VOLUME II-B

APPENDIX G
ENERGY CALCULATIONS

FEASIBILITY STUDY FOR INSTALLATION OF UMCS FORT RILEY, KANSAS

ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)

Prepared for

U.S. Army Corps of Engineers
Kansas City District
Kansas City, Missouri

Under

U.S. Army Engineer District, Mobile
Indefinite Delivery A-E Contract
Contract No. DACA01-94-D-0033
Delivery Order 0001
EMC No. 1406-001

19971017 068

December 1995

DTIC QUALITY INSPECTED 2

By

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Marie Wakefield,
Librarian Engineering

BUILDING 7610
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	**1.76**	**0.00**	**15.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.97**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	**1.76**	**0.00**	**15.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.97**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOUR CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS APPLICATION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	60
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.66**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,050.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	50.49	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**51.15**	**1,050.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.61**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.61**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION →	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7612
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	**CONDITIONED SQFT:**	41,892

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	**1.76**	**0.00**	**15.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.97**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	**1.76**	**0.00**	**15.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.97**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	**CONDITIONED SQFT:**	41,892

SYTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

OUTPUTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**59.83**	**1,225.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7614
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	**1.76**	**0.00**	**15.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.97**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	**1.76**	**0.00**	**15.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.97**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201
CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**59.83**	**1,225.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.61**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.61**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7616
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	**1.76**	**0.00**	**15.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.97**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	**1.76**	**0.00**	**15.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.97**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201
CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

[illegible] CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 — **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**59.83**	**1,225.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	**CONDITIONED SQFT:**	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.61**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.61**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7618
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	**CONDITIONED SQFT:**	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**10.99**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**10.99**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

RESULTS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7618 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**63.84**	**1,291.50**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7620
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7620 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,427	CONDITIONED SQFT:	6,340

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,310
CFM-CLG:	6,310
%OA:	40%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760

CLG HRS SAVED:	2,420
HTG HRS SAVED:	3,872
C/H HRS SAVED:	6,309

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7620 **BUILDING NAME: BN ADMIN & CLRM**

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,164.82	257.98	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	37,462.71	88.83	
Sub Total	**7.46**	**65,742.88**	**346.81**	
Economizer	0.00	1,229.39	0.00	
Ventilation/Recirculation	0.00	197.84	12.47	
DDC Control	0.00	3,603.11	73.05	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**70,773.22**	**432.33**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7620 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,427	CONDITIONED SQFT:	6,340

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760

CLG HRS SAVED:	2,420
HTG HRS SAVED:	3,872
C/H HRS SAVED:	6,309

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7620 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,339.32	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**3,602.36**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**3,602.36**	**2.55**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7620 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,427	CONDITIONED SQFT:	6,340

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	21
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760

CLG HRS SAVED:	2,420
HTG HRS SAVED:	3,872
C/H HRS SAVED:	6,309

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7620 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	358.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	17.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**17.25**	**358.75**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

BUILDING 7622
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,949	CONDITIONED SQFT:	12,380

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,880
CFM-CLG:	3,880
%OA:	20%
%Area:	23%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,740.62	70.79	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	20,560.80	24.82	
Sub Total	**3.12**	**30,768.14**	**95.62**	
Economizer	0.00	965.04	0.00	
Ventilation/Recirculation	0.00	60.83	3.83	
DDC Control	0.00	2,828.35	20.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**3.12**	**34,622.36**	**119.87**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,949	CONDITIONED SQFT:	12,380

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,780
CFM-CLG:	3,780
%OA:	25%
%Area:	23%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,985.21	86.21	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	20,030.88	24.82	
Sub Total	**3.12**	**30,482.81**	**111.04**	
Economizer	0.00	940.17	0.00	
Ventilation/Recirculation	0.00	74.07	4.67	
DDC Control	0.00	2,755.46	20.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**3.12**	**34,252.51**	**136.12**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,949	CONDITIONED SQFT:	12,380

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,155
CFM-CLG:	6,155
%OA:	20%
%Area:	27%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	22,374.96	112.30	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	32,616.42	29.14	
Sub Total	**7.46**	**56,106.72**	**141.45**	
Economizer	0.00	1,530.88	0.00	
Ventilation/Recirculation	0.00	96.49	6.08	
DDC Control	0.00	4,486.73	23.97	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**62,220.82**	**171.49**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,949	CONDITIONED SQFT:	12,380

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	27%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	900,000
BLR CAP OUTPUT (BTUH):	720,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,288.57	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**5,755.29**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.10	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**5,755.29**	**5.10**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,949	CONDITIONED SQFT:	12,380

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	45
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7622 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,895.27	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**5,586.50**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	787.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	37.87	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**39.60**	**6,374.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7624
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

ENERGY CALCULATION PARAMETERS

BLDG: 7624 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	10,353
CFM-CLG:	10,353
%OA:	13%
%Area:	72%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

BLDG: 7624 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	36,763.72	139.84	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	62,482.12	38.66	
Sub Total	**10.99**	**100,888.65**	**178.50**	
Economizer	0.00	1,931.26	0.00	
Ventilation/Recirculation	0.00	105.50	6.65	
DDC Control	0.00	5,660.17	31.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**108,585.58**	**216.94**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

ENERGY CALCULATION PARAMETERS

BLDG: 7624 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	387,000
BLR CAP OUTPUT (BTUH):	310,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

BLDG: 7624 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,876.17**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.19	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**2,876.17**	**2.19**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

ENERGY CALCULATION PARAMETERS

BLDG: 7624 **BUILDING NAME: BN ADMIN & CLRM**

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

BLDG: 7624 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**25.25**	**525.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

BUILDING 7626
CLINIC W/O BEDS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7626 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,496	CONDITIONED SQFT:	3,604

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,230
CFM-CLG:	3,230
%OA:	20%
%Area:	80%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7626 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,827.64	207.99	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,962.36	43.08	
Sub Total	**0.00**	**18,256.73**	**251.07**	
Economizer	0.00	2,364.64	0.00	
Ventilation/Recirculation	0.00	238.41	9.89	
DDC Control	0.00	901.90	48.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**0.00**	**21,761.67**	**309.19**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7626 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,496	CONDITIONED SQFT:	3,604

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	258,000
BLR CAP OUTPUT (BTUH):	206,000

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7626 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,917.45**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.46	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**1,917.45**	**1.46**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7626 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,496	CONDITIONED SQFT:	3,604

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	11
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7626 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,764.43	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**4,231.16**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	185.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	8.92	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**10.09**	**4,416.66**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7630
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7630 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	10,353
CFM-CLG:	10,353
%OA:	13%
%Area:	72%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7630 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	35,269.26	134.15	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	59,942.20	38.66	
Sub Total	**10.99**	**96,854.27**	**172.81**	
Economizer	0.00	2,145.84	0.00	
Ventilation/Recirculation	0.00	105.50	6.65	
DDC Control	0.00	6,289.08	31.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**105,394.69**	**211.25**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7630 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	387,000
BLR CAP OUTPUT (BTUH):	310,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7630 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,560.81	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,767.66**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.19	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**2,767.66**	**2.19**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7630 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7630 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**25.25**	**525.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

BUILDING 7632
GYMNASIUM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,128,750
BLR CAP OUTPUT (BTUH):	2,503,000

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOUR CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	520,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.21	
Sub Total	**0.00**	**295.53**	**155.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**295.53**	**156.80**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.21	
Sub Total	**0.00**	**295.53**	**155.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**295.53**	**156.80**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**857.40**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**862.73**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**857.40**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**862.73**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**857.40**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**862.73**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**857.40**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**862.73**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7632 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**857.40**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**862.73**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

BUILDING 7636
REGIMENTAL HQ BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,563	CONDITIONED SQFT:	9,850

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	825
CFM-CLG:	825
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,432.70	89.20	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	5,181.41	9.38	
Sub Total	**0.92**	**9,752.01**	**98.58**	
Economizer	0.00	136.80	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	400.93	7.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.92**	**10,289.74**	**106.30**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,563	CONDITIONED SQFT:	9,850

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,989.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**1,989.79**	**2.55**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,563	CONDITIONED SQFT:	9,850

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,361.57	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.80**	**10,476.91**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	521.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.08	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**27.87**	**10,998.41**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,563

CONDITIONED SQFT:	9,850

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.70
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	8,600
CFM-CLG:	8,600
%OA:	0%
%Area:	80%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,580.41	0.00	
Opt ST/SP	0.00	483.50	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	10,102.20	22.35	
Sub Total	**0.00**	**21,166.11**	**22.35**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**21,166.11**	**22.35**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,563	CONDITIONED SQFT:	9,850

SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

BLDG: 7636 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,772.77**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7638
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7638 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	10,353
CFM-CLG:	10,353
%OA:	13%
%Area:	72%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7638 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	35,269.26	134.15	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	59,942.20	38.66	
Sub Total	**10.99**	**96,854.27**	**172.81**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	6,289.08	31.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**103,143.35**	**204.60**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7638 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	387,000
BLR CAP OUTPUT (BTUH):	310,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7638 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,707.21	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,845.11**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.19	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**1,845.11**	**2.19**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7638 **BUILDING NAME: BN ADMIN & CLRM**

Building UA:	1,467	CONDITIONED SQFT:	6,158

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7638 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**25.25**	**525.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

BUILDING 7642
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**10.99**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**10.99**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	**CONDITIONED SQFT:**	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**63.27**	**1,291.50**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7644
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**10.99**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**10.99**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201

CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

UTILITY CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7644 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**63.84**	**1,291.50**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7646
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	**CONDITIONED SQFT:**	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	**CONDITIONED SQFT:**	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**10.99**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**10.99**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	**CONDITIONED SQFT:**	41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	84
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,470.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	70.69	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**72.42**	**1,470.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7648
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**14.19**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**14.19**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**14.19**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**14.19**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,008,000
BLR CAP OUTPUT (BTUH):	1,606,400

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	84
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,470.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	70.69	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**72.42**	**1,470.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

BUILDING 7650
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**7.46**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**2,456.71**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**14.19**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**14.19**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7650 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	**14.19**	**0.00**	**50.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**14.19**	**3,360.69**	**136.83**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201

CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7650 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**63.84**	**1,291.50**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7652
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	**0.52**	**2,885.90**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	**0.52**	**2,885.90**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	**0.52**	**2,885.90**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	**0.52**	**2,885.90**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	800,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.67	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**5.67**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,613.02	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**2,981.98**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	262.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.62	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**13.55**	**3,244.48**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,343.80	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,550.64**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,550.64**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7654
ENLISTED PERSONNEL DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,579.22	115.06	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,524.80	49.13	
Sub Total	**7.46**	**14,219.37**	**164.19**	
Economizer	0.00	3,767.82	0.00	
Ventilation/Recirculation	0.00	399.03	18.19	
DDC Control	0.00	8,606.70	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**26,992.92**	**201.71**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
32	Direct digital control - VAV AHU	0	3	0	11	$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**4**	**1**	**14**	**$4,826.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654 **BUILDING NAME: ENL PERS DIN**

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,250
CFM-CLG:	7,250
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,669.36	119.17	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,650.69	49.13	
Sub Total	**7.46**	**14,435.40**	**168.30**	
Economizer	0.00	3,902.39	0.00	
Ventilation/Recirculation	0.00	413.28	18.84	
DDC Control	0.00	8,914.08	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**27,665.15**	**206.47**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
32	Direct digital control - VAV AHU	0	3	0	11	$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**4**	**1**	**14**	**$4,826.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,625,000
BLR CAP OUTPUT (BTUH):	6,900,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	71
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,706.08	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.80**	**3,821.42**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,242.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	59.75	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**62.54**	**5,063.92**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,432.32	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,801.29**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,801.29**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	8.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,400
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	11,288.21	0.00	
Opt ST/SP	0.00	1,784.55	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	146.06	
Sub Total	**0.00**	**13,072.76**	**146.06**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**13,072.76**	**147.48**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	**CONDITIONED SQFT:**	13,493

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,600
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

BLDG: 7654 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,889.86	0.00	
Opt ST/SP	0.00	614.95	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	73.03	
Sub Total	**0.00**	**4,504.80**	**73.03**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**4,504.80**	**73.74**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

BUILDING 7656
GENERAL INSTRUCTION BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

Building UA:	3,640	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	15	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	15%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760

