3.44E-04
DSC	3.81E+03	3.81E+03
NSC	2.59E+04	2.59E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 30-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10506  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,813.5	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>2,975.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,975.5</b>	<b>1.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10506

Building Sq.Ft.: 18,386

System Type 12

System Name: BASEBOARD RADIATION

System Number: HE1

EMC NO.: 1406-006

DATE: 30-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
13	BRICK	CLINIC W/O BEDS	0700-1600	MON-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.75	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	85.00%	
TON CAPC.	0	
MBTU CAPC.	0.46	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.11E-03	2.11E-03
COAUHC	8.08E-04	8.08E-04
HOAOH	227.68	227.68
HOAOHC	139.72	139.72
COAOC	3.35E-03	3.35E-03
COAOHC	1.29E-03	1.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.77E-04	2.77E-04
NSUCHC	1.70E-04	1.70E-04
DDCCHC	1.32E-04	1.32E-04
DDCCC	3.44E-04	3.44E-04
DSC	3.81E+03	3.81E+03
NSC	2.59E+04	2.59E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 30-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10506  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,246.4	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	405.4	
<b>Sub Total</b>	<b>0.0</b>	<b>2,375.8</b>	<b>405.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	59.6	
HW OA Reset	0.0	0.0	3.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,375.8</b>	<b>468.3</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10510

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10510

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,450

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	2	
Load Factor	0.8	
CFM - HTG	1230	
CFM - CLG	0	
% OA	100.00%	
% Area	21.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
<b>LOOK-UP VALUE</b>		
EFFHP	78.00%	78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10510  
 System Type 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>176.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10510

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	1	
Load Factor	0.8	
CFM - HTG	210	
CFM - CLG	0	
% OA	100.00%	
% Area	4.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	69.20%	69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10510  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10510

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10510  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10510

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10510  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.3</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10512

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,512

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	52,266
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.5123
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,512  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>3.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,512  
 Building Sq.Ft.: 52,266

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.75	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.9801	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,512  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,770
System Type	14
System Name:	VENTILATION
System Number:	AHU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10512

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,770
System Type	14
System Name:	VENTILATION
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,770
System Type	14
System Name:	VENTILATION
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	4566	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512

EMC NO.: 1406-006

DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 17,770

System Type	14
System Name:	VENTILATION
System Number:	AHU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	4779	
CFM - CLG	0	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512  
 Building Sq.Ft.: 17,770

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS:	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	110.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>110.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>123.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512  
 Building Sq.Ft.: 17,770

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	110.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>110.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>123.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,770
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	110.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>110.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>123.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512  
 Building Sq.Ft.: 17,770

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	750	
CFM - CLG	0	
% OA	100.00%	
% Area	12.75%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	110.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>110.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>123.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	34,496
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	80.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>80.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10512

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	34,496
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1350
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10232  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	80.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>80.0</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10514

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,514

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 45,719

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,514  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,514  
 Building Sq.Ft.: 45,719

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,514  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10514  
 Building Sq.Ft.: 11,430

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10514  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	94.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>105.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10514

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	11,430
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	770	
CFM - CLG	0	
% OA	100.00%	
% Area	17.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10514  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	94.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>105.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10514  
 Building Sq.Ft.: 11,430

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10514  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	94.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>105.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10514  
 Building Sq.Ft.: 34,289

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10514  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	81.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>81.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10514  
 Building Sq.Ft.: 34,289

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	0
Heating HRS AV	0	0
C/H HRS AV	0	0

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10514  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	81.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>81.7</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10520

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10520

Building Sq.Ft.: 12,450

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10520  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>176.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10520

Building Sq.Ft.: 12,450

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10520  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10520

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95  
PAGE 2 OF 2

Bldg Number: 10520  
System Type: 9  
System Name: CONVERTER AND PUMPS  
System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10520

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,450
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 10520  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.3</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10522

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,522

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	43,886
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	2	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.3875	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	78.00%	78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,522  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10522  
 Building Sq.Ft.: 43,886

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10522  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>129.4</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>129.4</b>	<b>4.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10522

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	10,972
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10522  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	90.7	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>90.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10522  
 Building Sq.Ft.: 10,972

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/LC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00E+00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10522  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	90.7	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>90.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10522  
 Building Sq.Ft.: 10,972

EMC NO.: 1406-006

DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10522  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	90.7	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>90.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10522  
 Building Sq.Ft.: 32,915

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10522  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	78.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>78.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10522

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,915
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10522  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	78.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>78.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10524

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,524  
 Building Sq.Ft.: 45,746

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,524  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,524

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	45,746
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVAV	0	
Heating HRSVAV	0	
C/H HRSVAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,524  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10524

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	11,437
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10524

System Type 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	94.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>105.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10524

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	11,437
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10524  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	94.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>105.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10524  
 Building Sq.Ft.: 11,437

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10524  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	94.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>105.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10524

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	34,310
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10524  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	81.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>81.7</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10524  
 Building Sq.Ft.: 34,310

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10524  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	81.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>81.7</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10550

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10550

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 15,560

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	8000
CFM - CLG	0
% OA	100.00%
% Area	17.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAV	840	
Heating HRSAV	1,344	
C/H HRSAV	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10550  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,789.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.4	
<b>Sub Total</b>	<b>0.0</b>	<b>12,801.7</b>	<b>174.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,801.7</b>	<b>237.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10550

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/MLC  
 PAGE 1 OF 2

Building Sq.Ft.:	15,560
System Type	2
System Name:	H&V UNIT
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	8
Load Factor	0.8
CFM - HTG	5265
CFM - CLG	0
% OA	25.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRS AV	938	
Heating HRS AV	1,501	
C/H HRS AV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10550  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,042.8	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	248.4	
<b>Sub Total</b>	<b>0.0</b>	<b>15,122.3</b>	<b>248.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	89.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>15,122.3</b>	<b>338.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10550

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	15,560
System Type	2
System Name:	H&V UNIT
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4670
CFM - CLG	0
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10550  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,001.1	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	219.2	
<b>Sub Total</b>	<b>0.0</b>	<b>18,308.0</b>	<b>219.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>18,308.0</b>	<b>298.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10550

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/MLC  
 PAGE 1 OF 2

Building Sq.Ft.:	15,560
System Type	2
System Name:	H&V UNIT
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7430
CFM - CLG	0
% OA	5.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSVA	938	
Heating HRSVA	1,501	
C/H HRSVA	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10550  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,236.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	350.7	
<b>Sub Total</b>	<b>0.0</b>	<b>27,177.0</b>	<b>350.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	126.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>27,177.0</b>	<b>477.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10550

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	15,560
System Type	2
System Name:	H&V UNIT
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSVA	938	
Heating HRSVA	1,501	
C/H HRSVA	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10550  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,725.7	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	146.1	
<b>Sub Total</b>	<b>0.0</b>	<b>11,550.2</b>	<b>146.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	52.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>11,550.2</b>	<b>198.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10550  
 Building Sq.Ft.: 15,560

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAV	840	
Heating HRSAV	1,344	
C/H HRSAV	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10550  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	23.4	
<b>Sub Total</b>	<b>0.0</b>	<b>7,181.9</b>	<b>23.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	8.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>7,181.9</b>	<b>31.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10550

Building Sq.Ft.: 15,560

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAV	840	
Heating HRSAV	1,344	
C/H HRSAV	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10550  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,349.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	108.1	
<b>Sub Total</b>	<b>0.0</b>	<b>3,637.0</b>	<b>108.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	39.1	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>3,637.0</b>	<b>158.3</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10570

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10570

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,827
System Type	2
System Name:	H&V UNIT
System Number:	HV1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	23.9	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>23.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>30.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10570

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,828
System Type	2
System Name:	H&V UNIT
System Number:	HV2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type 2  
 System Name: H&V UNIT  
 System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	23.9	
<b>Sub Total</b>	<b>0.0</b>	<b>101,035.1</b>	<b>23.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>101,035.1</b>	<b>30.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10570

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,827
System Type	2
System Name:	H&V UNIT
System Number:	HV3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	22.5	
Load Factor	0.8	
CFM - HTG	6020	
CFM - CLG	0	
% OA	33.00%	
% Area	10.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
<b>LOOK-UP VALUE</b>		
EFFHP	88.10%	88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	23.9	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>23.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>30.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10570

Building Sq.Ft.: 25,827

System Type	2
System Name:	H&V UNIT
System Number:	HV4

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	22.5	
Load Factor	0.8	
CFM - HTG	4090	
CFM - CLG	0	
% OA	100.00%	
% Area	5.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	88.10%	88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.0	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>12.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>15.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10570

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 25,827

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.3	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>18.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10570

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 25,827

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>7.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>9.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10570

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	25,827
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.3	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>18.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10570

Building Sq.Ft.: 25,827

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	14.3	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>18.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10570

EMC NO.: 1406-006

DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 25,827

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-5

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>7.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>9.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10570

Building Sq.Ft.: 25,827

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU6

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70%   86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.0	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>12.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10570

Building Sq.Ft.: 25,827

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-7

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	7.5	
Load Factor	0.8	
CFM - HTG	16100	
CFM - CLG	0	
% OA	100.00%	
% Area	2.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	83.10%	83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	4.8	
<b>Sub Total</b>	<b>0.0</b>	<b>29,644.0</b>	<b>4.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>29,644.0</b>	<b>6.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10570

Building Sq.Ft.: 25,827

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HTP1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	57.4	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>57.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	14.7	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>98.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10570

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 25,827

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	5	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	4.62	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	81.60%	81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>34.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10570

Building Sq.Ft.: 25,827

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10570  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>31.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10580

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	27,310
System Type	2
System Name:	H&V UNIT
System Number:	HV1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	100.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVAV	2,040	
Heating HRSVAV	3,264	
C/H HRSVAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DCCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	25.3	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>25.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>31.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	27,310
System Type	2
System Name:	H&V UNIT
System Number:	HV2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	25.3	
<b>Sub Total</b>	<b>0.0</b>	<b>101,035.1</b>	<b>25.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>101,035.1</b>	<b>31.7</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580  
 Building Sq.Ft.: 27,310

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	2
System Name:	H&V UNIT
System Number:	HV3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVAV	2,040	
Heating HRSVAV	3,264	
C/H HRSVAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	25.3	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>25.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>31.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	27,310
System Type	2
System Name:	H&V UNIT
System Number:	HV4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV4

HEATING AND VENTILATING SYSTEMS:	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.6	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>12.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>15.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 27,310

