ENERGY ENGINEERING ANALYSIS PROGRAM							
AT							
FORT LEAVEN	WORTH, KANSAS						
FINAL S	UBMITTAL						
ENERGY SAVINGS OPPORTUNITY SURVEY EXECUTIVE SUMMARY CONTRACT NUMBER DACA41-86-C-0061 JUNE 4, 1990							

MATRINUTION STATEMENT E Approved for public released Dismission Unlimited



DEPARTMENT OF THE ARMY CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS P.O. BOX 9005 CHAMPAIGN, ILLINOIS 61826-9005

OF: TR-I Library

17 Sep 1997

Based on SOW, these Energy Studies are unclassified/unlimited. Distribution A. Approved for public release.

1.10

Marie Wakeffeld, Librarian Engineering

INTRODUCTION

A. General Description

Fort Leavenworth is located in Northeastern Kansas on approximately 6,000 acres of land. Approximately 2000 acres have been developed and maintained. Included in the Fort grounds are Sherman Army Air Field and the United Stated Disciplinary Barracks.

B. Purpose of Report

The purpose of this report is evaluate selected Energy Conservation Opportunities and provide programming or implementation documentation for all recommended ECO's.

After the individual ECO's were calculated, those projects with SIR's greater than 1 were grouped into projects for funding. Form 4283, Facilities Engineering Work Request was filled out for each project grouping. Projects meeting ECIP requirements have PDB's and Form 1391 documentation.

C. Computer Programs

19971023 191

A number of computer programs were used to aid in the calculation of energy savings, construction cost estimates and other government forms. For the energy analysis of some ECO's, we used "Energy Plus - Energy Use and Load Analysis" by Computer Design Software Company. This program uses the Hour-by-Hour method for calculating heating and cooling energy as presented in Chapter 25 of the ASHRAE Handbook of Fundamentals. Simple energy savings are calculated by standard methods or with the ASHRAE modified temperature bin methods using standard spreadsheet computer program. Bell Hall used "PC-DOE", a microcomputer version of DOE-2.1B energy analysis program. The "Life Cycle Cost in Design (LCCID) Economic Analysis Computer Program" by

EXECUTIVE SUMMARY

PAGE -1

the Government thru the University of Illinois is used for life cycle cost analysis calculations.

D. Observations

In general, inadequate preventive maintenance of the Fort Leavenworth facilities is the cause of a significant amount of wasted energy. Although lighting and architectural maintenance are, in general, adequate, maintenance of mechanical equipment, especially controls, is not adequate due to a shortage of maintenace personnel.

In the past, mechanical maintenance for most HVAC systems has been on a "replace on breakdown" schedule. Time clocks, thermostats, mixed air controls, night setback and outdoor air temperature reset controls were either disconnected or malfunctioning. Currenty there is a comitment to do preventitive maintenance, however an infusion of funds is necessary to help correct current problems that are beyond the scope of regular maintenance work. Once these projects have been completed, maintenance personel should be able to keep up with a preventitive maintenance program.



EXISTING ANNUAL ENERGY CONSUMPTION

)

BUILDING		ELECTRICITY			NATURAL GAS	;		TOTAL
NAME	KWH	DOLLARS	MBTU	THERMS	DOLLARS	MBTU	DOLLARS	MBTU
BUILDING #25								
WATER TREATMENT	84.969	\$4,495	290	5.48E-09	\$1.726	548	\$6,221	838
BUILDING #48								
EM BARRACKS	327,947	\$17.349	1.119	1.45E-08	\$4.577	1.453	\$21.926	2,572
BUILDING #50								
DATA PROCESSING	131,969	\$6,981	450	0.00E+00	\$0	0	\$6,981	450
BUILDING #52								
CACDA, CAORA	1.430.708	\$75.687	4.883	5.93E-08	\$18.668	5.927	\$94,355	10,810
BUILDING #56								
POST CHAPEL	444,792	\$23,530	1.518	3.99E-08	\$12,576	3.992	\$36,106	5,510
BUILDING #77								
MEDIA CENTER	363.024	\$19.205	1.239	1.05E-08	\$3,298	1.047	\$22,503	2,286
BUILDING #102								
FINANCE	184.360	\$9,753	629	1.65E-08	\$5,193	1.648	\$14,945	2,278
BUILDING #136								
COMMUNICATIONS	5,442,469	\$287,915	18.575	5.42E-08	\$17,074	5,420	\$304,989	23,996
BUILDING #225								
BOQ, & DINING	315.558	\$16,694	1.077	6.11E-09	\$1,925	611	\$18,618	1,688
BUILDING #318								
OFFICERS CLUB	125,696	\$6,650	.429	6.57E-09	\$2.070	657	\$8,719	1,086
BUILDING #345								
PATCH CENTER	138.427	\$7.323		3.30E-08	\$10.397	3.301	\$17,720	3,773
BUILDING #398								
DB GREENHOUSE	200.436	\$10.603	684	5.12E-09	\$1.613	512	\$12.216	1,196
BUILDING #429								
DB BARRACKS	330,101	\$17.463	1.127	2.93E-08	\$9,233	2,931	\$26.696	4,058
BUILDING #470								
DB VOC SHOPS	249.225	\$13,184	851	1.78E-08	\$5.594	1.776	\$18,778	2,626
BUILDING #1008								
LPU BARRACKS	107.823	\$5.704	368	6.61E-09	\$2.082	661	\$7.786	1,029
BUILDING #1009	E4 OOF	60 ,000	405		61.047	500	A	
	54,205	\$2.868	185	5.23E-09	\$1.64/	523	\$4,515	708
AFR-VESTIBULES	E0 170	£0.070	400	0.005.00	* 0.000		AC 474	4 4 9 9
AEH ENTRY DOOR	58.178	\$3.078	199	9.82E-09	\$3.093	982	\$0,1/1	1,180
11 10 ONLY	105 177	\$7454	404	0.005.00	67 107	0.000	\$14,000	0.740
AEH PATIO DOOP	135,177	\$7.151	401	2.285-08	\$7.18/	2.282	\$14,338	2,743
	170 504	¢0.001	500	2 90E 00	60.440	2 000	£10 404	A
	170,524	\$9.021	562	2.09E-00		2,092	\$18,131	3,4/4
USDB OVERALL	61,324	\$3.244	209	0.00E+00	\$0	0	\$3,244	209
	10,356,910	\$547,896	35,348	3.72E-07	\$117,064	37,163	\$664,960	72,511