CLG HRS SAVED:	1,920
HTG HRS SAVED:	3,072
C/H HRS SAVED:	5,006

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	18,305.21	110.90	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	7,743.84	55.51	
Sub Total	**7.46**	**27,164.39**	**166.41**	
Economizer	0.00	2,060.35	0.00	
Ventilation/Recirculation	0.00	0.00	6.76	
DDC Control	0.00	2,415.13	58.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**31,639.88**	**231.23**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

Building UA:	3,640	CONDITIONED SQFT:	13,493

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	15	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	15%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760

CLG HRS SAVED:	1,920
HTG HRS SAVED:	3,072
C/H HRS SAVED:	5,006

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	18,305.21	110.90	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	7,743.84	55.51	
Sub Total	**7.46**	**27,164.39**	**166.41**	
Economizer	0.00	2,060.35	0.00	
Ventilation/Recirculation	0.00	0.00	6.76	
DDC Control	0.00	2,415.13	58.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**31,639.88**	**231.23**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

Building UA:	3,640	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	23	0

INPUTS

Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,265,000
BLR CAP OUTPUT (BTUH):	6,900,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,600	3,360
HTG HRS ON:	2,560	5,376
H/C HRS ON:	4,171	8,760

CLG HRS SAVED:	1,760
HTG HRS SAVED:	2,816
C/H HRS SAVED:	4,589

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,734.05	0.00	
Opt ST/SP	0.00	512.74	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**5,246.80**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	46.86	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**5,246.80**	**46.86**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

Building UA:	3,640	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	15	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760

CLG HRS SAVED:	1,920
HTG HRS SAVED:	3,072
C/H HRS SAVED:	5,006

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,351.35	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**5,042.58**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**63.84**	**6,334.08**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

Building UA:	3,640	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	23	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,600	3,360
HTG HRS ON:	2,560	5,376
H/C HRS ON:	4,171	8,760

CLG HRS SAVED:	1,760
HTG HRS SAVED:	2,816
C/H HRS SAVED:	4,589

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7656 **BUILDING NAME:** GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,309.20	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**4,775.93**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,775.93**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

BUILDING 7658
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	163.73	
Sub Total	**0.52**	**2,885.90**	**163.73**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**163.73**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	**0.52**	**2,885.90**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	**0.52**	**2,885.90**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	**0.52**	**2,885.90**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/CWW

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	**0.52**	**2,885.90**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.52**	**2,942.07**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	800,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.67	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**5.67**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,613.02	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**2,981.98**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	262.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.62	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**13.55**	**3,244.48**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7658 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,343.80	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,550.64**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,550.64**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7665
DENTAL CLINIC

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7665 **BUILDING NAME:** DENTAL CLINIC

Building UA:	4,597	CONDITIONED SQFT:	11,076

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	19,500
CFM-CLG:	19,500
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7665 **BUILDING NAME:** DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	78,047.51	602.30	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	17,157.24	165.49	
Sub Total	**0.00**	**98,353.96**	**767.80**	
Economizer	0.00	15,861.86	0.00	
Ventilation/Recirculation	0.00	719.65	29.86	
DDC Control	0.00	6,049.87	185.26	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**0.00**	**120,985.34**	**982.91**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7665 **BUILDING NAME:** DENTAL CLINIC

Building UA:	4,597	CONDITIONED SQFT:	11,076

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	810,000
BLR CAP OUTPUT (BTUH):	648,000

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

RESULTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7665 **BUILDING NAME:** DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7665 **BUILDING NAME:** DENTAL CLINIC

Building UA:	4,597	CONDITIONED SQFT:	11,076

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	50
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7665 **BUILDING NAME:** DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,630.20	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.80**	**9,745.54**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	875.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	42.08	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**44.87**	**10,620.54**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7670
DENTAL CLINIC

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

ENERGY CALCULATION PARAMETERS

BLDG: 7670 **BUILDING NAME:** DENTAL CLINIC

Building UA:	6,209	CONDITIONED SQFT:	14,960

SYTEM INFORMATION

System Type:	18
System Name:	Dual Duct air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	25,405
CFM-CLG:	25,405
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

BLDG: 7670 **BUILDING NAME:** DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	18
System Name:	Dual Duct air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	52,054.93	784.69	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	22,352.81	223.52	
Sub Total	**0.00**	**76,050.56**	**1,008.22**	
Economizer	0.00	20,665.15	0.00	
Ventilation/Recirculation	0.00	937.57	38.90	
DDC Control	0.00	7,881.90	250.22	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**0.00**	**105,535.18**	**1,297.34**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
28	Direct digital control - Dual Duct AHU	1	7	0	9	$3,761.00
34	Outside air damper ventilation and recirculation control - Dual Duct AHU	0	1	0	0	$272.00
37	Outside air damper economizer control - Dual Duct AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**3**	**8**	**1**	**13**	**$5,241.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJNCWW

ENERGY CALCULATION PARAMETERS

BLDG: 7670 **BUILDING NAME:** DENTAL CLINIC

Building UA:	6,209	CONDITIONED SQFT:	14,960

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,308,000
BLR CAP OUTPUT (BTUH):	782,000

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

OPERATING HOURS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJNCWW

BLDG: 7670 **BUILDING NAME:** DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

ENERGY CALCULATION PARAMETERS

BLDG: 7670 **BUILDING NAME:** DENTAL CLINIC

Building UA:	6,209	CONDITIONED SQFT:	14,960

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	83
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

BLDG: 7670 BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,611.41	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**4,078.13**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,452.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	69.84	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**71.02**	**5,530.63**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

ENERGY CALCULATION PARAMETERS

BLDG: 7670 **BUILDING NAME:** DENTAL CLINIC

Building UA:	6,209	CONDITIONED SQFT:	14,960

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

BLDG: 7670 **BUILDING NAME:** DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,707.21	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,845.11**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,845.11**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

BUILDING 7720
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.08	
Sub Total	**0.00**	**3,685.15**	**64.08**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	27.59	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,685.15**	**91.66**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.77	
Sub Total	**0.00**	**1,931.91**	**45.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**65.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.77	
Sub Total	**0.00**	**1,931.91**	**45.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**65.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.77	
Sub Total	**0.00**	**1,931.91**	**45.77**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**65.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	54.92	
Sub Total	**0.00**	**1,931.91**	**54.92**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.65	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**78.57**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	119.00	
Sub Total	**0.00**	**5,169.18**	**119.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	51.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,169.18**	**170.23**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**31.45**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**31.45**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,015.58**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	62.90	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,015.58**	**62.90**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	219.69	
Sub Total	**0.00**	**1,931.91**	**219.69**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,931.91**	**219.69**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325

SYTEM INFORMATION:

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	146.46	
Sub Total	**0.00**	**1,294.68**	**146.46**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,294.68**	**146.46**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 7739
MOVING TARGET SIMULATOR BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7739 **BUILDING NAME:** MVNG TRGT SIM BLDG

Building UA:	1,901	CONDITIONED SQFT:	4,074

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
18	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,064
CFM-CLG:	7,064
%OA:	15%
%Area:	80%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

BLDG: 7739 **BUILDING NAME:** MVNG TRGT SIM BLDG

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	25,458.32	104.66	
Opt ST/SP	0.00	1,272.59	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	14,407.14	136.72	
Sub Total	**0.00**	**41,138.04**	**241.38**	
Economizer	0.00	4,657.62	0.00	
Ventilation/Recirculation	0.00	108.78	5.68	
DDC Control	0.00	2,022.17	62.05	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**0.00**	**47,926.62**	**309.10**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7739 **BUILDING NAME:** MVNG TRGT SIM BLDG

Building UA:	1,901	CONDITIONED SQFT:	4,074

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
18	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	385,000
BLR CAP OUTPUT (BTUH):	308,000

CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

BLDG: 7739 **BUILDING NAME:** MVNG TRGT SIM BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	293.63	0.00	
Opt ST/SP	0.00	25.96	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**319.59**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.18	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**319.59**	**2.18**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7739 **BUILDING NAME:** MVNG TRGT SIM BLDG

Building UA:	1,901	CONDITIONED SQFT:	4,074

SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
18	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	20
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

BLDG: 7739 **BUILDING NAME:** MVNG TRGT SIM BLDG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	350.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	16.83	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**16.83**	**350.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7739 **BUILDING NAME:** MVNG TRGT SIM BLDG

Building UA:	1,901	CONDITIONED SQFT:	4,074

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
18	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

BLDG: 7739 **BUILDING NAME:** MVNG TRGT SIM BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	293.63	0.00	
Opt ST/SP	0.00	25.96	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**319.59**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**319.59**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7760
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	30%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,980.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	54.69	
Sub Total	**0.00**	**3,243.59**	**54.69**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.55	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,243.59**	**78.24**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	39.06	
Sub Total	**0.00**	**1,700.43**	**39.06**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	16.82	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,700.43**	**55.88**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	39.06	
Sub Total	**0.00**	**1,700.43**	**39.06**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	16.82	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,700.43**	**55.88**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	39.06	
Sub Total	**0.00**	**1,700.43**	**39.06**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	16.82	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,700.43**	**55.88**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	30%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	46.88	
Sub Total	**0.00**	**1,700.43**	**46.88**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,700.43**	**67.06**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	30%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,180.83	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	101.57	
Sub Total	**0.00**	**4,549.79**	**101.57**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	43.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,549.79**	**145.29**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,288.57	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**5,755.29**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	26.84	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,755.29**	**26.84**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,288.57	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**5,755.29**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	26.84	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,755.29**	**26.84**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	18,614.99	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**20,257.81**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	53.69	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**20,257.81**	**53.69**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	187.51	
Sub Total	**0.00**	**1,700.43**	**187.51**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,700.43**	**187.51**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,047.14	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	125.00	
Sub Total	**0.00**	**1,139.55**	**125.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,139.55**	**125.00**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 7780
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.26	
Sub Total	**0.00**	**3,685.15**	**49.26**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.21	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,685.15**	**70.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	35.19	
Sub Total	**0.00**	**1,931.91**	**35.19**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	15.15	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**50.34**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	35.19	
Sub Total	**0.00**	**1,931.91**	**35.19**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	15.15	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**50.34**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	35.19	
Sub Total	**0.00**	**1,931.91**	**35.19**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	15.15	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**50.34**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.23	
Sub Total	**0.00**	**1,931.91**	**42.23**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**60.41**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	**CONDITIONED SQFT:**	17,163

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	91.49	
Sub Total	**0.00**	**5,169.18**	**91.49**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	39.39	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,169.18**	**130.88**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	24.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**24.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	24.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**24.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,015.58**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	48.36	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,015.58**	**48.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	168.90	
Sub Total	**0.00**	**1,931.91**	**168.90**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,931.91**	**168.90**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	112.60	
Sub Total	**0.00**	**1,294.68**	**112.60**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,294.68**	**112.60**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 7802
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7802 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	963
BLR CAP OUTPUT (BTUH):	770

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7802 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.01	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.01**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7802 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7802 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	252.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.12	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**12.12**	**252.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS **EMC NO:** 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 **DATE:** 16-Sep-95
LOCATION: FT. RILEY, KS **PREPARED BY:**

ENERGY CALCULATION PARAMETERS

BLDG: 7802 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	6,500
CFM-CLG:	6,500
%OA:	0%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7802 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,531.24	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,421.54	160.83	
Sub Total	**0.00**	**15,215.82**	**160.83**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**15,215.82**	**160.83**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7802 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7802 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,876.17**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,876.17**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7804
ENLISTED PERSONNEL DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,579.22	115.06	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,524.80	49.13	
Sub Total	**7.46**	**14,219.37**	**164.19**	
Economizer	0.00	3,767.82	0.00	
Ventilation/Recirculation	0.00	399.03	18.19	
DDC Control	0.00	8,606.70	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**26,992.92**	**201.71**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 **BUILDING NAME: ENL PERS DIN**

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,250
CFM-CLG:	7,250
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,669.36	119.17	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,650.69	49.13	
Sub Total	**7.46**	**14,435.40**	**168.30**	
Economizer	0.00	3,902.39	0.00	
Ventilation/Recirculation	0.00	413.28	18.84	
DDC Control	0.00	8,914.08	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**27,665.15**	**206.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 09-Dec-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,625,000
BLR CAP OUTPUT (BTUH):	6,900,000

CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	**CONDITIONED SQFT:**	13,493