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>19.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580  
 Building Sq.Ft.: 27,310

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/MLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.6	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>7.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>9.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	27,310
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>19.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10580

Building Sq.Ft.: 27,310

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>19.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	27,310
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-5

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.6	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>7.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>9.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	27,310
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.6	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>12.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10580

Building Sq.Ft.: 27,310

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-7

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	5.1	
<b>Sub Total</b>	<b>0.0</b>	<b>29,644.0</b>	<b>5.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>29,644.0</b>	<b>6.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	27,310
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HTP1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3,587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	60.7	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>60.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	15.5	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>102.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10580

Building Sq.Ft.: 27,310

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP2

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>34.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 LOCAL PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10580

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	27,310
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10580  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>31.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10610

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10610

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,452
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10610  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>176.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10610

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,452

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10610  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10610

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,452
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10610  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10610

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,452
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10610  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10612

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,612  
 Building Sq.Ft.: 53,892

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.5123
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,612  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>3.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,612

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	53,892
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.75	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.9801	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 10,612  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,323
System Type	14
System Name:	VENTILATION
System Number:	AHU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	4779	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10612  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,323
System Type	VENTILATION
System Name:	AHU2
System Number:	

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	4566	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
KW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10612  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612

EMC NO.: 1406-006

DATE: 12-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 18,323

System Type	14
System Name:	VENTILATION
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10612  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612  
 Building Sq.Ft.: 18,323

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

System Type	14
System Name:	VENTILATION
System Number:	AHU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	4779	
CFM - CLG	0	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 12-Apr-95  
PAGE 2 OF 2

Bldg Number: 10612  
System Type: 14  
System Name: VENTILATION  
System Number: AHU-4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,323
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10612  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	113.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>127.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612  
 Building Sq.Ft.: 18,323

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10612  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	113.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>127.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,323
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10612  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	113.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>127.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612  
 Building Sq.Ft.: 18,323

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10612  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	113.6	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>113.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>127.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10612

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 35,569

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10612  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	83.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>83.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10612

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	35,569
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	1350	
CFM - CLG	0	
% OA	100.00%	
% Area	19.30%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10512  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	80.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>80.7</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10614

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,614  
 Building Sq.Ft.: 44,510

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,614  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,614

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	44,510
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.75	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.6683	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,614  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10614

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 11,128

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10614  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	92.0	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>92.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>103.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10614  
 Building Sq.Ft.: 11,128

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSWBMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10614  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	92.0	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>92.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>103.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10614  
 Building Sq.Ft.: 11,128

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10614  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	92.0	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>92.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	11.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>103.1</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10614

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	33,383
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10614  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>79.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10614

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	33,383
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	1060	
CFM - CLG	0	
% OA	100.00%	
% Area	16.70%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10614  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	79.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>79.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10620

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10620

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	13,225
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10620  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	173.5	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>173.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>186.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10620

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	13,225
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10620  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	33.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>35.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10620

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	13,225
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10620  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10620

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	13,225
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10620  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	619.6	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>619.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	48.0	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>668.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10622

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622  
 Building Sq.Ft.: 52,990

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0*
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	2	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.3875	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	78.00%	78.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,900	3,360
Heating HRSON	3,040	5,376
C/H HRSON	4,954	8,760
Cooling HRSAV	1,460	
Heating HRSAV	2,336	
C/H HRSAV	3,806	

\*ESTIMATED PUMP ON 50% OF UNOCCUPIED HOURS

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,572.8	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>3,860.3</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>3,860.3</b>	<b>2.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,622  
 Building Sq.Ft.: 52,990

EMC NO.: 1406-006

DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,622  
 System Type 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10622

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,017
System Type	14
System Name:	VENTILATION
System Number:	AHU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUC	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUC	0.00E+00	0.00E+00
HOAOC	220.75	220.75
HOAOC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,017
System Type	14
System Name:	VENTILATION
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DCCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,017
System Type	14
System Name:	VENTILATION
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY.ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVAV	2,060	
Heating HRSVAV	3,296	
C/H HRSVAV	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,017
System Type	14
System Name:	VENTILATION
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622  
 Building Sq.Ft.: 18,017

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95

PAGE 2 OF 2

Bldg Number: 10622  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	111.8	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>111.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>125.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,017
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVAV	2,060	
Heating HRSVAV	3,296	
C/H HRSVAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	111.8	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>111.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>125.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	18,017
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	111.8	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>111.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>125.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622  
 Building Sq.Ft.: 18,017

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	111.8	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>111.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>125.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	34,973
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.5	
Load Factor	0.8	
CFM - HTG	1860	
CFM - CLG	0	
% OA	100.00%	
% Area	19.30%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	81.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>81.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10622

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	34,973
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	1350	
CFM - CLG	0	
% OA	100.00%	
% Area	19.30%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10622  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	81.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>81.9</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10630

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10630

EMC NO.: 1406-006

DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,452
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.40%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 28-Mar-95  
PAGE 2 OF 2

Bldg Number: 10630  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	166.4	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>166.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>179.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10630  
 Building Sq.Ft.: 12,452

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	1	
Load Factor	0.8	
CFM - HTG	210	
CFM - CLG	0	
% OA	100.00%	
% Area	3.60%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	69.20%	69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10630  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	28.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>28.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>30.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10630  
 Building Sq.Ft.: 12,452

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10630  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10630

Building Sq.Ft.: 12,452

EMC NO.: 1406-006

DATE: 28-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10630  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10632

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,632

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	51,794
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	2	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.5123	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	78.00%	78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,632  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>3.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,632

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	51,794
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9801
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,632  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	7.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>7.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10632

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	4779	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSN	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 12-Apr-95  
PAGE 2 OF 2

Bldg Number: 10632  
System Type: 14  
System Name: VENTILATION  
System Number: AHU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10632

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUI	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 01-Apr-95

PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10632

EMC NO.: 1406-006  
 DATE: 12-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK V	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4566
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 12-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU-3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>0</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10632

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	14
System Name:	VENTILATION
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4779
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 14  
 System Name: VENTILATION  
 System Number: AHU4

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,666.1	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,092.0</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10632

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	17,610
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVAV	2,060	
Heating HRSVAV	3,296	
C/H HRSVAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10632  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10632  
 Building Sq.Ft.: 17,610

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	750
CFM - CLG	0
% OA	100.00%
% Area	12.75%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSVA	2,060	
Heating HRSVA	3,296	
C/H HRSVA	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10632

Building Sq.Ft.: 17,610

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KCW/LC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	750	
CFM - CLG	0	
% OA	100.00%	
% Area	12.75%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	109.2	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>109.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	13.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>122.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10632

Building Sq.Ft.: 34,184

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSWB/MG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	1860
CFM - CLG	0
% OA	100.00%
% Area	19.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	0
Heating HRSAV	0	0
C/H HRSAV	0	0

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	83.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>83.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10632

Building Sq.Ft.: 34,184

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU11

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:

20

Enter Weeks of Winter:

32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	0.33	
Load Factor	0.8	
CFM - HTG	1350	
CFM - CLG	0	
% OA	100.00%	
% Area	19.30%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10632  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU11

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	80.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>80.0</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10640

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10640

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,452
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	1230
CFM - CLG	0
% OA	100.00%
% Area	21.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10640  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	8,214.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	163.3	
<b>Sub Total</b>	<b>0.0</b>	<b>8,501.7</b>	<b>163.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	12.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,501.7</b>	<b>176.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10640

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,452
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	210
CFM - CLG	0
% OA	100.00%
% Area	4.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95  
PAGE 2 OF 2

Bldg Number: 10640  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: AHU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,629.4	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,791.4</b>	<b>31.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,791.4</b>	<b>33.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10640  
 Building Sq.Ft.: 12,452

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.2602
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10640  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	5,041.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,328.6</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,328.6</b>	<b>1.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10640

EMC NO.: 1406-006

DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,452

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE2

### Typical Building Information

Category	Construction	Use	Occ.	Day
17	BRICK	BN HQ BLDG	0600-1700	SUN-SAT

Enter Weeks of Summer: 20

Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	75.00%
TON CAPC.	0
MBTU CAPC.	0.1117
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	257.00	257.00
HOAOHC	158.00	158.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	4.84E+03	4.84E+03
NSC	6.25E+04	6.25E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 04-Apr-95  
PAGE 2 OF 2

Bldg Number: 10640  
System Type: 12  
System Name: BASEBOARD RADIATION  
System Number: HE2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,268.5	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	583.3	
<b>Sub Total</b>	<b>0.0</b>	<b>2,397.8</b>	<b>583.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.2	
HW OA Reset	0.0	0.0	0.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,397.8</b>	<b>629.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10642

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,642  
 Building Sq.Ft.: 43,790

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.3875
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,642  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,642

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	43,790
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,642  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10642  
 Building Sq.Ft.: 10,948

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY,ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10642  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	90.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>90.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10642  
 Building Sq.Ft.: 10,948

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10642  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	90.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>90.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10642

Building Sq.Ft.: 10,948

EMC NO.: 1406-006

DATE: 02-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10642  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	90.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>90.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>101.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10642  
 Building Sq.Ft.: 32,843

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT		
Motor HP	0.33		
Load Factor	0.8		
CFM - HTG	1300		
CFM - CLG	0		
% OA	100.00%		
% Area	16.70%		
TON CAPC.	0		
MBTU CAPC.	0		
kW/Ton	0		
MOSON	12		
EFF	1		
LOOK-UP VALUE	EFFHP	65.00%	65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10642  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	78.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>78.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10642

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	32,843
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10642  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	78.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>78.2</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10644

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,644

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	40,864
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP		2
Load Factor		0.8
CFM - HTG		0
CFM - CLG		0
% OA		0.00%
% Area		0.00%
TON CAPC.		0
MBTU CAPC.		0.3875
kW/Ton		0
MOSON		7
EFF		1
LOOK-UP VALUE		
EFFHP	78.00%	78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,644  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>287.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>287.5</b>	<b>2.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10,644  
 Building Sq.Ft.: 40,864

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.6683
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 01-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10,644  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE-2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10644

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	10,216
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10644  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	84.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>84.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10644  
 Building Sq.Ft.: 10,216

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 02-Apr-95  
PAGE 2 OF 2

Bldg Number: 10644  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	84.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>84.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10644  
 Building Sq.Ft.: 10,216