Page 1 of 1

EXPLANATION OF ECO'S

MECHANICAL

ECO M1. Economizer Cycles (Dry Bulb)

The economizer functions by using outside air for cooling when the outdoor air temperature is low enough to provide cooling for the building. (Approx. 65°F)

ECO M2. Prevent Air Stratification

Air stratification occurs when warm air rises to the ceiling of a room or building leaving the lower half of the room cooler than the top half. The heating system is usually controlled by a thermostat in the lower portion of the space, and keeps running even though the average temperature of the space might be satisfactory.

ECO M3. Boiler O2 Trim Control

Adjusting the amount of oxygen to the exact needs of the boiler combustion device will reduce the amount of excess air used during combustion. Since this excess air is heated during combustion, any reduction in air will save energy.

ECO M4. Upgrade Boiler Controls

Upgrading boiler controls will increase efficiency and allow such features as water temperature reset to be incorporated.

ECO M5. Insulate Steam Lines

In areas where insulation on steam lines is missing or inadequate the lines may be re-insulated to reduce the amount of heating energy lost.

ECO M6. Return Condensate

If condensate is not returned to the boiler, the hot condensate is lost and the make-up water is heated from near room temperature to the boiler set point. Currently, there are no areas where condensated is purposly dumped. Some leaks and malfunctioning systems exist, but they are under repair or scheduled for repaire.

ECO M7. Upgrade Building HVAC Controls

Upgrading building HVAC controls involves remodeling or replacing the controls to improve operational characteristics and efficiency. Many existing controls are old and/or malfunctioning and should be replaced.



ECO M8. Steam Trap Program

Steam traps are devices that consistently fail, and are designed to be easily replaceable and repairable. These devices need to be regularly checked and replaced for maximum system efficiency.

ECO M9. Air Curtains

Air curtains located at loading dock doors prevents outside air from entering the building, thus reducing heating and cooling energy due to infiltration.

ECO M10. Infra-red Heaters

Infra-red heaters save energy by directing heat where it is required on surfaces, and not heating air unnecessarily. They are especially useful in factories, warehouses and greenhouses where there are few personnel.

ELECTRICAL

ECO E1. Energy Saving Fluorescent

Energy saving fluorescent lighting saves approximately 30 watts per fixture (4lamps, 2-ballasts), vs a standard fixture. All of the replacement lamps are currently energy saving lamps.

ECO E2. Reduce Lighting Levels

Reducing lighting levels would reduce the number of watts used to light a particular room. However, reduction in lighting levels must be carefully considered for each application because lighting levels affect worker performance and moral.

ECO E3. Replace Incandescent Lamps

Replacing incandescent lamps with more efficient lighting sources can save a significant amount of energy without reducing light levels. However, in some cases, the atheistic value of the lighting quality needs to be considered.

ECO E4. High efficiency Motor Replacement

Electrical energy can be saved by installing high efficiency motors in place of standard motors. The high efficiency motor delivers the same horsepower, but uses less electrical energy.

ECO E5. Improve Electrical Power Factor

If the power company charges a penalty for a low power factor. Improving electrical power factor will reduce the power company penalty. At Fort Leavenworth the power company does not charge for a low power factor.

ARCHITECTURAL

ECO A1. Insulation

Insulation of buildings includes the addition of roof, attic, and wall insulation. Most buildings had substandard insulation, however, insulation is expensive to install in retrofit applications and is seldom cost effective unless credit can be taken for construction costs required by renovation and or replacement based on factors other than energy savings.

ECO A2. Thermopane Glass

Thermopane Glass is hermetically sealed with an air gap between two panes of glass. The glass has very good insulating qualities, however, it is expensive to install and will not usually provide a short payback unless new windows are already required.