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,706.08	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.80**	**3,821.42**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**64.90**	**5,112.92**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,200,000
BLR CAP OUTPUT (BTUH):	2,200,000

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,432.32	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,801.29**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	12.47	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,801.29**	**12.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,400
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,329.73	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	486.87	
Sub Total	**0.00**	**5,445.07**	**486.87**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	4.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,445.07**	**491.60**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,600
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 7804 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,432.32	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	243.44	
Sub Total	**0.00**	**1,801.29**	**243.44**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	2.37	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,801.29**	**245.80**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

BUILDING 7806
BN HQ BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	6,400
%OA:	0%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,990.08	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	29,204.34	37.64	
Sub Total	**4.62**	**40,885.65**	**37.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	5,831.66	30.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**46,717.30**	**68.60**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,600
CFM-CLG:	6,600
%OA:	0%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,990.08	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	30,116.97	37.64	
Sub Total	**4.62**	**41,798.28**	**37.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	6,013.90	30.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**47,812.18**	**68.60**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,023,000
BLR CAP OUTPUT (BTUH):	818,400

OUTPUTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,801.76	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.80**	**7,917.11**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**64.90**	**9,208.61**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	830,000
BLR CAP OUTPUT (BTUH):	830,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.71	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**4.71**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	**CONDITIONED SQFT:**	13,493

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,018.27	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,225.11**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,225.11**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7808
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	528,000
BLR CAP OUTPUT (BTUH):	411,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.99	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**2.99**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	**CONDITIONED SQFT:**	13,280

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	252.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.12	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**12.12**	**252.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,384.93	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.38	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.38**	**4,591.78**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.38**	**4,591.78**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	6,500
CFM-CLG:	6,500
%OA:	0%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,576.21	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,498.13	160.83	
Sub Total	**0.00**	**15,337.39**	**160.83**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**15,337.39**	**160.83**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	**CONDITIONED SQFT:**	13,280

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	63%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

BLDG: 7808 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,691.03	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,897.87**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,897.87**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7810
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	**CONDITIONED SQFT:**	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**59.83**	**1,225.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.61**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.61**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7812
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY:

BLDG: 7812 — BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS **EMC NO:** 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 **DATE:** 09-Dec-95
LOCATION: FT. RILEY, KS **PREPARED BY:**

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	290,880
BLR CAP OUTPUT (BTUH):	242,400

OUTPUTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY:

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,286.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.85	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**62.78**	**1,286.25**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.61**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.61**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS **EMC NO:** 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 **DATE:** 16-Sep-95
LOCATION: FT. RILEY, KS **PREPARED BY:**

BLDG: 7812 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7814
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	**CONDITIONED SQFT:**	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**59.83**	**1,225.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.61**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.61**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7816
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS.	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS **EMC NO:** 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 **DATE:** 09-Dec-95
LOCATION: FT. RILEY, KS **PREPARED BY:**

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183

CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	290,880
BLR CAP OUTPUT (BTUH):	242,400

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

[illegible]

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS ENGIN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	1	0	3	1	$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,286.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.85	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**62.78**	**1,286.25**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.61**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.61**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	**CONDITIONED SQFT:**	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7818
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**3.12**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	**1.76**	**0.00**	**15.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**1,704.70**	**40.92**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,400
BLR CAP OUTPUT (BTUH):	212,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.93**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**63.03**	**1,291.50**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.61**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.61**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7820
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7820 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,512	CONDITIONED SQFT:	6,673

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,490
CFM-CLG:	6,490
%OA:	30%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7820 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	17,744.48	202.29	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	39,168.26	91.94	
Sub Total	**4.62**	**57,603.97**	**294.23**	
Economizer	0.00	1,210.65	0.00	
Ventilation/Recirculation	0.00	152.62	9.62	
DDC Control	0.00	3,548.20	75.61	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**4.62**	**62,515.43**	**379.46**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS **EMC NO:** 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 **DATE:** 16-Sep-95
LOCATION: FT. RILEY, KS **PREPARED BY:**

ENERGY CALCULATION PARAMETERS

BLDG: 7820 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,512	**CONDITIONED SQFT:**	6,673

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7820 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,876.17**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**2,876.17**	**2.55**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7820 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,512	CONDITIONED SQFT:	6,673

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	21
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY:

BLDG: 7820 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	358.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	17.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**17.25**	**358.75**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

BUILDING 7824
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,818
CFM-CLG:	4,818
%OA:	20%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7824 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,023.88	96.05	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	27,895.44	29.89	
Sub Total	**7.46**	**53,034.66**	**125.94**	
Economizer	0.00	998.62	0.00	
Ventilation/Recirculation	0.00	75.53	4.76	
DDC Control	0.00	2,926.76	24.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**57,035.58**	**155.29**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	7,155
CFM-CLG:	7,155
%OA:	15%
%Area:	44%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	34,838.13	106.98	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	41,426.29	46.98	
Sub Total	**10.99**	**77,907.25**	**153.95**	
Economizer	0.00	1,483.00	0.00	
Ventilation/Recirculation	0.00	84.13	5.30	
DDC Control	0.00	4,346.41	38.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**83,820.78**	**197.89**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,818
CFM-CLG:	4,818
%OA:	20%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,023.88	96.05	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	27,895.44	29.89	
Sub Total	**7.46**	**53,034.66**	**125.94**	
Economizer	0.00	998.62	0.00	
Ventilation/Recirculation	0.00	75.53	4.76	
DDC Control	0.00	2,926.76	24.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**57,035.58**	**155.29**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,125,000
BLR CAP OUTPUT (BTUH):	900,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**3,519.57**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	6.38	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**3,519.57**	**6.38**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	71
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7824 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,348.54	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**6,039.77**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,247.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	60.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**61.73**	**7,287.52**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7826
CLINIC W/O BEDS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7826 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,594	CONDITIONED SQFT:	3,841

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,230
CFM-CLG:	3,230
%OA:	20%
%Area:	86%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7826 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,827.64	207.99	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,962.36	49.35	
Sub Total	**0.00**	**18,256.73**	**257.34**	
Economizer	0.00	2,364.64	0.00	
Ventilation/Recirculation	0.00	238.41	9.89	
DDC Control	0.00	901.90	55.24	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**0.00**	**21,761.67**	**322.47**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7826 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,594	CONDITIONED SQFT:	3,841

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	344,000
BLR CAP OUTPUT (BTUH):	275,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7826 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,917.45**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.95	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**1,917.45**	**1.95**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7826 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,594	CONDITIONED SQFT:	3,841

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	10
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7826 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	175.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	8.42	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**8.42**	**175.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

BUILDING 7832
GYMNASIUM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	250,000
BLR CAP OUTPUT (BTUH):	220,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	5,900,000
BLR CAP OUTPUT (BTUH):	4,720,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	0	0	3	1	$865.00
	TOTAL:	**0**	**0**	**3**	**1**	**$865.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.21	
Sub Total	**0.00**	**295.53**	**155.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**295.53**	**156.80**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.21	
Sub Total	**0.00**	**295.53**	**155.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**295.53**	**156.80**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**873.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**878.43**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**873.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**878.43**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**873.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**878.43**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832 BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**873.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**878.43**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760

CLG HRS SAVED:	1,460
HTG HRS SAVED:	2,336
C/H HRS SAVED:	3,806

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832 **BUILDING NAME:** GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	**0.00**	**3,194.90**	**873.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,194.90**	**878.43**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

BUILDING 7834
REGIMENTAL HQ BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7834 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,577	CONDITIONED SQFT:	9,904

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	700,000
BLR CAP OUTPUT (BTUH):	560,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

BLDG: 7834 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.97	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**3.97**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7834 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,577	CONDITIONED SQFT:	9,904

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

BLDG: 7834 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,611.41	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**4,078.13**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**26.42**	**4,603.13**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7834 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,577	**CONDITIONED SQFT:**	9,904

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

BLDG: 7834 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,172.76	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.38	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.38**	**4,379.60**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.38**	**4,379.60**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7834 **BUILDING NAME:** REGIMENTAL HQ BLDG

Building UA:	2,577	CONDITIONED SQFT:	9,904

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	11,200
%OA:	20%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

BLDG: 7834 **BUILDING NAME:** REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	7,443.29	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	12,128.51	28.09	
Sub Total	**0.00**	**19,940.77**	**28.09**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**19,940.77**	**28.09**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 7836
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,818
CFM-CLG:	4,818
%OA:	20%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

BLDG: 7836 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,023.88	96.05	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	27,895.44	29.89	
Sub Total	**7.46**	**53,034.66**	**125.94**	
Economizer	0.00	998.62	0.00	
Ventilation/Recirculation	0.00	75.53	4.76	
DDC Control	0.00	2,926.76	24.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**57,035.58**	**155.29**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	7,155
CFM-CLG:	7,155
%OA:	15%
%Area:	44%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7836 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	34,838.13	106.98	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	41,426.29	46.98	
Sub Total	**10.99**	**77,907.25**	**153.95**	
Economizer	0.00	1,483.00	0.00	
Ventilation/Recirculation	0.00	84.13	5.30	
DDC Control	0.00	4,346.41	38.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**83,820.78**	**197.89**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7836 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	34,838.13	106.98	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	41,426.29	46.98	
Sub Total	**10.99**	**77,907.25**	**153.95**	
Economizer	0.00	1,483.00	0.00	
Ventilation/Recirculation	0.00	84.13	5.30	
DDC Control	0.00	4,346.41	38.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**83,820.78**	**197.89**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,818
CFM-CLG:	4,818
%OA:	20%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7836 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,023.88	96.05	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	27,895.44	29.89	
Sub Total	**7.46**	**53,034.66**	**125.94**	
Economizer	0.00	998.62	0.00	
Ventilation/Recirculation	0.00	75.53	4.76	
DDC Control	0.00	2,926.76	24.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**7.46**	**57,035.58**	**155.29**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,125,000
BLR CAP OUTPUT (BTUH):	900,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7836 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**3,519.57**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	6.38	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**3,519.57**	**6.38**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,917
CONDITIONED SQFT:	12,246

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	71
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7836 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,348.54	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.73**	**6,039.77**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,247.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	60.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**61.73**	**7,287.52**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

BUILDING 7842
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,000
BLR CAP OUTPUT (BTUH):	212,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOUR CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS OBJECT NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	1	0	3	1	$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	73
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,268.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.01	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**62.18**	**1,268.75**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.75**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.75**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	**CONDITIONED SQFT:**	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 7844
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	488,520
BLR CAP OUTPUT (BTUH):	407,100

OUTPUTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AS/AJN

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**63.27**	**1,291.50**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.75**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.75**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 7846
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,000
BLR CAP OUTPUT (BTUH):	212,000

HOURS/CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	73
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,268.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.01	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**62.18**	**1,268.75**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.75**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.75**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 7848
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,400
BLR CAP OUTPUT (BTUH):	212,000

OUTPUTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AS/AJN

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**63.27**	**1,291.50**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	**CONDITIONED SQFT:**	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.75**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.75**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 7850
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**16.66**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 09-Dec-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,000
BLR CAP OUTPUT (BTUH):	212,000

DURC CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 09-Dec-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	**CONDITIONED SQFT:**	41,843

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	73
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,268.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.01	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**62.18**	**1,268.75**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.75**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.75**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850 BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7850 **BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 7852
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	586,000
BLR CAP OUTPUT (BTUH):	469,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.32	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**3.32**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	252.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.12	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**12.12**	**252.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	**CONDITIONED SQFT:**	13,280

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**4.21**	**87.50**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	7,758.69	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**8,127.66**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**8,127.66**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	6,500
CFM-CLG:	6,500
%OA:	0%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,531.24	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,421.54	160.83	
Sub Total	**0.00**	**15,215.82**	**160.83**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**15,215.82**	**160.83**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	63%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,917.45**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,917.45**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7854
BN HQ BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	6,400
%OA:	0%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,990.08	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	29,204.34	37.64	
Sub Total	**4.62**	**40,885.65**	**37.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	5,831.66	30.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**46,717.30**	**68.60**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,600
CFM-CLG:	6,600
%OA:	0%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,990.08	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	30,116.97	37.64	
Sub Total	**4.62**	**41,798.28**	**37.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	6,013.90	30.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**47,812.18**	**68.60**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,023,000
BLR CAP OUTPUT (BTUH):	818,400