EMC NO.: 1406-006  
 DATE: 02-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
14	BRICK	ADM & SUPPLY, ENL BRK	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	770
CFM - CLG	0
% OA	100.00%
% Area	17.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRS AV	2,060	
Heating HRS AV	3,296	
C/H HRS AV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	220.75	220.75
HOAOHC	110.07	110.07
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	5.84E+03	5.84E+03
NSC	4.86E+04	4.86E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10644  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	1,626.4	0.0	
Optimum ST/SP	0.0	56.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	84.5	
<b>Sub Total</b>	<b>0.0</b>	<b>1,683.3</b>	<b>84.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>1,683.3</b>	<b>94.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10644  
 Building Sq.Ft.: 30,648

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1300
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 02-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10644  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	73.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>73.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10644  
 Building Sq.Ft.: 30,648

EMC NO.: 1406-006  
 DATE: 01-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
15	BRICK	ADM & SUPPLY, ENL BRK	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	1060
CFM - CLG	0
% OA	100.00%
% Area	16.70%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.40E+04	1.40E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date:

02-Apr-95

PAGE 2 OF 2

Bldg Number: 10644  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEM	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	73.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>73.0</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10650

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10650

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,578
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	7.5	
Load Factor	0.8	
CFM - HTG	8000	
CFM - CLG	0	
% OA	100.00%	
% Area	17.60%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	83.10%	83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10650  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,789.6	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	174.4	
<b>Sub Total</b>	<b>0.0</b>	<b>12,801.7</b>	<b>174.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,801.7</b>	<b>237.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10650

EMC NO.: 1406-006

DATE: 06-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.:	12,578
System Type	2
System Name:	H&V UNIT
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	8	
Load Factor	0.8	
CFM - HTG	5265	
CFM - CLG	0	
% OA	25.00%	
% Area	17.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	83.10%	83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAV	938	
Heating HRSAV	1,501	
C/H HRSAV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10650  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,042.8	0.0	
Optimum ST/SP	0.0	1,079.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	200.8	
<b>Sub Total</b>	<b>0.0</b>	<b>15,122.3</b>	<b>200.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	72.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>15,122.3</b>	<b>273.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10650

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 12,578

System Type	2
System Name:	H&V UNIT
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	4670
CFM - CLG	0
% OA	100.00%
% Area	15.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10650  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,001.1	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	177.2	
<b>Sub Total</b>	<b>0.0</b>	<b>18,308.0</b>	<b>177.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	64.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>18,308.0</b>	<b>241.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10650

EMC NO.: 1406-006

DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,578
System Type	2
System Name:	H&V UNIT
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7430
CFM - CLG	0
% OA	5.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRS AV	938	
Heating HRS AV	1,501	
C/H HRS AV	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10650  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,236.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	283.5	
<b>Sub Total</b>	<b>0.0</b>	<b>27,177.0</b>	<b>283.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	102.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>27,177.0</b>	<b>385.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10650  
 Building Sq.Ft.: 12,578

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	2
System Name:	H&V UNIT
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	1930	1930	1930	1930	1930	1930	1930

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6
Load Factor	0.8
CFM - HTG	3145
CFM - CLG	0
% OA	5.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,422	3,360
Heating HRSON	3,875	5,376
C/H HRSON	6,314	8,760
Cooling HRSAB	938	
Heating HRSAB	1,501	
C/H HRSAB	2,445	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10650  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,725.7	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	118.1	
<b>Sub Total</b>	<b>0.0</b>	<b>11,550.2</b>	<b>118.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	42.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>11,550.2</b>	<b>160.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10650

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,578
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	7.40%
TON CAPC.	0
MBTU CAPC.	1.5064
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAV	840	
Heating HRSAV	1,344	
C/H HRSAV	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10650  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HE1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,349.5	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	87.4	
<b>Sub Total</b>	<b>0.0</b>	<b>3,637.0</b>	<b>87.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	31.6	
HW OA Reset	0.0	0.0	11.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>3,637.0</b>	<b>130.1</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10650

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	12,578
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
16	BRICK	ENK PERS DINNING	0400-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	400	400	400	400	400	400	400
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	600
CFM - CLG	0
% OA	0.00%
% Area	1.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	2,520	3,360
Heating HRSON	4,032	5,376
C/H HRSON	6,570	8,760
Cooling HRSAB	840	
Heating HRSAB	1,344	
C/H HRSAB	2,190	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	39.67	39.67
HOAOHC	24.34	24.34
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	3.39E+04	3.39E+04
NSC	9.39E+04	9.39E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10650  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,614.1	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	18.9	
<b>Sub Total</b>	<b>0.0</b>	<b>7,181.9</b>	<b>18.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>7,181.9</b>	<b>25.7</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10660

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	41,968
System Type	2
System Name:	H&V UNIT
System Number:	HV1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	38.9	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>38.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>48.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	41,968
System Type	2
System Name:	H&V UNIT
System Number:	HV2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	27.5
Load Factor	0.8
CFM - HTG	11410
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	89.40% 89.40%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 10660  
System Type 2  
System Name: H&V UNIT  
System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	38.9	
<b>Sub Total</b>	<b>0.0</b>	<b>101,035.1</b>	<b>38.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>101,035.1</b>	<b>48.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10660

Building Sq.Ft.: 41,968

System Type	2
System Name:	H&V UNIT
System Number:	HV3

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	38.9	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>38.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	9.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>48.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660  
 Building Sq.Ft.: 41,968

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	2
System Name:	H&V UNIT
System Number:	HV4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	19.4	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>19.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>24.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	41,968
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	18150
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	23.3	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>23.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>29.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	41,968
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	11.7	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>11.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	41,968
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	23.3	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>23.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>29.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	41,968
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	23.3	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>23.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>29.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10660

Building Sq.Ft.: 41,968

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-5

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	11.7	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>11.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>14.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10660

Building Sq.Ft.: 41,968

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	19.4	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>19.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>24.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 41,968

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-7

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.8	
<b>Sub Total</b>	<b>0.0</b>	<b>29,644.0</b>	<b>7.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>29,644.0</b>	<b>9.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	41,968
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HTP1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	93.3	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>93.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	23.8	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>143.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660  
 Building Sq.Ft.: 41,968

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>34.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10660

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	41,968
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10660  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>31.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10670

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10670

Building Sq.Ft.: 43,519

System Type	2
System Name:	H&V UNIT
System Number:	HV1

EMC NO.: 1406-006

DATE: 31-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	11135
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 31-Mar-95

PAGE 2 OF 2

Bldg Number: 10670  
System Type: 2  
System Name: H&V UNIT  
System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	40.3	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>40.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>50.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	43,519
System Type	2
System Name:	H&V UNIT
System Number:	HV2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	27.5	
Load Factor	0.8	
CFM - HTG	11410	
CFM - CLG	0	
% OA	33.00%	
% Area	10.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	89.40%	89.40%

HOURS CALCULATIONS	REQUIRED	PRESENT
	HR/YR	HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV2

HEATING AND VENTILATING SYSTEMS:	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,585.7	0.0	
Optimum ST/SP	0.0	3,449.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	40.3	
<b>Sub Total</b>	<b>0.0</b>	<b>101,035.1</b>	<b>40.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>101,035.1</b>	<b>50.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10670

Building Sq.Ft.: 43,519

EMC NO.: 1406-006

DATE: 31-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KCW/LC

PAGE 1 OF 2

System Type	2
System Name:	H&V UNIT
System Number:	HV3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	6020
CFM - CLG	0
% OA	33.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	40.3	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>40.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	10.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>50.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670

EMC NO.: 1406-006

DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	43,519
System Type	2
System Name:	H&V UNIT
System Number:	HV4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	22.5
Load Factor	0.8
CFM - HTG	4090
CFM - CLG	0
% OA	33.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: HV4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	81,021.0	0.0	
Optimum ST/SP	0.0	2,863.9	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	20.1	
<b>Sub Total</b>	<b>0.0</b>	<b>83,884.9</b>	<b>20.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>83,884.9</b>	<b>25.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG:

10670

Building Sq.Ft.: 43,519

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-1

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

## Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	15	
Load Factor	0.8	
CFM - HTG	18150	
CFM - CLG	0	
% OA	100.00%	
% Area	6.00%	
TON CAPC.	0	
MBTU CAPC.	0	
KW/Ton	0	
MOSON	12	
EFF	1	
<b>LOOK-UP VALUE</b>		
EFFHP	86.70%	86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVAV	2,040	
Heating HRSVAV	3,264	
C/H HRSVAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>24.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>30.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670  
 Building Sq.Ft.: 43,519

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9200
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70%   86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.1	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>12.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670  
 Building Sq.Ft.: 43,519

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT		
Motor HP	15		
Load Factor	0.8		
CFM - HTG	16920		
CFM - CLG	0		
% OA	100.00%		
% Area	6.00%		
TON CAPC.	0		
MBTU CAPC.	0		
kW/Ton	0		
MOSON	12		
EFF	1		
LOOK-UP VALUE	EFFHP	86.70%	86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>24.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>30.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670  
 Building Sq.Ft.: 43,519

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	24.2	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>24.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	6.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>30.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670  
 Building Sq.Ft.: 43,519

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-5

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	12.1	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>12.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>15.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	43,519
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-6

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	20.1	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>20.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>25.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	43,519
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-7

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	6840
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	8.1	
<b>Sub Total</b>	<b>0.0</b>	<b>29,644.0</b>	<b>8.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>29,644.0</b>	<b>10.1</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670  
 Building Sq.Ft.: 43,519

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HTP1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	96.7	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>96.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	24.7	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>147.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670  
 Building Sq.Ft.: 43,519

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAB	2,040	
Heating HRSAB	3,264	
C/H HRSAB	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>34.2</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10670

EMC NO.: 1406-006  
 DATE: 31-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	43,519
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4,258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSAV	2,040	
Heating HRSAV	3,264	
C/H HRSAV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 31-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10670  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>31.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10680

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10680

EMC NO.: 1406-006

DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 39,679

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	16920
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRS AV	2,040	
Heating HRS AV	3,264	
C/H HRS AV	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	11.0	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>11.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>13.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	22.0	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>22.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>27.7</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10680  
 Building Sq.Ft.: 39,679

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/MLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	20000
CFM - CLG	0
% OA	100.00%
% Area	6.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	22.0	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>22.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	5.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>27.7</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10680  
 Building Sq.Ft.: 39,679

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-5

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	10000
CFM - CLG	0
% OA	100.00%
% Area	3.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	11.0	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>11.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>13.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10680

Building Sq.Ft.: 39,679

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	15	
Load Factor	0.8	
CFM - HTG	16100	
CFM - CLG	0	
% OA	100.00%	
% Area	5.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
<b>LOOK-UP VALUE</b>		
EFFHP	86.70%	86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	54,886.2	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	18.4	
<b>Sub Total</b>	<b>0.0</b>	<b>56,826.3</b>	<b>18.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>56,826.3</b>	<b>23.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10680

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	39,679
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU-7

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	16100
CFM - CLG	0
% OA	100.00%
% Area	2.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU-7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,632.0	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	7.3	
<b>Sub Total</b>	<b>0.0</b>	<b>29,644.0</b>	<b>7.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	1.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>29,644.0</b>	<b>9.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10680

EMC NO.: 1406-006

DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	39,679
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HTP1

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:

Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	3.587
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HTP1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	88.2	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>88.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	22.5	
HW OA Reset	0.0	0.0	26.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>137.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10680

EMC NO.: 1406-006

DATE: 05-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.:	39,679
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP2

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4.62
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	34.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>34.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10680

EMC NO.: 1406-006

DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	39,679
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HTP3

### Typical Building Information

Category	Construction	Use	Occ.	Day
18	BRICK	VEH MNT SHOP	0700-1900	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	700
Stop Time	0	1600	1600	1600	1600	1600	1600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	4,258
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,320	3,360
Heating HRSON	2,112	5,376
C/H HRSON	3,441	8,760
Cooling HRSVA	2,040	
Heating HRSVA	3,264	
C/H HRSVA	5,319	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	15.77	15.77
HOAOHC	9.68	9.68
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.36E+03	2.36E+03
NSC	9.26E+03	9.26E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10680  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HTP3

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	11,929.6	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>12,616.7</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	31.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,616.7</b>	<b>31.5</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10690

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	4
System Name:	SINGLE ZONE AHU
System Number:	AHU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	20
Load Factor	0.8
CFM - HTG	11000
CFM - CLG	11000
% OA	9.00%
% Area	43.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	0
EFF	1
LOOK-UP VALUE	
EFFHP	88.10% 88.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 4  
 System Name: SINGLE ZONE AHU  
 System Number: AHU-1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	69,236.5	0.0	
Optimum ST/SP	0.0	2,545.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	27.1	0.0	0.0	
Night Setback	0.0	0.0	685.2	
<b>Sub Total</b>	<b>27.1</b>	<b>71,782.2</b>	<b>685.2</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	1.5	1.0	
DDC Control	0.0	0.0	100.0	
HWV OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>27.1</b>	<b>71,783.7</b>	<b>786.2</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690  
 Building Sq.Ft.: 26,400

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV1

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	2040
CFM - CLG	0
% OA	33.00%
% Area	10.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,404.6	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	167.0	
<b>Sub Total</b>	<b>0.0</b>	<b>4,566.7</b>	<b>167.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.7	
DDC Control	0.0	0.0	24.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,566.7</b>	<b>192.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV2

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	3300
CFM - CLG	0
% OA	100.00%
% Area	34.20%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,815.4	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	538.7	
<b>Sub Total</b>	<b>0.0</b>	<b>8,103.0</b>	<b>538.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	78.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,103.0</b>	<b>617.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	11
System Name:	CONDENSING UNIT
System Number:	DC1

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	31.75
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 11  
 System Name: CONDENSING UNIT  
 System Number: DC1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	303.8	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>303.8</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	11
System Name:	CONDENSING UNIT
System Number:	DC3

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	11.2
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 11  
 System Name: CONDENSING UNIT  
 System Number: DC3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	107.2	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>107.2</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	11
System Name:	CONDENSING UNIT
System Number:	CU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	25.3
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 11  
 System Name: CONDENSING UNIT  
 System Number: CU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	242.1	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>242.1</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 26,400  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AC1

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	5400
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AC1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,669.3	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,095.1</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,095.1</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 26,400

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AC3

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	5400
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AC3

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,669.3	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,095.1</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,095.1</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AC5

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG		
CFM - CLG	5400	
% OA	100.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0	
KW/Ton	0	
MOSON	5	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AC5

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,669.3	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>5,095.1</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>5,095.1</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AC7

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4300
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 06-Apr-95

PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AC7

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,180.6	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>3,468.1</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>3,468.1</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AC8

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	4300
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AC8

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	3,180.6	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>3,468.1</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>3,468.1</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AC9

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	8100
% OA	100.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUHC	8.32E-06	8.32E-06
HOAOH	14.77	14.77
HOAOHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAOHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	6	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AC9

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,508.1	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>8,195.2</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,195.2</b>	<b>0.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10690

EMC NO.: 1406-006  
 DATE: 06-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	26,400
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HX1

### Typical Building Information

Category	Construction	Use	Occ.	Day
10	BRICK	DIV CMD/CNTRL BUILDING	600-1800	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	10	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	0.00%	
TON CAPC.	0	
MBTU CAPC.	0.59	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	85.80%	85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAHC	0.00	0.00
COAUC	2.17E-05	2.17E-05
COAUC	8.32E-06	8.32E-06
HOAHC	14.77	14.77
HOAHC	9.07	9.07
COAOC	2.10E-05	2.10E-05
COAHC	8.04E-06	8.04E-06
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	1.26E-05	1.26E-05
NSUCHC	7.74E-06	7.74E-06
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	8.71E+03	8.71E+03
NSC	5.97E+04	5.97E+04
FV	0	6
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 06-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10690  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HX1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	4.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>4.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10710

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10710

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	5,900
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV1

### Typical Building Information

Category	Construction	Use	Occ.	Day
19	BRICK	POST SAFETY/LEA 1ST FL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	90.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	3.67E-07	3.67E-07
ECHC	1.23E-07	1.23E-07
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	6.04E-06	6.04E-06
DDCCC	1.81E-05	1.81E-05
DSC	4.06E+03	4.06E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10710  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	21.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>21.6</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10710

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	5,900
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	C1

### Typical Building Information

Category	Construction	Use	Occ.	Day
19	BRICK	POST SAFETY/LEA 1ST FL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.226
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	0
Heating HRSVA	0	0
C/H HRSVA	0	0

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	3.67E-07	3.67E-07
ECHC	1.23E-07	1.23E-07
NSUC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	6.04E-06	6.04E-06
DDCCC	1.81E-05	1.81E-05
DSC	4.06E+03	4.06E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 10710  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: C1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	1.7	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>1.7</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10710

EMC NO.: 1406-006

DATE: 07-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.:	5,900
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	RAD

### Typical Building Information

Category	Construction	Use	Occ.	Day
19	BRICK	POST SAFETY/LEA 1ST FL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	10.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	3.67E-07	3.67E-07
ECHC	1.23E-07	1.23E-07
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	6.04E-06	6.04E-06
DDCCC	1.81E-05	1.81E-05
DSC	4.06E+03	4.06E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10710  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: RAD

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>2.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10715

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10715  
 Building Sq.Ft.: 12,020

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HX1

### Typical Building Information

Category	Construction	Use	Occ.	Day
20	BRICK	POST SAFETY/LEA 2ND F	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1600	1600	1600	1600	1600	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	6	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	18.00%	
TON CAPC.	0	
MBTU CAPC.	0.96	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	81.60%	81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,100	3,360
Heating HRSON	1,760	5,376
C/H HRSON	2,868	8,760
Cooling HRSAV	2,260	
Heating HRSAV	3,616	
C/H HRSAV	5,892	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	196.36	196.36
HOAOHC	97.91	97.91
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+03	1.18E+03
NSC	2.16E+04	2.16E+04
FV	321	321
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10715  
 System Type 12  
 System Name: BASEBOARD RADIATION  
 System Number: HX1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	15,859.4	0.0	
Optimum ST/SP	0.0	824.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	46.7	
<b>Sub Total</b>	<b>0.0</b>	<b>16,683.9</b>	<b>46.7</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	2.6	
HW OA Reset	0.0	0.0	7.1	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>16,683.9</b>	<b>56.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10715

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	20,577
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HVU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
19	BRICK	POST SAFETY/LEA 1ST FL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	7.5	
Load Factor	0.8	
CFM - HTG	7760	
CFM - CLG	0	
% OA	40.59%	
% Area	24.30%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	83.10%	83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	3.67E-07	3.67E-07
ECHC	1.23E-07	1.23E-07
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	6.04E-06	6.04E-06
DDCCC	1.81E-05	1.81E-05
DSC	4.06E+03	4.06E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10715  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HVU-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	20.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>20.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10715  
 Building Sq.Ft.: 20,577

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HVU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
19	BRICK	POST SAFETY/LEA 1ST FL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	8230
CFM - CLG	0
% OA	16.04%
% Area	60.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	3.67E-07	3.67E-07
ECHC	1.23E-07	1.23E-07
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	6.04E-06	6.04E-06
DDCCC	1.81E-05	1.81E-05
DSC	4.06E+03	4.06E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10715  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HVU-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	50.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>50.7</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10715  
 Building Sq.Ft.: 12,020

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HVU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
20	BRICK	POST SAFETY/LEA 2ND F	0600-1700	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1700	1700	1700	1700	1700	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	9040
CFM - CLG	0
% OA	11.06%
% Area	82.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	196.36	196.36
HOAOHC	97.91	97.91
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.18E+03	1.18E+03
NSC	2.16E+04	2.16E+04
FV	321	321
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAB	2,060	
Heating HRSAB	3,296	
C/H HRSAB	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10715  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HVU-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	55,424.3	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	213.0	
<b>Sub Total</b>	<b>0.0</b>	<b>57,364.4</b>	<b>213.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	51.3	
DDC Control	0.0	0.0	11.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>57,364.4</b>	<b>275.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10715  
 Building Sq.Ft.: 20,577

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HX2

### Typical Building Information

Category	Construction	Use	Occ.	Day
19	BRICK	POST SAFETY/LEA 1ST FL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	8.40%
TON CAPC.	0
MBTU CAPC.	0.8418
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	3.67E-07	3.67E-07
ECHC	1.23E-07	1.23E-07
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	6.04E-06	6.04E-06
DDCCC	1.81E-05	1.81E-05
DSC	4.06E+03	4.06E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10715  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HX2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	162.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>162.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	7.0	
HW OA Reset	0.0	0.0	6.2	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>162.0</b>	<b>13.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10715  
 Building Sq.Ft.: 20,577