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7854 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.80	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**5.80**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,801.76	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.80**	**7,917.11**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**64.90**	**9,208.61**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7854 **BUILDING NAME:** BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,018.27	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,225.11**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,225.11**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7856
ENLISTED PERSONNEL DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454
CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,579.22	115.06	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,524.80	49.13	
Sub Total	**7.46**	**14,219.37**	**164.19**	
Economizer	0.00	3,767.82	0.00	
Ventilation/Recirculation	0.00	399.03	18.19	
DDC Control	0.00	8,606.70	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**26,992.92**	**201.71**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,250
CFM-CLG:	7,250
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,669.36	119.17	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,650.69	49.13	
Sub Total	**7.46**	**14,435.40**	**168.30**	
Economizer	0.00	3,902.39	0.00	
Ventilation/Recirculation	0.00	413.28	18.84	
DDC Control	0.00	8,914.08	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**27,665.15**	**206.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 **BUILDING NAME: ENL PERS DIN**

Building UA:	2,454

CONDITIONED SQFT:	13,493

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,625,000
BLR CAP OUTPUT (BTUH):	6,900,000

HRS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**0.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	$1,015.00
	TOTAL:	**1**	**0**	**3**	**1**	**$1,015.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	71
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,706.08	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.80**	**3,821.42**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,242.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	59.75	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**62.54**	**5,063.92**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,200,000
BLR CAP OUTPUT (BTUH):	2,200,000

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,432.32	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,801.29**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	12.47	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,801.29**	**12.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,400
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	7,055.13	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	486.87	
Sub Total	**0.00**	**8,170.48**	**486.87**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	4.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**8,170.48**	**491.60**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,600
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,333.91	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	243.44	
Sub Total	**0.00**	**2,702.88**	**243.44**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	2.37	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,702.88**	**245.80**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

BUILDING 7858
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7858 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	**CONDITIONED SQFT:**	13,280

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7858 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	252.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.12	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**12.12**	**252.00**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7858 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	6,500
CFM-CLG:	6,500
%OA:	0%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7858 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,531.24	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,421.54	160.83	
Sub Total	**0.00**	**15,215.82**	**160.83**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**15,215.82**	**160.83**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7858 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	4,669	**CONDITIONED SQFT:**	13,280

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	63%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7858 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,876.17**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,876.17**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 7865
UNIT CHAPEL

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865 **BUILDING NAME:** UNIT CHAPEL

Building UA:	2,526	CONDITIONED SQFT:	8,718

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
8	BRICK AND CMU	CHURCH	0700-1800	SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,000
CFM-CLG:	10,000
%OA:	22%
%Area:	55%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760

CLG HRS SAVED:	2,200
HTG HRS SAVED:	3,520
C/H HRS SAVED:	5,736

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865 BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	25,340.75	211.99	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	11,586.14	141.71	
Sub Total	**7.46**	**38,042.23**	**353.70**	
Economizer	0.00	3,659.39	0.00	
Ventilation/Recirculation	0.00	232.17	11.27	
DDC Control	0.00	17,722.31	77.38	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**59,656.10**	**442.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865 **BUILDING NAME: UNIT CHAPEL**

Building UA:	2,526	CONDITIONED SQFT:	8,718

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
8	BRICK AND CMU	CHURCH	0700-1800	SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,125,000
BLR CAP OUTPUT (BTUH):	900,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760

CLG HRS SAVED:	2,200
HTG HRS SAVED:	3,520
C/H HRS SAVED:	5,736

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865 **BUILDING NAME:** UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,591.47	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,729.36**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	6.38	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**1,729.36**	**6.38**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865 **BUILDING NAME:** UNIT CHAPEL

Building UA:	2,526
CONDITIONED SQFT:	8,718

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
8	BRICK AND CMU	CHURCH	0700-1800	SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	12
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760

CLG HRS SAVED:	2,200
HTG HRS SAVED:	3,520
C/H HRS SAVED:	5,736

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865 BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	210.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	10.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**10.10**	**210.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865 **BUILDING NAME:** UNIT CHAPEL

Building UA:	2,526	CONDITIONED SQFT:	8,718

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
8	BRICK AND CMU	CHURCH	0700-1800	SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760

CLG HRS SAVED:	2,200
HTG HRS SAVED:	3,520
C/H HRS SAVED:	5,736

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865 **BUILDING NAME:** UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**25.25**	**525.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865 **BUILDING NAME:** UNIT CHAPEL

Building UA:	2,526	CONDITIONED SQFT:	8,718

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
8	BRICK AND CMU	CHURCH	0700-1800	SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760

CLG HRS SAVED:	2,200
HTG HRS SAVED:	3,520
C/H HRS SAVED:	5,736

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865 BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,777.11	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**9,243.84**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**9,243.84**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865 BUILDING NAME: UNIT CHAPEL

Building UA:	2,526	CONDITIONED SQFT:	8,718

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	4,390
CFM-CLG:	4,390
%OA:	15%
%Area:	45%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760

CLG HRS SAVED:	2,200
HTG HRS SAVED:	3,520
C/H HRS SAVED:	5,736

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865 **BUILDING NAME:** UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,889.86	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	4,431.64	12.39	
Sub Total	**0.00**	**8,528.34**	**12.39**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**8,528.34**	**12.39**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 7866
THEATER W/DRESSING ROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

Building UA:	3,187	CONDITIONED SQFT:	11,098

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
20	BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760

CLG HRS SAVED:	2,880
HTG HRS SAVED:	4,608
C/H HRS SAVED:	7,509

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.21**	**87.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

Building UA:	3,187	**CONDITIONED SQFT:**	11,098

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
20	BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	14,500
CFM-CLG:	14,500
%OA:	20%
%Area:	90%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760

CLG HRS SAVED:	2,880
HTG HRS SAVED:	4,608
C/H HRS SAVED:	7,509

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	65,052.84	579.21	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	51,824.16	579.40	
Sub Total	**14.19**	**118,998.50**	**1,158.61**	
Economizer	0.00	3,411.39	0.00	
Ventilation/Recirculation	0.00	520.97	23.53	
DDC Control	0.00	12,683.85	332.72	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**14.19**	**135,614.71**	**1,514.86**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

Building UA:	3,187	CONDITIONED SQFT:	11,098

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
20	BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	15%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760

CLG HRS SAVED:	2,880
HTG HRS SAVED:	4,608
C/H HRS SAVED:	7,509

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,277.43	53.93	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	6,433.34	64.38	
Sub Total	**2.47**	**17,079.74**	**118.30**	
Economizer	0.00	423.48	0.00	
Ventilation/Recirculation	0.00	48.50	2.19	
DDC Control	0.00	1,574.55	36.97	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**19,126.28**	**157.46**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

Building UA:	3,187	**CONDITIONED SQFT:**	11,098

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	0.50
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	982,500
BLR CAP OUTPUT (BTUH):	786,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760

CLG HRS SAVED:	2,880
HTG HRS SAVED:	4,608
C/H HRS SAVED:	7,509

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,131.83	0.00	
Opt ST/SP	0.00	141.10	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,272.93**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.57	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**2,272.93**	**5.57**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

Building UA:	3,187	CONDITIONED SQFT:	11,098

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
20	BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760

CLG HRS SAVED:	2,880
HTG HRS SAVED:	4,608
C/H HRS SAVED:	7,509

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**25.25**	**525.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

Building UA:	3,187	CONDITIONED SQFT:	11,098

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
20	BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760

CLG HRS SAVED:	2,880
HTG HRS SAVED:	4,608
C/H HRS SAVED:	7,509

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,974.07	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**4,237.11**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,237.11**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 **BUILDING NAME: THEATER W/DRESS RM**

Building UA:	3,187	CONDITIONED SQFT:	11,098

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
20	BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760

CLG HRS SAVED:	2,880
HTG HRS SAVED:	4,608
C/H HRS SAVED:	7,509

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866 **BUILDING NAME:** THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,974.07	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**4,237.11**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,237.11**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

BUILDING 7900
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	**CONDITIONED SQFT:**	20,943

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	60.11	
Sub Total	**0.00**	**3,685.15**	**60.11**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	25.88	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,685.15**	**85.99**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.93	
Sub Total	**0.00**	**1,931.91**	**42.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**61.42**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	**CONDITIONED SQFT:**	20,943

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.93	
Sub Total	**0.00**	**1,931.91**	**42.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**61.42**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.93	
Sub Total	**0.00**	**1,931.91**	**42.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**61.42**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	51.52	
Sub Total	**0.00**	**1,931.91**	**51.52**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	22.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**73.70**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	111.63	
Sub Total	**0.00**	**5,169.18**	**111.63**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	48.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,169.18**	**159.69**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	29.50	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**29.50**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	29.50	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**29.50**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,015.58**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	59.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,015.58**	**59.01**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	206.09	
Sub Total	**0.00**	**1,931.91**	**206.09**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,931.91**	**206.09**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,106	**CONDITIONED SQFT:**	20,943

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	137.39	
Sub Total	**0.00**	**1,294.68**	**137.39**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,294.68**	**137.39**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 7920
VEHICLE MAINTENANCE SHOP DS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.52**	**52.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	8
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	140.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	6.73	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**6.73**	**140.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	**3.12**	**18,141.98**	**52.44**	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**18,972.63**	**85.65**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,575
CFM-CLG:	1,575
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,319.72	16.76	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	9,737.23	39.66	
Sub Total	**3.12**	**20,523.68**	**56.43**	
Economizer	0.00	274.22	0.00	
Ventilation/Recirculation	0.00	12.35	0.78	
DDC Control	0.00	803.68	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**21,613.92**	**89.83**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	**3.12**	**18,141.98**	**52.44**	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**18,972.63**	**85.65**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	**3.12**	**18,141.98**	**52.44**	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**18,972.63**	**85.65**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	**3.12**	**18,141.98**	**52.44**	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**18,972.63**	**85.65**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	**3.12**	**18,141.98**	**52.44**	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**18,972.63**	**85.65**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,700
CFM-CLG:	3,700
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,678.53	39.38	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	22,874.77	39.66	
Sub Total	**3.12**	**34,020.02**	**79.04**	
Economizer	0.00	644.19	0.00	
Ventilation/Recirculation	0.00	29.00	1.83	
DDC Control	0.00	1,888.00	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**36,581.21**	**113.49**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	**0.00**	**9,829.07**	**102.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,829.07**	**146.19**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349
CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	**0.00**	**9,829.07**	**102.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,829.07**	**146.19**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	**0.00**	**9,829.07**	**102.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,829.07**	**146.19**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	**0.00**	**6,636.72**	**102.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,636.72**	**146.19**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	**0.00**	**6,636.72**	**102.20**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,636.72**	**146.19**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	20,250
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**70.23**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	19,625
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	28,045.43	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**30,166.92**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**30,166.92**	**70.23**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	**CONDITIONED SQFT:**	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	20,900
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**70.23**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	20,900
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,859.81**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,859.81**	**70.23**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	20,900
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**70.23**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	14,500
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,859.81**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,859.81**	**70.23**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	**0.00**	**0.00**	**310.67**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**0.00**	**310.67**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	**0.00**	**0.00**	**310.67**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**0.00**	**310.67**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	**0.00**	**0.00**	**310.67**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**0.00**	**310.67**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349
CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	**0.00**	**0.00**	**310.67**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**0.00**	**310.67**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	**0.00**	**0.00**	**310.67**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**0.00**	**310.67**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 **BUILDING NAME:** VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	20,240
CFM-CLG:	0
%OA:	0%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	735.81	
Sub Total	**0.00**	**15,859.81**	**735.81**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**15,859.81**	**735.81**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 7940
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	30%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	63.43	
Sub Total	**0.00**	**3,685.15**	**63.43**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	27.31	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,685.15**	**90.74**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.31	
Sub Total	**0.00**	**1,931.91**	**45.31**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.51	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**64.81**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.31	
Sub Total	**0.00**	**1,931.91**	**45.31**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.51	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**64.81**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.31	
Sub Total	**0.00**	**1,931.91**	**45.31**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.51	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**64.81**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	**CONDITIONED SQFT:**	22,405

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	30%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	54.37	
Sub Total	**0.00**	**1,931.91**	**54.37**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.41	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**77.78**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	30%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	117.80	
Sub Total	**0.00**	**5,169.18**	**117.80**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	50.72	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,169.18**	**168.51**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	**CONDITIONED SQFT:**	22,405