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	4
System Name:	SINGLE ZONE AHU
System Number:	ACU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
19	BRICK	POST SAFETY/LEA 1ST FL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.33
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	100.00%
% Area	5.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	3.67E-07	3.67E-07
ECHC	1.23E-07	1.23E-07
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	6.04E-06	6.04E-06
DDCCC	1.81E-05	1.81E-05
DSC	4.06E+03	4.06E+03
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10715  
 System Type: 4  
 System Name: SINGLE ZONE AHU  
 System Number: ACU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.6	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.6</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	4.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.6</b>	<b>0.0</b>	<b>4.2</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10730

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/MLC  
 PAGE 1 OF 2

Building Sq.Ft.:	76,848
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU1

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	30
Load Factor	0.8
CFM - HTG	19350
CFM - CLG	19350
% OA	17.00%
% Area	5.80%
TON CAPC.	0
MBTU CAPC.	0
KW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	90.20% 90.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSVA	1,680	
Heating HRSVA	2,688	
C/H HRSVA	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	97,044.3	0.0	
Optimum ST/SP	0.0	3,729.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	61.2	
<b>Sub Total</b>	<b>0.0</b>	<b>100,773.9</b>	<b>61.2</b>	
Economizer	0.0	1,911.2	0.0	
Ventilation/Recirculation	0.0	435.7	68.4	
DDC Control	0.0	18,640.1	20.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>121,760.9</b>	<b>150.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730  
 Building Sq.Ft.: 76,848

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	10	
Load Factor	0.8	
CFM - HTG	7800	
CFM - CLG	7800	
% OA	17.79%	
% Area	2.80%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	85.80%	85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRS AV	1,680	
Heating HRS AV	2,688	
C/H HRS AV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU2

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	34,732.3	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	29.5	
<b>Sub Total</b>	<b>0.0</b>	<b>36,039.3</b>	<b>29.5</b>	
Economizer	0.0	770.4	0.0	
Ventilation/Recirculation	0.0	183.8	28.9	
DDC Control	0.0	7,513.8	10.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>44,507.4</b>	<b>68.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730  
 Building Sq.Ft.: 76,848

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP		5
Load Factor		0.8
CFM - HTG		0
CFM - CLG		4000
% OA		12.00%
% Area		0.96%
TON CAPC.		0
MBTU CAPC.		0
kW/Ton		0
MOSON		12
EFF		1
LOOK-UP VALUE		
EFFHP	81.60%	81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DCCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU3

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,489.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	10.1	
<b>Sub Total</b>	<b>0.0</b>	<b>18,176.6</b>	<b>10.1</b>	
Economizer	0.0	395.1	0.0	
Ventilation/Recirculation	0.0	63.6	0.0	
DDC Control	0.0	3,853.3	3.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>22,488.5</b>	<b>13.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730  
 Building Sq.Ft.: 76,848

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	7480
CFM - CLG	7480
% OA	6.09%
% Area	1.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAV	1,680	
Heating HRSAV	2,688	
C/H HRSAV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DCCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU4

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	31,855.2	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	10.5	
<b>Sub Total</b>	<b>0.0</b>	<b>33,162.1</b>	<b>10.5</b>	
Economizer	0.0	738.8	0.0	
Ventilation/Recirculation	0.0	60.3	9.5	
DDC Control	0.0	7,205.6	3.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>41,166.8</b>	<b>23.6</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCM/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	76,848
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	0
CFM - CLG	8500
% OA	9.69%
% Area	1.63%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAV	1,680	
Heating HRSAV	2,688	
C/H HRSAV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU5

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	47,740.9	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	17.2	
<b>Sub Total</b>	<b>0.0</b>	<b>49,681.0</b>	<b>17.2</b>	
Economizer	0.0	839.5	0.0	
Ventilation/Recirculation	0.0	109.0	0.0	
DDC Control	0.0	8,188.2	5.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>58,817.7</b>	<b>23.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730  
 Building Sq.Ft.: 76,848

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	3	
Load Factor	0.8	
CFM - HTG	1670	
CFM - CLG	1670	
% OA	11.98%	
% Area	0.24%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	79.00%	79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRS AV	1,680	
Heating HRS AV	2,688	
C/H HRS AV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DCCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU6

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	10,538.3	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	2.5	
<b>Sub Total</b>	<b>0.0</b>	<b>10,964.1</b>	<b>2.5</b>	
Economizer	0.0	164.9	0.0	
Ventilation/Recirculation	0.0	26.5	4.2	
DDC Control	0.0	1,608.7	0.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,764.3</b>	<b>7.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	76,848
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	900
CFM - CLG	1000
% OA	11.11%
% Area	0.12%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRS AV	1,680	
Heating HRS AV	2,688	
C/H HRS AV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU7

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,041.8	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	1.3	
<b>Sub Total</b>	<b>0.0</b>	<b>7,329.3</b>	<b>1.3</b>	
Economizer	0.0	98.8	0.0	
Ventilation/Recirculation	0.0	14.7	2.1	
DDC Control	0.0	963.3	0.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,406.1</b>	<b>3.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10730

Building Sq.Ft.: 76,848

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU8

EMC NO.: 1406-006

DATE: 29-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	7.5	
Load Factor	0.8	
CFM - HTG	4600	
CFM - CLG	4600	
% OA	11.80%	
% Area	1.47%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	83.10%	83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAV	1,680	
Heating HRSAV	2,688	
C/H HRSAV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU8

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,254.1	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.5	
<b>Sub Total</b>	<b>0.0</b>	<b>26,266.2</b>	<b>15.5</b>	
Economizer	0.0	454.3	0.0	
Ventilation/Recirculation	0.0	71.9	11.3	
DDC Control	0.0	4,431.2	5.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>31,223.7</b>	<b>32.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	76,848
System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	3495
CFM - CLG	3495
% OA	13.84%
% Area	1.47%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRS AV	1,680	
Heating HRS AV	2,688	
C/H HRS AV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU9

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	17,501.4	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.5	
<b>Sub Total</b>	<b>0.0</b>	<b>18,188.5</b>	<b>15.5</b>	
Economizer	0.0	345.2	0.0	
Ventilation/Recirculation	0.0	64.1	10.1	
DDC Control	0.0	3,366.8	5.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>21,964.6</b>	<b>30.8</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730  
 Building Sq.Ft.: 76,848

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	3
System Name:	SINGLE ZONE AHU WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	2	
Load Factor	0.8	
CFM - HTG	1800	
CFM - CLG	1800	
% OA	10.00%	
% Area	0.44%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	78.00%	78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRS AV	1,680	
Heating HRS AV	2,688	
C/H HRS AV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DCCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 3  
 System Name: SINGLE ZONE AHU WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,254.3	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	4.7	
<b>Sub Total</b>	<b>0.0</b>	<b>7,541.9</b>	<b>4.7</b>	
Economizer	0.0	177.8	0.0	
Ventilation/Recirculation	0.0	23.8	3.7	
DDC Control	0.0	1,734.0	1.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>9,477.4</b>	<b>10.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730  
 Building Sq.Ft.: 76,848

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	10	
Load Factor	0.8	
CFM - HTG	0	
CFM - CLG	0	
% OA	0.00%	
% Area	84.00%	
TON CAPC.	0	
MBTU CAPC.	2.101	
kW/Ton	0	
MOSON	8	
EFF	1	
LOOK-UP VALUE		
EFFHP	85.80%	85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRS AV	1,680	
Heating HRS AV	2,688	
C/H HRS AV	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	18,686.9	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	886.0	
<b>Sub Total</b>	<b>0.0</b>	<b>19,993.9</b>	<b>886.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	301.1	
HW OA Reset	0.0	0.0	15.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>19,993.9</b>	<b>1,202.7</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730  
 Building Sq.Ft.: 76,848

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	11
System Name:	CONDENSING UNIT
System Number:	CH1

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT		
Motor HP	0		
Load Factor	0.8		
CFM - HTG	0		
CFM - CLG	0		
% OA	0.00%		
% Area	0.00%		
TON CAPC.	95		
MBTU CAPC.	0		
kW/Ton	0		
MOSON	5		
EFF	1		
LOOK-UP VALUE	EFFHP	0.00%	0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 29-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10730  
 System Type 11  
 System Name: CONDENSING UNIT  
 System Number: CH1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	909.2	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>909.2</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10730  
 Building Sq.Ft.: 76,848

EMC NO.: 1406-006  
 DATE: 29-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	11
System Name:	CONDENSING UNIT
System Number:	CH2

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1000	1000	1000	1000	1000	1000	1000
Stop Time	2000	2000	2000	2000	2000	2000	2000

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	95
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,680	3,360
Heating HRSON	2,688	5,376
C/H HRSON	4,380	8,760
Cooling HRSAB	1,680	
Heating HRSAB	2,688	
C/H HRSAB	4,380	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DDCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 29-Mar-95

PAGE 2 OF 2

Bldg Number: 10730  
 System Type: 11  
 System Name: CONDENSING UNIT  
 System Number: CH2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	909.2	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>909.2</b>	<b>0.0</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10732

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10732  
 Building Sq.Ft.: 4,000

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	4
System Name:	SINGLE ZONE AHU
System Number:	AHU1

\*PROPANE IN-DUCT FURNACE

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1200	1200	1200	900	900	900	1200
Stop Time	1200	2000	2000	2100	2100	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	4000
CFM - CLG	4000
% OA	12.00%
% Area	100.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DCCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10732  
 System Type: 4  
 System Name: SINGLE ZONE AHU  
 System Number: AHU1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	13,981.3	0.0	
Optimum ST/SP	0.0	425.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	54.9	
<b>Sub Total</b>	<b>0.0</b>	<b>14,407.2</b>	<b>54.9</b>	
Economizer	0.0	305.7	0.0	
Ventilation/Recirculation	0.0	63.6	8.6	
DDC Control	0.0	2,981.7	18.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>17,758.1</b>	<b>82.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10732

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	4,000
System Type	11
System Name:	CONDENSING UNIT
System Number:	ACCU-1

\*PROPANE IN-DUCT FURNACE

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	1200	1200	1200	900	900	900	1200
Stop Time	1200	2000	2000	2100	2100	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	13.36
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DCCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	0.00
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10732  
 System Type: 11  
 System Name: CONDENSING UNIT  
 System Number: ACCU-1

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	945.2	0.0	
Optimum ST/SP	0.0	86.3	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.9	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.9</b>	<b>1,031.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.9</b>	<b>1,031.5</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

BLDG: 10732

EMC NO.: 1406-006

DATE: 10-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.: 4,000

System Type	11
System Name:	CONDENSING UNIT
System Number:	ACCU-2

\*PROPANE IN-DUCT FURNACE

### Typical Building Information

Category	Construction	Use	Occ.	Day
21	BRICK	CLO SALES/RETAIL/COM	1000-2000	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	1200	1200	1200	900	900	900	1200
Stop Time	1200	2000	2000	2100	2100	1700	1700

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.5
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	13.36
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,300	3,360
Heating HRSON	2,080	5,376
C/H HRSON	3,389	8,760
Cooling HRSAV	2,060	
Heating HRSAV	3,296	
C/H HRSAV	5,371	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.84E-03	1.84E-03
COAUHC	7.04E-04	7.04E-04
HOAOH	214.18	214.18
HOAOHC	131.44	131.44
COAOC	5.98E-03	5.98E-03
COAOHC	2.29E-03	2.29E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	5.88E-05	5.88E-05
ECHC	2.26E-05	2.26E-05
NSUCC	1.54E-04	1.54E-04
NSUCHC	9.45E-05	9.45E-05
DCCCHC	8.44E-05	8.44E-05
DDCCC	2.20E-04	2.20E-04
DSC	4.66E+03	4.66E+03
NSC	1.37E+04	1.37E+04
FV	93	93
CHWR	9.57	0.00
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10732  
 System Type: 11  
 System Name: CONDENSING UNIT  
 System Number: ACCU-2

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	945.2	0.0	
Optimum ST/SP	0.0	86.3	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.9	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.9</b>	<b>1,031.5</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.9</b>	<b>1,031.5</b>	<b>0.0</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10745

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10745  
 Building Sq.Ft.: 23,500

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HX-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	600	1900	1900	1900	1900	1900	600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	26.00%
TON CAPC.	0
MBTU CAPC.	2.155
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,720	3,360
Heating HRSON	2,752	5,376
C/H HRSON	4,484	8,760
Cooling HRSAB	1,640	
Heating HRSAB	2,624	
C/H HRSAB	4,276	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10745  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HX-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,013.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	598.1	
<b>Sub Total</b>	<b>0.0</b>	<b>4,300.8</b>	<b>598.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	155.7	
HW OA Reset	0.0	0.0	15.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,300.8</b>	<b>769.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10745

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	23,500
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	3445
CFM - CLG	0
% OA	25.30%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 05-Apr-95

PAGE 2 OF 2

Bldg Number: 10745

System Type: 1

System Name: H&V UNIT WITHOUT RETURN FAN

System Number: HV-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,815.4	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	552.1	
<b>Sub Total</b>	<b>0.0</b>	<b>8,103.0</b>	<b>552.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	143.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,103.0</b>	<b>695.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10745  
 Building Sq.Ft.: 23,500

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	2400
CFM - CLG	0
% OA	100.00%
% Area	16.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10745  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	386.5	
<b>Sub Total</b>	<b>0.0</b>	<b>6,850.0</b>	<b>386.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	100.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>6,850.0</b>	<b>487.1</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10745

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	23,500
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT		
Motor HP	1.5		
Load Factor	0.8		
CFM - HTG	2359		
CFM - CLG	0		
% OA	25.30%		
% Area	16.50%		
TON CAPC.	0		
MBTU CAPC.	0		
kW/Ton	0		
MOSON	12		
EFF	1		
LOOK-UP VALUE	EFFHP	69.20%	69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10745  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	379.6	
<b>Sub Total</b>	<b>0.0</b>	<b>6,850.0</b>	<b>379.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	98.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>6,850.0</b>	<b>478.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10745  
 Building Sq.Ft.: 23,500

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	1.5	
Load Factor	0.8	
CFM - HTG	2359	
CFM - CLG	0	
% OA	25.30%	
% Area	16.50%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	69.20%	69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10745  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	379.6	
<b>Sub Total</b>	<b>0.0</b>	<b>6,850.0</b>	<b>379.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	98.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>6,850.0</b>	<b>478.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10785

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

BLDG: 10785

Building Sq.Ft.: 3,024

System Type	2
System Name:	H&V UNIT
System Number:	AHU1

EMC NO.: 1406-006

DATE: 28-Mar-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

### Typical Building Information

Category	Construction	Use	Occ.	Day
24	BRICK	CHAPEL ZONE	0800-1400	SUN

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	800	0	0	0	0	0	0
Stop Time	1400	0	0	0	0	0	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	17.5
Load Factor	0.8
CFM - HTG	4100
CFM - CLG	0
% OA	48.78%
% Area	58.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	160	3,360
Heating HRSON	256	5,376
C/H HRSON	417	8,760
Cooling HRSAV	3,200	
Heating HRSAV	5,120	
C/H HRSAV	8,343	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	372.76	372.76
HOAOHC	185.87	185.87
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	7.01E+03	7.01E+03
NSC	2.51E+05	2.51E+05
FV	147	147
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	100,445.3	0.0	
Optimum ST/SP	0.0	2,263.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	441.0	
<b>Sub Total</b>	<b>0.0</b>	<b>102,708.8</b>	<b>441.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	9.4	
DDC Control	0.0	0.0	12.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>102,708.8</b>	<b>462.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785  
 Building Sq.Ft.: 7,048

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	2
System Name:	H&V UNIT
System Number:	AHU2

### Typical Building Information

Category	Construction	Use	Occ.	Day
25	BRICK	CHAPEL OFFICE ZONE	0600-1700	SUN-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	830	0	900	0	900	0	0
Stop Time	1300	0	1200	0	1200	0	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	11.65
Load Factor	0.8
CFM - HTG	2900
CFM - CLG	0
% OA	31.03%
% Area	73.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	334	3,360
Heating HRSON	534	5,376
C/H HRSON	871	8,760
Cooling HRSAV	3,026	
Heating HRSAV	4,842	
C/H HRSAV	7,889	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	347.79	347.79
HOAOHC	173.42	173.42
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	1.26E+04	1.26E+04
NSC	3.30E+04	3.30E+04
FV	52	52
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	63,895.2	0.0	
Optimum ST/SP	0.0	1,522.6	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	169.6	
<b>Sub Total</b>	<b>0.0</b>	<b>65,417.8</b>	<b>169.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	4.5	
DDC Control	0.0	0.0	64.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>65,417.8</b>	<b>238.9</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	40,519
System Type	2
System Name:	H&V UNIT
System Number:	AHU3

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6.7
Load Factor	0.8
CFM - HTG	3500
CFM - CLG	0
% OA	19.29%
% Area	6.83%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRS AV	1,960	
Heating HRS AV	3,136	
C/H HRS AV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,026.6	0.0	
Optimum ST/SP	0.0	920.7	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	15.8	
<b>Sub Total</b>	<b>0.0</b>	<b>25,947.3</b>	<b>15.8</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	27.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>25,947.3</b>	<b>43.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 40,519

System Type	2
System Name:	H&V UNIT
System Number:	AHU4

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer: 20  
 Enter Weeks of Winter: 32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	14.15
Load Factor	0.8
CFM - HTG	3500
CFM - CLG	0
% OA	12.00%
% Area	13.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 28-Mar-95  
PAGE 2 OF 2

Bldg Number: 10785  
System Type: 2  
System Name: H&V UNIT  
System Number: AHU4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	50,267.3	0.0	
Optimum ST/SP	0.0	1,849.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.9	
<b>Sub Total</b>	<b>0.0</b>	<b>52,116.7</b>	<b>31.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	55.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>52,116.7</b>	<b>87.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785  
 Building Sq.Ft.: 40,519

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	2
System Name:	H&V UNIT
System Number:	AHU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	2800
CFM - CLG	0
% OA	25.00%
% Area	11.10%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	35,524.6	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	25.6	
<b>Sub Total</b>	<b>0.0</b>	<b>36,831.6</b>	<b>25.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	44.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>36,831.6</b>	<b>70.3</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	40,519
System Type	2
System Name:	H&V UNIT
System Number:	AHU6

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	17.475
Load Factor	0.8
CFM - HTG	4850
CFM - CLG	0
% OA	20.62%
% Area	19.22%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70%   86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU6

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	61,434.9	0.0	
Optimum ST/SP	0.0	2,260.2	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	44.4	
<b>Sub Total</b>	<b>0.0</b>	<b>63,695.1</b>	<b>44.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	77.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>63,695.1</b>	<b>121.7</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	40,519
System Type	2
System Name:	H&V UNIT
System Number:	AHU7

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	6.3
Load Factor	0.8
CFM - HTG	1975
CFM - CLG	0
% OA	30.38%
% Area	7.81%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVAV	1,960	
Heating HRSVAV	3,136	
C/H HRSVAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU7

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	23,532.5	0.0	
Optimum ST/SP	0.0	865.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	18.0	
<b>Sub Total</b>	<b>0.0</b>	<b>24,398.2</b>	<b>18.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	31.4	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>24,398.2</b>	<b>49.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785  
 Building Sq.Ft.: 40,519

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	2
System Name:	H&V UNIT
System Number:	AHU8

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	10
Load Factor	0.8
CFM - HTG	2850
CFM - CLG	0
% OA	21.05%
% Area	11.26%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU8

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	35,524.6	0.0	
Optimum ST/SP	0.0	1,307.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	26.0	
<b>Sub Total</b>	<b>0.0</b>	<b>36,831.6</b>	<b>26.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	45.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>36,831.6</b>	<b>71.3</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	40,519
System Type	2
System Name:	H&V UNIT
System Number:	AHU9

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	11.65
Load Factor	0.8
CFM - HTG	3475
CFM - CLG	0
% OA	25.90%
% Area	13.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	85.80% 85.80%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 28-Mar-95

PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 2  
 System Name: H&V UNIT  
 System Number: AHU9

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	41,386.2	0.0	
Optimum ST/SP	0.0	1,522.6	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	31.9	
<b>Sub Total</b>	<b>0.0</b>	<b>42,908.8</b>	<b>31.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	55.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>42,908.8</b>	<b>87.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	40,519
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	AHU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3.75
Load Factor	0.8
CFM - HTG	1800
CFM - CLG	0
% OA	100.00%
% Area	7.10%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00E+00
COAUC	0.00E+00	0.00E+00
COAUC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 28-Mar-95  
 PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: AHU10

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	14,468.4	0.0	
Optimum ST/SP	0.0	532.3	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	16.4	
<b>Sub Total</b>	<b>0.0</b>	<b>15,000.7</b>	<b>16.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	28.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>15,000.7</b>	<b>45.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10785  
 Building Sq.Ft.: 40,519