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**31.13**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**31.13**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,510.43	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,625.77**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	62.27	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,625.77**	**62.27**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	217.47	
Sub Total	**0.00**	**1,931.91**	**217.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,931.91**	**217.47**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	144.98	
Sub Total	**0.00**	**1,294.68**	**144.98**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,294.68**	**144.98**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 7960
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,683	**CONDITIONED SQFT:**	20,245

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.32	
Sub Total	**0.00**	**3,685.15**	**57.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	24.68	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,685.15**	**81.99**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	40.94	
Sub Total	**0.00**	**1,931.91**	**40.94**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**58.57**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	40.94	
Sub Total	**0.00**	**1,931.91**	**40.94**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**58.57**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	40.94	
Sub Total	**0.00**	**1,931.91**	**40.94**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**58.57**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.13	
Sub Total	**0.00**	**1,931.91**	**49.13**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.15	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**70.28**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	106.44	
Sub Total	**0.00**	**5,169.18**	**106.44**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	45.83	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,169.18**	**152.27**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**28.13**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**28.13**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,015.58**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	56.27	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,015.58**	**56.27**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	196.51	
Sub Total	**0.00**	**1,931.91**	**196.51**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,931.91**	**196.51**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	131.01	
Sub Total	**0.00**	**1,294.68**	**131.01**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,294.68**	**131.01**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8002
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8002 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8002 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**3.69**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8002 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8002 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8006
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8006 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8006 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**3.69**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8006 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8006 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8008
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8008 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8008 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**1.84**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8008 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8008 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8010
DET DAY ROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8010 BUILDING NAME: DET DAY ROOM

Building UA:	665	CONDITIONED SQFT:	2,100

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	8
REQ STOP:	0	21	21	21	21	21	11

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,770
CFM-CLG:	2,770
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,560	3,360
HTG HRS ON:	2,496	5,376
H/C HRS ON:	4,067	8,760

CLG HRS SAVED:	1,800
HTG HRS SAVED:	2,880
C/H HRS SAVED:	4,693

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8010 **BUILDING NAME:** DET DAY ROOM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,011.17	21.06	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,232.26	24.34	
Sub Total	**2.47**	**18,612.40**	**45.40**	
Economizer	0.00	895.65	0.00	
Ventilation/Recirculation	0.00	21.71	1.37	
DDC Control	0.00	2,624.97	20.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**22,154.73**	**66.78**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

BUILDING 8012
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8012 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8012 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**3.69**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8012 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8012 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.62**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8014
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8014 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8014 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**1.84**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8014 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN

BLDG: 8014 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8020
DET DAY ROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8020 BUILDING NAME: DET DAY ROOM

Building UA:	665	CONDITIONED SQFT:	2,100

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	8
REQ STOP:	0	21	21	21	21	21	11

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,770
CFM-CLG:	2,770
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,560	3,360
HTG HRS ON:	2,496	5,376
H/C HRS ON:	4,067	8,760

CLG HRS SAVED:	1,800
HTG HRS SAVED:	2,880
C/H HRS SAVED:	4,693

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8020 **BUILDING NAME:** DET DAY ROOM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,011.17	21.06	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,232.26	24.34	
Sub Total	**2.47**	**18,612.40**	**45.40**	
Economizer	0.00	895.65	0.00	
Ventilation/Recirculation	0.00	21.71	1.37	
DDC Control	0.00	2,624.97	20.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**22,154.73**	**66.78**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

BUILDING 8021
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	450,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**2.55**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,213.37	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**3.12**	**10,680.10**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**10,680.10**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	18,000
CFM-CLG:	18,000
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,756.09	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	27,150.99	189.32	
Sub Total	**0.00**	**33,170.12**	**189.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**33,170.12**	**189.32**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,989.79**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,989.79**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,989.79**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,989.79**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,989.79**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,989.79**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	**CONDITIONED SQFT:**	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,989.79**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,989.79**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	**CONDITIONED SQFT:**	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,989.79**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,989.79**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

BUILDING 8023
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	586,000
BLR CAP OUTPUT (BTUH):	586,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.32	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**3.32**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**5,344.59**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**5,344.59**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	**CONDITIONED SQFT:**	23,676

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	18,000
CFM-CLG:	18,000
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	23,969.24	189.32	
Sub Total	**0.00**	**29,313.83**	**189.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**29,313.83**	**189.32**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

BUILDING 8025
BN ADMINISTRATION& CLASSROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 **BUILDING NAME:** BN ADMIN & CLRM

Building UA:	2,858	**CONDITIONED SQFT:**	12,000

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	2,610
%OA:	30%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760

CLG HRS SAVED:	2,380
HTG HRS SAVED:	3,808
C/H HRS SAVED:	6,205

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,909.22	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	15,467.38	0.00	
Sub Total	**1.17**	**20,843.33**	**0.00**	
Economizer	0.00	537.14	0.00	
Ventilation/Recirculation	0.00	162.39	0.00	
DDC Control	0.00	1,575.60	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**1.17**	**23,118.46**	**0.00**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	4,850
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760

CLG HRS SAVED:	2,380
HTG HRS SAVED:	3,808
C/H HRS SAVED:	6,205

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,963.71	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	28,742.07	0.00	
Sub Total	**1.73**	**36,397.01**	**0.00**	
Economizer	0.00	998.13	0.00	
Ventilation/Recirculation	0.00	201.18	0.00	
DDC Control	0.00	2,927.85	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**1.73**	**40,524.17**	**0.00**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	2,610
%OA:	30%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760

CLG HRS SAVED:	2,380
HTG HRS SAVED:	3,808
C/H HRS SAVED:	6,205

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,909.22	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	15,467.38	0.00	
Sub Total	**1.17**	**20,843.33**	**0.00**	
Economizer	0.00	537.14	0.00	
Ventilation/Recirculation	0.00	162.39	0.00	
DDC Control	0.00	1,575.60	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**1.17**	**23,118.46**	**0.00**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	780,000
BLR CAP OUTPUT (BTUH):	780,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760

CLG HRS SAVED:	2,380
HTG HRS SAVED:	3,808
C/H HRS SAVED:	6,205

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.42	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**4.42**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760

CLG HRS SAVED:	2,380
HTG HRS SAVED:	3,808
C/H HRS SAVED:	6,205

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,052.58	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.66**	**2,315.62**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.66	2,315.62	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760

CLG HRS SAVED:	2,380
HTG HRS SAVED:	3,808
C/H HRS SAVED:	6,205

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,606.65	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**4,975.62**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,975.62**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	$570.00
	TOTAL:	**1**	**0**	**1**	**1**	**$570.00**

BUILDING 8037
BN ADMINISTRATION& CLASSROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	2,610
%OA:	30%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,661.69	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	14,687.51	0.00	
Sub Total	**1.17**	**19,815.94**	**0.00**	
Economizer	0.00	602.91	0.00	
Ventilation/Recirculation	0.00	162.39	0.00	
DDC Control	0.00	1,768.54	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**1.17**	**22,349.78**	**0.00**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	4,850
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,612.60	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	27,292.89	0.00	
Sub Total	**1.73**	**34,596.72**	**0.00**	
Economizer	0.00	1,120.35	0.00	
Ventilation/Recirculation	0.00	201.18	0.00	
DDC Control	0.00	3,286.36	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**1.73**	**39,204.61**	**0.00**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	2,610
%OA:	30%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,661.69	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	14,687.51	0.00	
Sub Total	**1.17**	**19,815.94**	**0.00**	
Economizer	0.00	602.91	0.00	
Ventilation/Recirculation	0.00	162.39	0.00	
DDC Control	0.00	1,768.54	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**1.17**	**22,349.78**	**0.00**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	780,000
BLR CAP OUTPUT (BTUH):	780,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037 **BUILDING NAME:** BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,374.38	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**4,743.35**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.42	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,743.35**	**4.42**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,949.09	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.66**	**2,212.13**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.66**	**2,212.13**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,858	CONDITIONED SQFT:	12,000

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,452.31	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**2,659.15**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**2,659.15**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

BUILDING 8038
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8038 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	**CONDITIONED SQFT:**	22,700

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8038 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**3.69**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8038 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8038 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8040
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8040 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN

BLDG: 8040 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**1.84**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8040 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8040 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8042
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8042 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8042 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8042 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8042 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8044
APP INSTR BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8044 BUILDING NAME: APP INSTR BLDG

Building UA:	839	CONDITIONED SQFT:	2,470

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1.500
CFM-CLG:	1.500
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760

CLG HRS SAVED:	1,120
HTG HRS SAVED:	1,792
C/H HRS SAVED:	2,920

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8044 **BUILDING NAME:** APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,320.19	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	967.98	25.59	
Sub Total	**0.92**	**2,426.07**	**25.59**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	805.04	26.76	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.92	3,231.11	52.35	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8044 **BUILDING NAME:** APP INSTR BLDG

Building UA:	839	CONDITIONED SQFT:	2,470

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,500
CFM-CLG:	1,500
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760

CLG HRS SAVED:	1,120
HTG HRS SAVED:	1,792
C/H HRS SAVED:	2,920

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8044 **BUILDING NAME:** APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,320.19	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	967.98	25.59	
Sub Total	**0.92**	**2,426.07**	**25.59**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	805.04	26.76	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.92	3,231.11	52.35	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8044 **BUILDING NAME:** APP INSTR BLDG

Building UA:	839	CONDITIONED SQFT:	2,470

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	9
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760

CLG HRS SAVED:	1,120
HTG HRS SAVED:	1,792
C/H HRS SAVED:	2,920

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8044 BUILDING NAME: APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	148.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	7.15	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.15	148.75	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

BUILDING 8046
DET DAY ROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8046 BUILDING NAME: DET DAY ROOM

Building UA:	665	CONDITIONED SQFT:	2,100

SYTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	8
REQ STOP:	0	21	21	21	21	21	11

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,770
CFM-CLG:	2,770
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,560	3,360
HTG HRS ON:	2,496	5,376
H/C HRS ON:	4,067	8,760

CLG HRS SAVED:	1,800
HTG HRS SAVED:	2,880
C/H HRS SAVED:	4,693

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8046 **BUILDING NAME:** DET DAY ROOM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,011.17	21.06	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,232.26	24.34	
Sub Total	**2.47**	**18,612.40**	**45.40**	
Economizer	0.00	895.65	0.00	
Ventilation/Recirculation	0.00	21.71	1.37	
DDC Control	0.00	2,624.97	20.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**22,154.73**	**66.78**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

BUILDING 8048
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8048 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	2,899	**CONDITIONED SQFT:**	11,549

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8048 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**1.84**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8048 BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8048 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8050
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8050 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8050 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**1.84**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8050 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8050 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**2.47**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8052
SENIOR ENLISTED QUARTERS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8052 BUILDING NAME: SR ENL QTRS

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8052 **BUILDING NAME:** SR ENL QTRS

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**3.69**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8052 BUILDING NAME: SR ENL QTRS

Building UA:	5,777	CONDITIONED SQFT:	22,700

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN

BLDG: 8052 **BUILDING NAME:** SR ENL QTRS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**7.46**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8054
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8054 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8054 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**1.84**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8054 **BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8054 **BUILDING NAME:** ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

BUILDING 8056
DET DAY ROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8056 **BUILDING NAME:** DET DAY ROOM

Building UA:	665	**CONDITIONED SQFT:**	2,100

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	8
REQ STOP:	0	21	21	21	21	21	11

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,770
CFM-CLG:	2,770
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,560	3,360
HTG HRS ON:	2,496	5,376
H/C HRS ON:	4,067	8,760

CLG HRS SAVED:	1,800
HTG HRS SAVED:	2,880
C/H HRS SAVED:	4,693

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8056 **BUILDING NAME:** DET DAY ROOM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,011.17	21.06	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,232.26	24.34	
Sub Total	**2.47**	**18,612.40**	**45.40**	
Economizer	0.00	895.65	0.00	
Ventilation/Recirculation	0.00	21.71	1.37	
DDC Control	0.00	2,624.97	20.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**22,154.73**	**66.78**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

BUILDING 8057
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	450,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**2.55**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**5,344.59**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**5,344.59**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	18,000
CFM-CLG:	18,000
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	23,969.24	189.32	
Sub Total	**0.00**	**29,313.83**	**189.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**29,313.83**	**189.32**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	**CONDITIONED SQFT:**	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