EMC NO.: 1406-006  
 DATE: 28-Mar-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HE1

### Typical Building Information

Category	Construction	Use	Occ.	Day
23	BRICK	CHAPEL/REL ED/CHILD C	0600-1800	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	830	600	600	600	600	600	0
Stop Time	1300	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	25.80%
TON CAPC.	0
MBTU CAPC.	2.001
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,534	3,360
Heating HRSON	2,454	5,376
C/H HRSON	3,999	8,760
Cooling HRSAB	1,826	
Heating HRSAB	2,922	
C/H HRSAB	4,761	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	231.05	231.05
HOAOHC	115.21	115.21
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	9.94E+03	9.94E+03
NSC	5.70E+03	5.70E+03
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 28-Mar-95

PAGE 2 OF 2

Bldg Number: 10785  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HE1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,010.8	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	59.5	
<b>Sub Total</b>	<b>0.0</b>	<b>2,140.2</b>	<b>59.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	103.9	
HW OA Reset	0.0	0.0	14.8	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,140.2</b>	<b>178.2</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 10790

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10790  
 Building Sq.Ft.: 21,820

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HX-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	600	1900	1900	1900	1900	1900	600

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	26.00%
TON CAPC.	0
MBTU CAPC.	2.155
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,720	3,360
Heating HRSON	2,752	5,376
C/H HRSON	4,484	8,760
Cooling HRSAB	1,640	
Heating HRSAB	2,624	
C/H HRSAB	4,276	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10790  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HX-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	4,013.2	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	555.4	
<b>Sub Total</b>	<b>0.0</b>	<b>4,300.8</b>	<b>555.4</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	144.5	
HW OA Reset	0.0	0.0	15.9	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>4,300.8</b>	<b>715.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10790  
 Building Sq.Ft.: 21,820

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSWB/MG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	3445
CFM - CLG	0
% OA	25.30%
% Area	24.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10790  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	7,815.4	0.0	
Optimum ST/SP	0.0	287.5	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	552.1	
<b>Sub Total</b>	<b>0.0</b>	<b>8,103.0</b>	<b>552.1</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	143.7	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>8,103.0</b>	<b>695.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10790  
 Building Sq.Ft.: 21,820

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	2400
CFM - CLG	0
% OA	100.00%
% Area	16.80%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10790  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	386.5	
<b>Sub Total</b>	<b>0.0</b>	<b>6,850.0</b>	<b>386.5</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	100.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>6,850.0</b>	<b>487.1</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10790  
 Building Sq.Ft.: 21,820

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1.5
Load Factor	0.8
CFM - HTG	2359
CFM - CLG	0
% OA	25.30%
% Area	16.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10790  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-3

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	379.6	
<b>Sub Total</b>	<b>0.0</b>	<b>6,850.0</b>	<b>379.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	98.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>6,850.0</b>	<b>478.4</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 10790  
 Building Sq.Ft.: 21,820

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
22	BRICK	CHILD SUPPORT CENTER	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP	1.5	
Load Factor	0.8	
CFM - HTG	2359	
CFM - CLG	0	
% OA	25.30%	
% Area	16.50%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	12	
EFF	1	
LOOK-UP VALUE		
EFFHP	69.20%	69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	91.77	91.77
HOAOHC	56.32	56.32
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.55E+04	2.55E+04
NSC	9.79E+04	9.79E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 10790  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-4

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	6,607.0	0.0	
Optimum ST/SP	0.0	243.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	379.6	
<b>Sub Total</b>	<b>0.0</b>	<b>6,850.0</b>	<b>379.6</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	98.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>6,850.0</b>	<b>478.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 11050

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	67,570
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HX-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	2.16
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUHC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	0	194
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HX-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	16.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>16.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	67,570
System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	1
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.9
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	69.20% 69.20%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUHC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	6.7	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>6.7</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	67,570
System Type	12
System Name:	BASEBOARD RADIATION
System Number:	HX-1A

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0.75
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	18.70%
TON CAPC.	0
MBTU CAPC.	0.4393
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	65.00% 65.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUHC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	194	194
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 12  
 System Name: BASEBOARD RADIATION  
 System Number: HX-1A

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	2,158.3	0.0	
Optimum ST/SP	0.0	129.4	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	619.0	
<b>Sub Total</b>	<b>0.0</b>	<b>2,287.7</b>	<b>619.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	63.6	
HW OA Reset	0.0	0.0	3.3	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>2,287.7</b>	<b>685.9</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050  
 Building Sq.Ft.: 67,570

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

System Type	7
System Name:	VAV AHU
System Number:	AHU-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	15
Load Factor	0.8
CFM - HTG	7645
CFM - CLG	10130
% OA	46.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	86.70% 86.70%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUC	0.00	0.00
HOAUC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUC	5.64E-04	5.64E-04
HOAOC	130.00	130.00
HOAOC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	194	194
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type 7  
 System Name: VAV AHU  
 System Number: AHU-1

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	66,161.8	0.0	
Optimum ST/SP	0.0	1,940.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	297.9	
<b>Sub Total</b>	<b>0.0</b>	<b>68,101.9</b>	<b>297.9</b>	
	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	494.0	109.4	
DDC Control	0.0	959.8	30.6	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
<b>TOTAL</b>	<b>0.0</b>	<b>69,555.7</b>	<b>438.0</b>	<b>6</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	9,278
System Type	7
System Name:	VAV AHU
System Number:	AHU-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
27	BRICK	CLINIC W/O BEDS/SUPPL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	2470
CFM - CLG	3190
% OA	26.00%
% Area	31.50%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	
Heating HRSAV	0	
C/H HRSAV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	2.24E-04	2.24E-04
DDCCC	6.71E-04	6.71E-04
DSC	6.29E+04	6.29E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 7  
 System Name: VAV AHU  
 System Number: AHU-2

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	18,743.3	183.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
<b>TOTAL</b>	<b>0.0</b>	<b>18,743.3</b>	<b>183.8</b>	<b>6</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050  
 Building Sq.Ft.: 9,278

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	4
System Name:	SINGLE ZONE AHU
System Number:	AHU-3

### Typical Building Information

Category	Construction	Use	Occ.	Day
27	BRICK	CLINIC W/O BEDS/SUPPL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	2100
CFM - CLG	2100
% OA	100.00%
% Area	30.30%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAB	0	
Heating HRSAB	0	
C/H HRSAB	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	2.24E-04	2.24E-04
DDCCC	6.71E-04	6.71E-04
DSC	6.29E+04	6.29E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 4  
 System Name: SINGLE ZONE AHU  
 System Number: AHU-3

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	12,338.9	176.8	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>12,338.9</b>	<b>176.8</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050  
 Building Sq.Ft.: 9,278

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	7
System Name:	VAV AHU
System Number:	AHU-4

### Typical Building Information

Category	Construction	Use	Occ.	Day
27	BRICK	CLINIC W/O BEDS/SUPPL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	3475
CFM - CLG	4005
% OA	35.00%
% Area	23.18%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSAV	0	0
Heating HRSAV	0	0
C/H HRSAV	0	0

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	2.24E-04	2.24E-04
DDCCC	6.71E-04	6.71E-04
DSC	6.29E+04	6.29E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 10-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 7  
 System Name: VAV AHU  
 System Number: AHU-4

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	23,532.0	135.2	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
<b>TOTAL</b>	<b>0.0</b>	<b>23,532.0</b>	<b>135.2</b>	<b>6</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050  
 Building Sq.Ft.: 67,570

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	7
System Name:	VAV AHU
System Number:	AHU-5

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	3720
CFM - CLG	9915
% OA	25.00%
% Area	4.39%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUHC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	194	194
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 10-Apr-95

PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 7  
 System Name: VAV AHU  
 System Number: AHU-5

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	25,819.5	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	145.3	
<b>Sub Total</b>	<b>7.3</b>	<b>26,506.6</b>	<b>145.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	262.8	28.9	
DDC Control	0.0	939.4	14.9	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
<b>TOTAL</b>	<b>7.3</b>	<b>27,708.8</b>	<b>189.2</b>	<b>6</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050  
 Building Sq.Ft.: 67,570

EMC NO.: 1406-006  
 DATE: 10-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	7
System Name:	VAV AHU
System Number:	AHU-6

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	11035
CFM - CLG	13685
% OA	25.00%
% Area	13.03%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAV	1,960	
Heating HRSAV	3,136	
C/H HRSAV	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUHC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	194	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 10-Apr-95

PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 7  
 System Name: VAV AHU  
 System Number: AHU-6

HEATING AND COOLING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	28,535.4	0.0	
Optimum ST/SP	0.0	687.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	7.3	0.0	0.0	
Night Setback	0.0	0.0	431.3	
<b>Sub Total</b>	<b>7.3</b>	<b>29,222.6</b>	<b>431.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	362.7	0.0	
DDC Control	0.0	1,296.6	44.3	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6
<b>TOTAL</b>	<b>7.3</b>	<b>30,881.9</b>	<b>475.7</b>	<b>6</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	67,570
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	5000
CFM - CLG	0
% OA	25.00%
% Area	5.90%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSAB	1,960	
Heating HRSAB	3,136	
C/H HRSAB	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUHC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	194	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 04-Apr-95

PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-1

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	15,433.0	0.0	
Optimum ST/SP	0.0	567.8	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	195.3	
<b>Sub Total</b>	<b>0.0</b>	<b>16,000.8</b>	<b>195.3</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	20.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>16,000.8</b>	<b>215.4</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050

EMC NO.: 1406-006  
 DATE: 04-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	67,570
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	HV-2

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	700	700	700	700	700	0
Stop Time	0	1900	1900	1900	1900	1900	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	7.5
Load Factor	0.8
CFM - HTG	9000
CFM - CLG	0
% OA	25.00%
% Area	10.60%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	83.10% 83.10%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	3,360
Heating HRSON	2,240	5,376
C/H HRSON	3,650	8,760
Cooling HRSVA	1,960	
Heating HRSVA	3,136	
C/H HRSVA	5,110	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUHC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	194	194
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 04-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: HV-2

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	27,509.1	0.0	
Optimum ST/SP	0.0	1,012.1	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	350.9	
<b>Sub Total</b>	<b>0.0</b>	<b>28,521.2</b>	<b>350.9</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	70.0	
DDC Control	0.0	0.0	36.1	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>28,521.2</b>	<b>457.0</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050  
 Building Sq.Ft.: 67,570