BUILDING 8059
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	586,000
BLR CAP OUTPUT (BTUH):	586,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.32	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**3.32**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	**CONDITIONED SQFT:**	23,676

SYTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.76**	**5,344.59**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**5,344.59**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	$1,418.00
	TOTAL:	**1**	**0**	**1**	**4**	**$1,418.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	18,000
CFM-CLG:	18,000
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	23,969.24	189.32	
Sub Total	**0.00**	**29,313.83**	**189.32**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**29,313.83**	**189.32**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496
CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	**CONDITIONED SQFT:**	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS — EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033 — DATE: 16-Sep-95
LOCATION: FT. RILEY, KS — PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

Building UA:	5,496	**CONDITIONED SQFT:**	23,676

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059 **BUILDING NAME:** ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	**0.00**	**1,772.77**	**64.47**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,772.77**	**85.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

BUILDING 8063
ENLISTED PERSONNEL DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8063 **BUILDING NAME:** ENL PERS DIN

Building UA:	3,330	CONDITIONED SQFT:	18,313

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	5	5	5	5	5	7
REQ STOP:	18	18	18	18	18	18	18

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	21,700
CFM-CLG:	21,700
%OA:	20%
%Area:	75%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,740	3,360
HTG HRS ON:	2,784	5,376
H/C HRS ON:	4,536	8,760

CLG HRS SAVED:	1,620
HTG HRS SAVED:	2,592
C/H HRS SAVED:	4,224

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8063 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	40,797.72	520.58	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	23,921.04	142.86	
Sub Total	**14.19**	**66,840.25**	**663.44**	
Economizer	0.00	7,757.11	0.00	
Ventilation/Recirculation	0.00	824.67	37.59	
DDC Control	0.00	17,719.29	56.19	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**14.19**	**93,141.32**	**757.22**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8063 **BUILDING NAME:** ENL PERS DIN

Building UA:	3,330	CONDITIONED SQFT:	18,313

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	5	5	5	5	5	7
REQ STOP:	18	18	18	18	18	18	18

INPUTS

Motor HP:	30.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	41,000
CFM-CLG:	0
%OA:	100%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,740	3,360
HTG HRS ON:	2,784	5,376
H/C HRS ON:	4,536	8,760

CLG HRS SAVED:	1,620
HTG HRS SAVED:	2,592
C/H HRS SAVED:	4,224

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8063 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	53,526.15	0.00	
Opt ST/SP	0.00	6,298.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	26.33	0.00	0.00	
Night Setback	0.00	0.00	825.84	
Sub Total	**26.33**	**59,824.55**	**825.84**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	8.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**26.33**	**59,824.55**	**833.87**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8063 **BUILDING NAME:** ENL PERS DIN

Building UA:	3,330	CONDITIONED SQFT:	18,313

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	5	5	5	5	5	7
REQ STOP:	18	18	18	18	18	18	18

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,740	3,360
HTG HRS ON:	2,784	5,376
H/C HRS ON:	4,536	8,760

CLG HRS SAVED:	1,620
HTG HRS SAVED:	2,592
C/H HRS SAVED:	4,224

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8063 **BUILDING NAME:** ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,479.02	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**2,945.74**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.17**	**2,945.74**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

BUILDING 8065
CLINIC W/O BEDS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8065 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,597	**CONDITIONED SQFT:**	3,848

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	3,000
CFM-CLG:	3,000
%OA:	32%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8065 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,091.56	296.52	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,639.58	57.49	
Sub Total	**0.00**	**24,422.36**	**354.01**	
Economizer	0.00	2,440.29	0.00	
Ventilation/Recirculation	0.00	354.29	14.70	
DDC Control	0.00	930.75	64.36	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**0.00**	**28,147.69**	**433.07**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8065 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,597	CONDITIONED SQFT:	3,848

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	450,000

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8065 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,778.25	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,244.98**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,244.98**	**2.55**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8065 **BUILDING NAME:** CLINIC W/O BEDS

Building UA:	1,597	CONDITIONED SQFT:	3,848

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8065 **BUILDING NAME:** CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,611.41	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**4,078.13**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.17**	**4,078.13**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

BUILDING 8069
INDOOR SWIMMING POOL/GYM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,190
CFM-CLG:	5,190
%OA:	5%
%Area:	9%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,531.78	24.60	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	14,997.57	127.49	
Sub Total	**4.62**	**26,220.58**	**152.09**	
Economizer	0.00	181.94	0.00	
Ventilation/Recirculation	0.00	16.86	1.65	
DDC Control	0.00	313.46	3.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**26,732.84**	**157.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,125
CFM-CLG:	2,125
%OA:	5%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,590.52	10.07	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	6,140.62	56.66	
Sub Total	**2.47**	**12,100.11**	**66.73**	
Economizer	0.00	74.49	0.00	
Ventilation/Recirculation	0.00	6.90	0.68	
DDC Control	0.00	128.34	1.47	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**12,309.85**	**68.88**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	12	6	9
REQ STOP:	20	22	22	22	22	22	20

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	1,000,000

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,920	3,360
HTG HRS ON:	3,072	5,376
H/C HRS ON:	5,006	8,760

CLG HRS SAVED:	1,440
HTG HRS SAVED:	2,304
C/H HRS SAVED:	3,754

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	12,409.99	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**14,052.81**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.67	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**14,052.81**	**5.67**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	7.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,589.04	0.00	
Opt ST/SP	0.00	1,856.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**4.66**	**12,445.17**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.66**	**12,445.17**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	786.69	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.35**	**924.59**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.35**	**924.59**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	786.69	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.35**	**924.59**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.35**	**924.59**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	12	6	9
REQ STOP:	20	22	22	22	22	22	20

INPUTS

Motor HP:	10.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	9,000
CFM-CLG:	0
%OA:	50%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,920	3,360
HTG HRS ON:	3,072	5,376
H/C HRS ON:	5,006	8,760

CLG HRS SAVED:	1,440
HTG HRS SAVED:	2,304
C/H HRS SAVED:	3,754

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	16,850.82	104.51	
Opt ST/SP	0.00	2,230.69	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	59.49	
Sub Total	**0.00**	**19,081.51**	**164.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.84	
DDC Control	0.00	0.00	1.54	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**19,081.51**	**179.38**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	12	6	9
REQ STOP:	20	22	22	22	22	22	20

INPUTS

Motor HP:	10.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	9,000
CFM-CLG:	0
%OA:	50%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,920	3,360
HTG HRS ON:	3,072	5,376
H/C HRS ON:	5,006	8,760

CLG HRS SAVED:	1,440
HTG HRS SAVED:	2,304
C/H HRS SAVED:	3,754

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	16,850.82	104.51	
Opt ST/SP	0.00	2,230.69	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	59.49	
Sub Total	**0.00**	**19,081.51**	**164.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.84	
DDC Control	0.00	0.00	1.54	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**19,081.51**	**179.38**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,750
CFM-CLG:	0
%OA:	20%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,309.46	126.28	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	141.65	
Sub Total	**0.00**	**7,000.69**	**267.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.83	
DDC Control	0.00	0.00	3.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**7,000.69**	**285.44**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,750
CFM-CLG:	0
%OA:	20%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,309.46	126.28	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	141.65	
Sub Total	**0.00**	**7,000.69**	**267.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.83	
DDC Control	0.00	0.00	3.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**7,000.69**	**285.44**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,750
CFM-CLG:	0
%OA:	20%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,309.46	126.28	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	141.65	
Sub Total	**0.00**	**7,000.69**	**267.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.83	
DDC Control	0.00	0.00	3.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**7,000.69**	**285.44**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,750
CFM-CLG:	0
%OA:	20%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,309.46	126.28	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	141.65	
Sub Total	**0.00**	**7,000.69**	**267.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.83	
DDC Control	0.00	0.00	3.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**7,000.69**	**285.44**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HV-9

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	6.50
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HV-9

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	13,234.92	748.34	
Opt ST/SP	0.00	1,449.95	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	184.15	
Sub Total	**0.00**	**14,684.86**	**932.49**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	4.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**14,684.86**	**937.25**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620

SYTEM INFORMATION

System Type:	27
System Name:	Perimeter radiation valve
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069 **BUILDING NAME:** IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	27
System Name:	Perimeter radiation valve
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	$456.00
	TOTAL:	**0**	**1**	**0**	**1**	**$456.00**

BUILDING 8071
REGIMENTAL HQ BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8071 **BUILDING NAME:** RGT HQ BUILD

Building UA:	2,545	**CONDITIONED SQFT:**	9,963

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	12,450
CFM-CLG:	12,450
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8071 **BUILDING NAME:** RGT HQ BUILD

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	44,766.19	124.10	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	72,083.49	93.15	
Sub Total	**14.19**	**118,971.18**	**217.24**	
Economizer	0.00	2,580.48	0.00	
Ventilation/Recirculation	0.00	97.59	6.15	
DDC Control	0.00	7,562.93	76.60	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**14.19**	**129,212.18**	**300.00**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8071 **BUILDING NAME:** RGT HQ BUILD

Building UA:	2,545	CONDITIONED SQFT:	9,963

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8071 **BUILDING NAME:** RGT HQ BUILD

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,035.33	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.66**	**2,298.37**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.66**	**2,298.37**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

BUILDING 8100
CONSOLIDATED MAINTENANCE

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	795
%OA:	10%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	500.02	0.00	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.11	0.00	0.00	
Night Setback	0.00	4,869.69	0.00	
Sub Total	**0.11**	**5,415.22**	**0.00**	
Economizer	0.00	150.26	0.00	
Ventilation/Recirculation	0.00	16.49	0.00	
DDC Control	0.00	440.75	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.11**	**6,022.71**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-11

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,350
CFM-CLG:	0
%OA:	30%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-11

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,761.50	72.42	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	28.65	
Sub Total	**0.00**	**5,130.46**	**101.08**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	5.61	
DDC Control	0.00	0.00	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,130.46**	**130.25**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-12

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	0
%OA:	20%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-12

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,920.27	82.18	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	28.65	
Sub Total	**0.00**	**9,611.50**	**110.84**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	6.37	
DDC Control	0.00	0.00	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,611.50**	**140.77**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	**CONDITIONED SQFT:**	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-13

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	19,760
CFM-CLG:	0
%OA:	20%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-13

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	405.99	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	114.61	
Sub Total	**0.00**	**29,499.17**	**520.59**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	31.46	
DDC Control	0.00	0.00	94.25	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**29,499.17**	**646.31**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-14

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	14,780
CFM-CLG:	0
%OA:	35%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-14

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	531.42	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.30	
Sub Total	**0.00**	**29,499.17**	**588.72**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	41.18	
DDC Control	0.00	0.00	47.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**29,499.17**	**677.03**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-15

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	23,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-15

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	221.46	
Sub Total	**0.00**	**100,551.65**	**221.46**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	95.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**100,551.65**	**316.81**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-16

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	8.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,000
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-16

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	23,029.46	0.00	
Opt ST/SP	0.00	1,784.55	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	**0.00**	**24,814.01**	**147.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	63.57	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**24,814.01**	**211.21**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-17

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	23,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-17

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	221.46	
Sub Total	**0.00**	**100,551.65**	**221.46**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	95.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**100,551.65**	**316.81**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-18

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	17.50
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	12,420
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-18

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	47,910.94	0.00	
Opt ST/SP	0.00	3,712.61	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	**0.00**	**51,623.55**	**147.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	63.57	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**51,623.55**	**211.21**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-19

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	23,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-19

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	221.46	
Sub Total	**0.00**	**100,551.65**	**221.46**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	95.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**100,551.65**	**316.81**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	600
%OA:	10%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	467.40	0.00	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.11	0.00	0.00	
Night Setback	0.00	3,675.24	0.00	
Sub Total	**0.11**	**4,188.15**	**0.00**	
Economizer	0.00	113.40	0.00	
Ventilation/Recirculation	0.00	12.44	0.00	
DDC Control	0.00	332.64	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.11**	**4,646.63**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-20

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	23,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-20

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	221.46	
Sub Total	**0.00**	**100,551.65**	**221.46**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	95.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**100,551.65**	**316.81**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-21

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	18.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	6,000
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-21

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	48,768.27	0.00	
Opt ST/SP	0.00	3,779.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	**0.00**	**52,547.31**	**147.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	63.57	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**52,547.31**	**211.21**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-22

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	25.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	15,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-22

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	67,733.70	0.00	
Opt ST/SP	0.00	5,248.67	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	295.28	
Sub Total	**0.00**	**72,982.38**	**295.28**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	127.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**72,982.38**	**422.42**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-23

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	25,000
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-23

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	295.28	
Sub Total	**0.00**	**100,551.65**	**295.28**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	127.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**100,551.65**	**422.42**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	$697.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**2**	**2**	**0**	**5**	**$1,782.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-24

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	35,200
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-24

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	53,325.88	0.00	
Opt ST/SP	0.00	4,132.21	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**57,458.09**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	253.64	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**57,458.09**	**253.64**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	**CONDITIONED SQFT:**	224,927

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-24(2)

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	35,200
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-24(2)

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	53,325.88	0.00	
Opt ST/SP	0.00	4,132.21	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**57,458.09**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	253.64	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**57,458.09**	**253.64**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-25

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,500
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-25

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,393.41	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,508.75**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	101.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,508.75**	**101.45**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-26

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	19,600
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-26

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	40,640.22	0.00	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**43,789.43**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	152.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**43,789.43**	**152.18**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-27

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	1,000
CFM-CLG:	0
%OA:	100%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-27

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,393.41	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,508.75**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	50.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,508.75**	**50.73**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	600
%OA:	10%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	467.40	0.00	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.11	0.00	0.00	
Night Setback	0.00	3,675.24	0.00	
Sub Total	**0.11**	**4,188.15**	**0.00**	
Economizer	0.00	113.40	0.00	
Ventilation/Recirculation	0.00	12.44	0.00	
DDC Control	0.00	332.64	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.11**	**4,646.63**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	1,000
%OA:	10%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	534.31	0.00	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.11	0.00	0.00	
Night Setback	0.00	6,125.40	0.00	
Sub Total	**0.11**	**6,705.22**	**0.00**	
Economizer	0.00	189.00	0.00	
Ventilation/Recirculation	0.00	20.74	0.00	
DDC Control	0.00	554.40	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.11**	**7,469.36**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	**CONDITIONED SQFT:**	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	725
CFM-CLG:	725
%OA:	10%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,076.41	7.53	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.30	0.00	0.00	
Night Setback	0.00	4,375.50	28.65	
Sub Total	**0.30**	**5,497.41**	**36.18**	
Economizer	0.00	135.24	0.00	
Ventilation/Recirculation	0.00	5.68	0.36	
DDC Control	0.00	396.37	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.30**	**6,034.71**	**60.11**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	12,045
CFM-CLG:	12,045
%OA:	40%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	74,163.24	500.59	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	21.06	0.00	0.00	
Night Setback	0.00	72,693.63	85.95	
Sub Total	**21.06**	**150,006.08**	**586.54**	
Economizer	0.00	2,246.89	0.00	
Ventilation/Recirculation	0.00	377.66	23.81	
DDC Control	0.00	6,585.22	70.69	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**21.06**	**159,215.84**	**681.04**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
32	Direct digital control - VAV AHU	0	3	0	11	$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**4**	**1**	**14**	**$4,826.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	3,790
CFM-CLG:	3,790
%OA:	10%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,078.25	39.38	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	22,873.30	28.65	
Sub Total	**7.46**	**48,066.89**	**68.03**	
Economizer	0.00	706.99	0.00	
Ventilation/Recirculation	0.00	29.71	1.87	
DDC Control	0.00	2,072.06	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**7.46**	**50,875.65**	**93.47**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-8

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,295
CFM-CLG:	6,295
%OA:	50%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	39,733.29	327.02	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	37,991.40	28.65	
Sub Total	**10.99**	**79,367.50**	**355.68**	
Economizer	0.00	1,174.28	0.00	
Ventilation/Recirculation	0.00	246.72	15.55	
DDC Control	0.00	3,441.59	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**10.99**	**84,230.08**	**394.79**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
32	Direct digital control - VAV AHU	0	3	0	11	$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**4**	**1**	**14**	**$4,826.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-9

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	0
%OA:	40%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-9

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,200.40	328.73	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	28.65	
Sub Total	**0.00**	**22,843.22**	**357.39**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	25.47	
DDC Control	0.00	0.00	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**22,843.22**	**406.42**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	6,278,000
BLR CAP OUTPUT (BTUH):	5,021,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,917.45**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	35.60	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**1,917.45**	**35.60**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	6,278,000
BLR CAP OUTPUT (BTUH):	5,021,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**1,917.45**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	35.60	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**1,917.45**	**35.60**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	**CONDITIONED SQFT:**	224,927

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.52**	**52.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.52**	**52.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.52**	**52.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,764.43	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**4,231.16**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**26.42**	**4,756.16**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	262.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.62	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**12.62**	**262.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-8

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	24
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,764.43	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**1.17**	**4,231.16**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	420.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	20.20	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**21.37**	**4,651.16**	**0.00**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	$664.00
16	Alarms - Chiller	0	0	2	0	$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	$150.00
	TOTAL:	**2**	**0**	**3**	**2**	**$1,481.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**29,499.17**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**29,499.17**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	**CONDITIONED SQFT:**	224,927

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**29,499.17**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**29,499.17**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,200.40	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**22,843.22**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**22,843.22**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	40,640.22	0.00	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**43,789.43**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**43,789.43**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	40,640.22	0.00	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**43,789.43**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**43,789.43**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.90
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	12,440
CFM-CLG:	0
%OA:	0%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,303.29	0.00	
Opt ST/SP	0.00	255.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	369.10	
Sub Total	**0.00**	**3,559.26**	**369.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**3,559.26**	**369.10**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	**CONDITIONED SQFT:**	224,927

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	38,674
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,920.27	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	590.57	
Sub Total	**0.00**	**9,611.50**	**590.57**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**9,611.50**	**590.57**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	6.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	76,800
CFM-CLG:	0
%OA:	0%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	22,021.92	0.00	
Opt ST/SP	0.00	1,706.48	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	885.85	
Sub Total	**0.00**	**23,728.40**	**885.85**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**23,728.40**	**885.85**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.90
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	32,212
CFM-CLG:	0
%OA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,303.29	0.00	
Opt ST/SP	0.00	255.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	442.93	
Sub Total	**0.00**	**3,559.26**	**442.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**3,559.26**	**442.93**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.80
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	20,600
CFM-CLG:	0
%OA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,606.58	0.00	
Opt ST/SP	0.00	511.94	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	442.93	
Sub Total	**0.00**	**7,118.52**	**442.93**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**7,118.52**	**442.93**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.40
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	7,730
CFM-CLG:	0
%OA:	0%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,808.77	0.00	
Opt ST/SP	0.00	682.59	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	**0.00**	**9,491.36**	**147.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**9,491.36**	**147.64**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	8,650
CFM-CLG:	0
%OA:	0%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	**0.00**	**2,876.17**	**147.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**2,876.17**	**147.64**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-8

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	2,324
CFM-CLG:	0
%OA:	0%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100 **BUILDING NAME:** CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	903.46	0.00	
Opt ST/SP	0.00	70.01	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	73.82	
Sub Total	**0.00**	**973.47**	**73.82**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**973.47**	**73.82**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8300
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	58.10	
Sub Total	**0.00**	**3,685.15**	**58.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	25.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,685.15**	**83.11**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.80	
Sub Total	**0.00**	**1,931.91**	**49.80**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**71.24**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.89	
Sub Total	**0.00**	**5,169.18**	**107.89**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	46.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,169.18**	**154.34**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**28.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**28.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,015.58**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	57.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,015.58**	**57.03**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	199.18	
Sub Total	**0.00**	**1,931.91**	**199.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,931.91**	**199.18**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	132.79	
Sub Total	**0.00**	**1,294.68**	**132.79**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,294.68**	**132.79**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8320
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	58.10	
Sub Total	**0.00**	**3,685.15**	**58.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	25.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,685.15**	**83.11**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	**CONDITIONED SQFT:**	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.80	
Sub Total	**0.00**	**1,931.91**	**49.80**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**71.24**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.89	
Sub Total	**0.00**	**5,169.18**	**107.89**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	46.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,169.18**	**154.34**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**28.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**28.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,015.58**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	57.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,015.58**	**57.03**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	**CONDITIONED SQFT:**	20,240

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	199.18	
Sub Total	**0.00**	**1,931.91**	**199.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,931.91**	**199.18**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	**CONDITIONED SQFT:**	20,240

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	132.79	
Sub Total	**0.00**	**1,294.68**	**132.79**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,294.68**	**132.79**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8330
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256

SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	8
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	140.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	6.73	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**6.73**	**140.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,445
CFM-CLG:	3,455
%OA:	10%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,637.16	36.67	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	21,360.09	93.71	
Sub Total	**3.12**	**32,463.97**	**130.38**	
Economizer	0.00	601.53	0.00	
Ventilation/Recirculation	0.00	27.08	1.70	
DDC Control	0.00	1,762.98	77.07	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**34,855.57**	**209.14**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	20.00
HP Effic:	0.76
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,898,000
BLR CAP OUTPUT (BTUH):	2,318,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	63,281.99	0.00	
Opt ST/SP	0.00	4,786.96	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**68,068.94**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.43	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**68,068.94**	**16.43**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,420
CFM-CLG:	0
%OA:	32%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	115.17	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	62.47	
Sub Total	**0.00**	**6,636.72**	**177.64**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	8.71	
DDC Control	0.00	0.00	51.38	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,636.72**	**237.73**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256

SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	$386.00
	TOTAL:	**1**	**0**	**1**	**0**	**$386.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	**CONDITIONED SQFT:**	39,256

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,960
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,636.72**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	55.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,636.72**	**55.30**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,755
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,636.72**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	55.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,636.72**	**55.30**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.70
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	22,000
CFM-CLG:	0
%OA:	0%
%Area:	30%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,391.73	0.00	
Opt ST/SP	0.00	483.50	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	482.88	
Sub Total	**0.00**	**6,875.23**	**482.88**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**6,875.23**	**482.88**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
EMC NO: 1406-001
CLIENT CNTRCT #: DACA 01-94-D-0033
DATE: 16-Sep-95
LOCATION: FT. RILEY, KS
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	26,400
CFM-CLG:	0
%OA:	0%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	563.36	
Sub Total	**0.00**	**6,636.72**	**563.36**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**6,636.72**	**563.36**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8340
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	58.10	
Sub Total	**0.00**	**3,685.15**	**58.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	25.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,685.15**	**83.11**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	**0.00**	**1,931.91**	**41.50**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**59.36**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	**CONDITIONED SQFT:**	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.80	
Sub Total	**0.00**	**1,931.91**	**49.80**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**1,931.91**	**71.24**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.89	
Sub Total	**0.00**	**5,169.18**	**107.89**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	46.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,169.18**	**154.34**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801
CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**28.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,538.79**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,538.79**	**28.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,015.58**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	57.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,015.58**	**57.03**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	199.18	
Sub Total	**0.00**	**1,931.91**	**199.18**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,931.91**	**199.18**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	8,801	**CONDITIONED SQFT:**	20,240

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760

CLG HRS SAVED:	2,480
HTG HRS SAVED:	3,968
C/H HRS SAVED:	6,466

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	132.79	
Sub Total	**0.00**	**1,294.68**	**132.79**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,294.68**	**132.79**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8360
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	7
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	122.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	5.89	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**5.89**	**122.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	**CONDITIONED SQFT:**	39,428

SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	2,460
CFM-CLG:	2,460
%OA:	20%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	50.54	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	25.90	
Sub Total	**0.00**	**6,489.82**	**76.44**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	3.92	
DDC Control	0.00	0.00	21.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	**0.00**	**6,489.82**	**101.66**	**5.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
29	Direct digital control - MZ AHU	0	7	0	8	$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	$112.00
	TOTAL:	**1**	**8**	**1**	**11**	**$4,509.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	**CONDITIONED SQFT:**	39,428

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	5,537,500
BLR CAP OUTPUT (BTUH):	4,430,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**29,499.17**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	31.40	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**29,499.17**	**31.40**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,270
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,761.50	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	**0.00**	**5,130.46**	**83.41**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**5,130.46**	**119.33**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	**CONDITIONED SQFT:**	39,428

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	6,660
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	**0.00**	**6,489.82**	**83.41**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,489.82**	**119.33**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	6,490
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	**0.00**	**6,489.82**	**83.41**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,489.82**	**119.33**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	**CONDITIONED SQFT:**	39,428