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	8
System Name:	CHILLER AND PUMPS
System Number:	CHR-1A,B,C

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	54.4
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DDCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 8  
 System Name: CHILLER AND PUMPS  
 System Number: CHR-1A,B,C

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	3.1	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>3.1</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	520.6	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>3.1</b>	<b>520.6</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050

EMC NO.: 1406-006  
 DATE: 05-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	9,278
System Type	11
System Name:	CONDENSING UNIT
System Number:	ACCU1A-3B

### Typical Building Information

Category	Construction	Use	Occ.	Day
27	BRICK	CLINIC W/O BEDS/SUPPL	0000-2400	SUN-SAT

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	4
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	42.8
MBTU CAPC.	0
kW/Ton	0
MOSON	5
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	0.00	0.00
HOAOHC	0.00	0.00
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	2.24E-04	2.24E-04
DDCCC	6.71E-04	6.71E-04
DSC	6.29E+04	6.29E+04
NSC	0.00E+00	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	0.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 05-Apr-95  
 PAGE 2 OF 2

Bldg Number: 11050  
 System Type: 11  
 System Name: CONDENSING UNIT  
 System Number: ACCU1A-3B

COOLING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	6.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>6.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	409.6	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>6.0</b>	<b>409.6</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11050

EMC NO.: 1406-006

DATE: 19-Apr-95

PREPARED BY: CSW/BMG

CHECKED BY: KC/WLC

PAGE 1 OF 2

Building Sq.Ft.:	67,570
System Type	13
System Name:	STEAM HUMIDIFICATION
System Number:	B-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
26	BRICK	CLINIC W/O BEDS/SUPPL	0700-1900	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	700	700	700	700	700	700	700
Stop Time	1700	1700	1700	1700	1700	1700	170

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT	
Motor HP		0
Load Factor		0.8
CFM - HTG		0
CFM - CLG		0
% OA		0.00%
% Area		0.00%
TON CAPC.		0
MBTU CAPC.		0.9
kW/Ton		0
MOSON		12
EFF		1
LOOK-UP VALUE		
EFFHP	0.00%	0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,374	3,360
Heating HRSON	2,198	5,376
C/H HRSON	3,582	8,760
Cooling HRSVA	1,986	
Heating HRSVA	3,178	
C/H HRSVA	5,178	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	1.37E-03	1.37E-03
COAUHC	5.64E-04	5.64E-04
HOAOH	130.00	130.00
HOAOHC	64.82	64.82
COAOC	6.15E-03	6.15E-03
COAOHC	2.06E-03	2.06E-03
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	2.13E-04	2.13E-04
NSUCHC	1.44E-04	1.44E-04
DCCCHC	8.68E-06	8.68E-06
DDCCC	2.60E-05	2.60E-05
DSC	5.04E+03	5.04E+03
NSC	4.90E+04	4.90E+04
FV	194	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 19-Apr-95

PAGE 2 OF 2

Bldg Number: 11050  
System Type: 13  
System Name: STEAM HUMIDIFICATION  
System Number: B-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	6.7	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>6.7</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 11142

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11142

EMC NO.: 1406-006  
 DATE: 17-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KCW/LC  
 PAGE 1 OF 2

Building Sq.Ft.:	1,465
System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B1

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.455
kW/Ton	0
MOSON	0
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
CLIENT PROJECT ENGINEER: STEVE ROWLEY  
LOCATION: FT. DRUM

Date: 17-Apr-95  
PAGE 2 OF 2

Bldg Number: 11142  
System Type: 10  
System Name: HOT WATER BOILER AND PUMPS  
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	3.4	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.4</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 11144

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 11144

EMC NO.: 1406-006

DATE: 17-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	4,200
System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B1

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0.269
kW/Ton	0
MOSON	0
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAN	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 17-Apr-95

PAGE 2 OF 2

Bldg Number: 11144  
System Type 10  
System Name: HOT WATER BOILER AND PUMPS  
System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	2.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>2.0</b>	<b>3</b>

**ENERGY CALCULATIONS**

BUILDING 21517

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510/21516/21517

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	9
System Name:	CONVERTER AND PUMPS
System Number:	HX-1

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

Present Operations	S	M	T	W	TH	F	S
Start Time	0	0	0	0	0	0	0
Stop Time	2400	2400	2400	2400	2400	2400	2400

INPUTS	INPUT
Motor HP	2
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	78.00% 78.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	3,360	3,360
Heating HRSON	5,376	5,376
C/H HRSON	8,760	8,760
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DCCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 21510/21516/21517  
 System Type 9  
 System Name: CONVERTER AND PUMPS  
 System Number: HX-1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B1

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	6.695
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 21510  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B1

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	49.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>49.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510  
 Building Sq.Ft.: 19,247

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	10
System Name:	HOT WATER BOILER AND PUMPS
System Number:	B2

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	0
Load Factor	0.8
CFM - HTG	0
CFM - CLG	0
% OA	0.00%
% Area	0.00%
TON CAPC.	0
MBTU CAPC.	6.695
kW/Ton	0
MOSON	12
EFF	1
LOOK-UP VALUE	
EFFHP	0.00% 0.00%

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	5.85E+04
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	188.00

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 21510  
 System Type: 10  
 System Name: HOT WATER BOILER AND PUMPS  
 System Number: B2

HEATING ONLY SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	0.0	
HW OA Reset	0.0	0.0	49.5	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>49.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU01

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	11250
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 21510  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU01

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510  
 Building Sq.Ft.: 19,247

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU02

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	5625
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95  
PAGE 2 OF 2

Bldg Number: 21510  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: MAU02

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU03

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:	20
Enter Weeks of Winter:	32

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT	
Motor HP	5	
Load Factor	0.8	
CFM - HTG	11250	
CFM - CLG	0	
% OA	100.00%	
% Area	9.00%	
TON CAPC.	0	
MBTU CAPC.	0	
kW/Ton	0	
MOSON	7	
EFF	1	
LOOK-UP VALUE		
EFFHP	81.60%	81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 21510  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU03

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.: 19,247

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU04

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	11250
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 21510  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU04

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU5

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	5625
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 21510  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU5

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU06

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	11250
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95  
PAGE 2 OF 2

Bldg Number: 21510  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: MAU06

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU07

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	5625
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95

PAGE 2 OF 2

Bldg Number: 21510  
System Type 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: MAU07

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU08

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	3
Load Factor	0.8
CFM - HTG	5625
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	79.00% 79.00%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM

Date: 07-Apr-95  
 PAGE 2 OF 2

Bldg Number: 21510  
 System Type: 1  
 System Name: H&V UNIT WITHOUT RETURN FAN  
 System Number: MAU08

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# EMC ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510  
 Building Sq.Ft.: 19,247

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU09

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	11250
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRS AV	0	
Heating HRS AV	0	
C/H HRS AV	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95  
PAGE 2 OF 2

Bldg Number: 21510  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: MAU09

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6  
 CLIENT PROJECT ENGINEER: STEVE ROWLEY  
 LOCATION: FT. DRUM BLDG: 21510

EMC NO.: 1406-006  
 DATE: 07-Apr-95  
 PREPARED BY: CSW/BMG  
 CHECKED BY: KC/WLC  
 PAGE 1 OF 2

Building Sq.Ft.:	19,247
System Type	1
System Name:	H&V UNIT WITHOUT RETURN FAN
System Number:	MAU10

### Typical Building Information

Category	Construction	Use	Occ.	Day
2	BRICK	MOTOR REPAIR SHOP	0600-1730	MON-FRI

Enter Weeks of Summer:   
 Enter Weeks of Winter:

Required Operation	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

Present Operations	S	M	T	W	TH	F	S
Start Time	0	600	600	600	600	600	0
Stop Time	0	1800	1800	1800	1800	1800	0

INPUTS	INPUT
Motor HP	5
Load Factor	0.8
CFM - HTG	11250
CFM - CLG	0
% OA	100.00%
% Area	9.00%
TON CAPC.	0
MBTU CAPC.	0
kW/Ton	0
MOSON	7
EFF	1
LOOK-UP VALUE	
EFFHP	81.60% 81.60%

HOURS CALCULATIONS	REQUIRED HR/YR	PRESENT HR/YR
Cooling HRSON	1,400	1,200
Heating HRSON	2,240	1,920
C/H HRSON	3,650	3,129
Cooling HRSVA	0	
Heating HRSVA	0	
C/H HRSVA	0	

CONSTANT	LOOK-UP	INPUT
HOAUH	0.00	0.00
HOAUHC	0.00	0.00
COAUC	0.00E+00	0.00E+00
COAUHC	0.00E+00	0.00E+00
HOAOH	198.24	198.24
HOAOHC	121.66	121.66
COAOC	0.00E+00	0.00E+00
COAOHC	0.00E+00	0.00E+00
DC DUTY	0.00	0.00
DC DEMAND	0.17	0.17
ECC	0.00E+00	0.00E+00
ECHC	0.00E+00	0.00E+00
NSUCC	0.00E+00	0.00E+00
NSUCHC	0.00E+00	0.00E+00
DDCCHC	0.00E+00	0.00E+00
DDCCC	0.00E+00	0.00E+00
DSC	2.04E+03	2.04E+03
NSC	5.85E+04	0.00E+00
FV	0	0
CHWR	9.57	9.57
OAR	7.40	7.40
OPT	188.00	0.00

# E M C ENGINEERS, INC.

PROJECT: UMCS FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA01-94-D-0033 D.O. 6

CLIENT PROJECT ENGINEER: STEVE ROWLEY

LOCATION: FT. DRUM

Date: 07-Apr-95  
PAGE 2 OF 2

Bldg Number: 21510  
System Type: 1  
System Name: H&V UNIT WITHOUT RETURN FAN  
System Number: MAU10

HEATING AND VENTILATING SYSTEMS	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.0	0.0	0.0	
Optimum ST/SP	0.0	0.0	0.0	
Duty Cycle	0.0	0.0	0.0	
Demand Limit	0.0	0.0	0.0	
Night Setback	0.0	0.0	0.0	
<b>Sub Total</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	
Economizer	0.0	0.0	0.0	
Ventilation/Recirculation	0.0	0.0	0.0	
DDC Control	0.0	0.0	3.5	
HW OA Reset	0.0	0.0	0.0	
Chilled Water Reset	0.0	0.0	0.0	
Condenser Water Reset	0.0	0.0	0.0	
Chiller Demand Limit	0.0	0.0	0.0	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>3</b>