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,870
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	**0.00**	**6,489.82**	**83.41**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,489.82**	**119.33**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	**CONDITIONED SQFT:**	39,428

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,360
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	**0.00**	**6,489.82**	**83.41**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,489.82**	**119.33**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	9,540
CFM-CLG:	0
%OA:	100%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,920.27	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	100.10	
Sub Total	**0.00**	**9,611.50**	**100.10**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	43.10	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,611.50**	**143.19**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	**CONDITIONED SQFT:**	39,428

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	600.57	
Sub Total	**0.00**	**1,917.45**	**600.57**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,917.45**	**600.57**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	17,691	**CONDITIONED SQFT:**	39,428

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760

CLG HRS SAVED:	2,460
HTG HRS SAVED:	3,936
C/H HRS SAVED:	6,414

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,192.57	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	400.38	
Sub Total	**0.00**	**1,284.98**	**400.38**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,284.98**	**400.38**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8370
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,180
CFM-CLG:	2,180
%OA:	10%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,316.02	23.20	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	13,477.57	59.88	
Sub Total	**2.47**	**22,162.55**	**83.08**	
Economizer	0.00	379.55	0.00	
Ventilation/Recirculation	0.00	17.09	1.08	
DDC Control	0.00	1,112.39	49.24	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**23,671.57**	**133.40**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,750
CFM-CLG:	1,750
%OA:	28%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,493.51	52.15	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	10,819.15	55.60	
Sub Total	**1.76**	**17,575.70**	**107.75**	
Economizer	0.00	304.68	0.00	
Ventilation/Recirculation	0.00	38.41	2.42	
DDC Control	0.00	892.97	45.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**1.76**	**18,811.76**	**155.90**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.21**	**87.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.21**	**87.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	11,686	**CONDITIONED SQFT:**	26,876

SYTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	400,000
BLR CAP OUTPUT (BTUH):	400,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**9,829.07**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.27	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,829.07**	**2.27**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM-HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	$1,109.00
	TOTAL:	**1**	**1**	**1**	**3**	**$1,495.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	11,686	**CONDITIONED SQFT:**	26,876

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,900
CFM-CLG:	0
%OA:	10%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,477.31	30.52	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.16	
Sub Total	**0.00**	**3,740.35**	**94.67**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	2.31	
DDC Control	0.00	0.00	52.76	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,740.35**	**149.75**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,000
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,477.31	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	143.26	
Sub Total	**0.00**	**3,740.35**	**143.26**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	61.68	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**3,740.35**	**204.94**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	6,240
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**6,636.72**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	37.86	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**6,636.72**	**37.86**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	40%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,822.95	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	440.80	
Sub Total	**0.00**	**1,960.85**	**440.80**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,960.85**	**440.80**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8380
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,100
CFM-CLG:	2,100
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

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CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,302.51	22.35	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,982.98	11.59	
Sub Total	**2.47**	**21,654.45**	**33.94**	
Economizer	0.00	365.62	0.00	
Ventilation/Recirculation	0.00	16.46	1.04	
DDC Control	0.00	1,071.57	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**23,108.10**	**44.51**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,520
CFM-CLG:	1,520
%OA:	5%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,182.11	8.09	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	9,397.20	5.80	
Sub Total	**3.12**	**20,046.04**	**13.88**	
Economizer	0.00	264.64	0.00	
Ventilation/Recirculation	0.00	5.96	0.38	
DDC Control	0.00	775.61	4.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**21,092.25**	**19.03**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,100
CFM-CLG:	2,100
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,302.51	22.35	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,982.98	11.59	
Sub Total	**2.47**	**21,654.45**	**33.94**	
Economizer	0.00	365.62	0.00	
Ventilation/Recirculation	0.00	16.46	1.04	
DDC Control	0.00	1,071.57	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**23,108.10**	**44.51**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,245
CFM-CLG:	2,245
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,326.99	23.89	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	13,879.42	11.59	
Sub Total	**2.47**	**22,575.38**	**35.48**	
Economizer	0.00	390.87	0.00	
Ventilation/Recirculation	0.00	17.60	1.11	
DDC Control	0.00	1,145.56	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**24,129.40**	**46.13**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,305
CFM-CLG:	2,305
%OA:	5%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,142.52	12.27	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	14,250.36	11.59	
Sub Total	**2.47**	**22,761.85**	**23.86**	
Economizer	0.00	401.31	0.00	
Ventilation/Recirculation	0.00	9.03	0.57	
DDC Control	0.00	1,176.17	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**24,348.37**	**33.96**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	15,650
CFM-CLG:	0
%OA:	10%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	67,836.96	166.57	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	21.06	0.00	0.00	
Night Setback	0.00	0.00	34.77	
Sub Total	**21.06**	**70,986.16**	**201.34**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	7.73	
DDC Control	0.00	0.00	28.60	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**21.06**	**70,986.16**	**237.67**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	13,980
CFM-CLG:	0
%OA:	5%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	45,699.02	74.40	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	28.98	
Sub Total	**14.19**	**47,820.51**	**103.37**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	3.45	
DDC Control	0.00	0.00	23.83	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**14.19**	**47,820.51**	**130.66**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.21**	**87.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.52**	**52.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	6
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	96.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.63	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.63**	**96.25**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.21**	**87.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**41.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**41.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**9,829.07**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,829.07**	**20.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**9,829.07**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,829.07**	**20.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	9,600
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**41.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	9,600
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**41.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,859.81**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,859.81**	**20.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-8

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,859.81**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,859.81**	**20.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	**0.00**	**1,314.07**	**209.04**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,314.07**	**209.04**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	**0.00**	**1,314.07**	**209.04**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,314.07**	**209.04**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	**0.00**	**1,314.07**	**209.04**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,314.07**	**209.04**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,400

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	**0.00**	**1,314.07**	**209.04**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,314.07**	**209.04**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8390
TACTICAL EQUIPMENT SHOP

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	3,475
CFM-CLG:	3,475
%OA:	10%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	13,879.75	33.17	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	19,267.16	47.28	
Sub Total	**4.62**	**33,838.14**	**80.45**	
Economizer	0.00	792.28	0.00	
Ventilation/Recirculation	0.00	27.24	1.72	
DDC Control	0.00	2,322.03	38.88	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.62**	**36,979.69**	**121.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755

SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,250,000
BLR CAP OUTPUT (BTUH):	2,600,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	37,336.14	0.00	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**40,485.34**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	18.43	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	**0.00**	**40,485.34**	**18.43**	**4.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	$277.00
2	Hot water reset - HW Boiler	0	0	0	3	$836.00
4	Alarms - HW Boiler	0	0	2	0	$330.00
	TOTAL:	**2**	**0**	**2**	**3**	**$1,443.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

Building UA:	10,764	**CONDITIONED SQFT:**	24,755

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	8
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	140.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	6.73	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**6.73**	**140.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

Building UA:	10,764	**CONDITIONED SQFT:**	24,755

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,345
CFM-CLG:	0
%OA:	33%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,374.38	104.18	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	47.28	
Sub Total	**0.00**	**4,743.35**	**151.45**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	8.79	
DDC Control	0.00	0.00	38.88	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,743.35**	**199.12**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,700
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,374.38	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**4,743.35**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	69.75	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,743.35**	**69.75**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

Building UA:	10,764	**CONDITIONED SQFT:**	24,755

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,700
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,374.38	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**4,743.35**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	69.75	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**4,743.35**	**69.75**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

Building UA:	10,764	**CONDITIONED SQFT:**	24,755

SYTEM INFORMATION

System Type:	27
System Name:	Perimeter radiation valve
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	27
System Name:	Perimeter radiation valve
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**0.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	$456.00
	TOTAL:	**0**	**1**	**0**	**1**	**$456.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 BUILDING NAME: TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	0%
%Area:	23%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 **BUILDING NAME:** TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,118.54	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	233.46	
Sub Total	**0.00**	**3,381.58**	**233.46**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**3,381.58**	**233.46**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 BUILDING NAME: TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755

SYTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	0%
%Area:	23%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760

CLG HRS SAVED:	2,260
HTG HRS SAVED:	3,616
C/H HRS SAVED:	5,892

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390 BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,118.54	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	233.46	
Sub Total	**0.00**	**3,381.58**	**233.46**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**3,381.58**	**233.46**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

BUILDING 8410
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,100
CFM-CLG:	2,100
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,302.51	22.35	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,982.98	11.59	
Sub Total	**2.47**	**21,654.45**	**33.94**	
Economizer	0.00	365.62	0.00	
Ventilation/Recirculation	0.00	16.46	1.04	
DDC Control	0.00	1,071.57	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**23,108.10**	**44.51**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,520
CFM-CLG:	1,520
%OA:	5%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,182.11	8.09	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	9,397.20	5.80	
Sub Total	**3.12**	**20,046.04**	**13.88**	
Economizer	0.00	264.64	0.00	
Ventilation/Recirculation	0.00	5.96	0.38	
DDC Control	0.00	775.61	4.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.12**	**21,092.25**	**19.03**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,100
CFM-CLG:	2,100
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,302.51	22.35	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,982.98	11.59	
Sub Total	**2.47**	**21,654.45**	**33.94**	
Economizer	0.00	365.62	0.00	
Ventilation/Recirculation	0.00	16.46	1.04	
DDC Control	0.00	1,071.57	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**23,108.10**	**44.51**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,233

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,245
CFM-CLG:	2,245
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,326.99	23.89	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	13,879.42	11.59	
Sub Total	**2.47**	**22,575.38**	**35.48**	
Economizer	0.00	390.87	0.00	
Ventilation/Recirculation	0.00	17.60	1.11	
DDC Control	0.00	1,145.56	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	24,129.40	46.13	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,305
CFM-CLG:	2,305
%OA:	5%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,142.52	12.27	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	14,250.36	11.59	
Sub Total	**2.47**	**22,761.85**	**23.86**	
Economizer	0.00	401.31	0.00	
Ventilation/Recirculation	0.00	9.03	0.57	
DDC Control	0.00	1,176.17	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.47**	**24,348.37**	**33.96**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	15,650
CFM-CLG:	0
%OA:	10%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	67,836.96	166.57	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	21.06	0.00	0.00	
Night Setback	0.00	0.00	34.77	
Sub Total	**21.06**	**70,986.16**	**201.34**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	7.73	
DDC Control	0.00	0.00	28.60	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**21.06**	**70,986.16**	**237.67**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	13,980
CFM-CLG:	0
%OA:	5%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	45,699.02	74.40	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	75.34	
Sub Total	**14.19**	**47,820.51**	**149.74**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	3.45	
DDC Control	0.00	0.00	61.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**14.19**	**47,820.51**	**215.15**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	$399.00
	TOTAL:	**1**	**3**	**0**	**6**	**$2,116.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.21**	**87.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	**CONDITIONED SQFT:**	73,233

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**2.52**	**52.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	6
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	96.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.63	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.63**	**96.25**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**4.21**	**87.50**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**0.00**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**3.37**	**70.00**	**0.00**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	$243.00
	TOTAL:	**1**	**0**	**1**	**0**	**$243.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**41.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**41.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**9,829.07**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,829.07**	**20.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**9,829.07**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**9,829.07**	**20.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	9,600
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**41.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	9,600
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**23,360.30**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**23,360.30**	**41.04**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	0
%OA:	100%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,859.81**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	61.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,859.81**	**61.56**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-8

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 18-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	**0.00**	**15,859.81**	**0.00**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	**0.00**	**15,859.81**	**20.52**	**3.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	$348.00
30	Direct digital control - H&V Unit	0	1	0	3	$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	$272.00
	TOTAL:	**1**	**2**	**0**	**4**	**$1,433.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 15-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 **BUILDING NAME:** VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	**0.00**	**1,314.07**	**209.04**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	**0.00**	**1,314.07**	**209.04**	**0.00**

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	**0.00**	**1,314.07**	**209.04**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1403-001
DATE: 16-Sep-95
PREPARED BY: JMA/JN/AMS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP CRC

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

FUNCTION	kW/yr	kWh/yr	MEtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	**0.00**	**1,314.07**	**209.04**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233

SYTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760

CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	**0.00**	**1,314.07**	**209.04**	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	$1,213.00
	TOTAL:	**1**	**0**	**1**	**2**	**$1,213.00**