ECO A3. Weatherstrip/Caulk

Weatherstripping and Caulking is a low cost solution to the problem of excessive infiltration thru loose windows, doors etc.. Generally weatherstripping and caulking can be done by Post personnel.

ECO A4. Solar Film

Solar film can be added to window glazing to reduce the amount of sunlight and heat entering the building during the cooling season. A increase in heating energy may be required to offset reduced solar gain in the winter.

ECO A5. Vestibules

Vestibules reduce energy consumption by limiting the amount of outside air infiltration into buildings thru frequently used doors.

ECO A6. Reduce Glass Areas

Removing unnecessary windows and infilling the opening with wall material, can significantly reduce the heat loss or gain thru that section of wall.

ECO A7. Loading Dock Seals

Loading dock seals operate similar to vestibules. They reduce air infiltration when loading dock doors are open to the outside by sealing around the truck being unloaded.

ALL ECOs INVESTIGATED

	BUILDING	ENERGY	ENERGY		TOTAL	SIMPLE	
ECO	NAME	SAVINGS	SAVINGS	CONSTRUCTION	PROJECT	PAYBACK	SIR
		MBTU'S/YR	(\$)	COST	COST*	YEARS	
CONO	MIZER CYCLES						
	BUILDING #56						
<u>M1</u>	POST CHAPEL	58.0	\$903	\$5,092	\$5,601	6.2	1.4/
	BUILDING #102						
M1	FINANCE	16.0	\$255	\$9,351	\$10,286	40.3	0.2
<u>M1</u>	FINANCE	16.0	\$255	\$9,351	\$10,286	40.3	0.23
M1		16.0	\$255	\$9,351	\$10,286	40.3	0.23
M1	FINANCE	16.0	\$255	\$9,351	\$10,286	40.3	0.23
M1 NR STR M2	FINANCE ATIFICATION CONTROL BUILDING #52 CACDA, CAORA	16.0	\$255 \$261	\$9,351 \$19,082	\$10,286 \$20,990	40.3 80.4	0.23
M1 NR STR M2	FINANCE ATIFICATION CONTROL BUILDING #52 CACDA, CAORA BUILDING #56	83.0	\$255 \$261	\$9,351 \$19,082	\$10,286 \$20,990	40.3 80.4	0.23
<u>M1</u> NR STR M2 M2	FINANCE ATIFICATION CONTROL BUILDING #52 CACDA, CAORA BUILDING #56 POST CHAPEL	83.0 38.0	\$255 \$261 \$120	\$9,351 \$19,082 \$1,963	\$10,286 \$20,990 \$2,159	40.3 80.4 18.0	0.23
M1 NR STR M2 M2	FINANCE ATIFICATION CONTROL BUILDING #52 CACDA, CAORA BUILDING #56 POST CHAPEL BUILDING #56	83.0 38.0	\$255 \$261 \$120	\$9,351 \$19,082 \$1,963	\$10,286 \$20,990 \$2,159	40.3 80.4 18.0	0.23

BOILER OXYGEN TRIM CONTROL

	BUILDING #72						
M3	BOILER PLANT	Dropped from	study - Buildin	g 72 is being phased	out.		
	BUILDING #225						
MЗ	BOO DINNING	346.0	\$1,091	\$1 <u>0,209</u>	\$11,230	10.3	1.32

UPGRADE BOILER CONTROLS

	BUILDING #56						
M4	POST CHAPEL	13.0	\$41	\$2,672	\$2,939	71.7	0.19
	BUILDING #345						
M4	PATCH COMM. CNTR.	NOT RECOM	MENDED - EX	ISTING CONTROLS	ARE ADEQUA	TE	
	BUILDING #56						
M4A	POST CHAPEL	630.0	\$1,985	\$43,610	\$47,971	24.2	0.56
	BUILDING #345						
M4A	PATCH COMM. CNTR.	523.0	\$1,647	\$41,384	\$45,522	27.6	0.49

INSULATE STEAM LINES

	BUILDING #72						
M5	BOILER PLANT	Dropped from	study - Buildin	g 72 is being phased	out.		
	BUILDING #102						
M5	FINANCE	216.3	\$682	\$923	\$1,015	1.5	9.10
	BULDING #470						
M5	DB VOC. SHOPS	39.3	\$124	\$196	\$216	1.7	7.79
	BUILDING #1009						
M5	LPU MESSHALL	78.5	\$248	\$393	\$432	1.7	7.77
M5	USDB OVERALL	1479.0	\$4,658	\$9,533	\$10,486	2.3	6.02

UPGRADE HVAC CONTROLS

	BUILDING #48						
<u>M7</u>	EM BARRACKS	290.3	\$4,364	\$8,877	\$9,765	2.2	4.10
	BUILDING #52					_	
M7	CACDA, CAORA	3723.8	\$36,638	\$23,877	\$26,265	0.7	13.64
	BUILDING #56						
M7	POST CHAPEL	919.7	\$4,068	\$11,063	\$12,169	3.0	4.00
	BUILDING #102		1				
M7	FINANCE	862.7	\$4,753	\$9,275	\$10,203	2.1	5.21
	BUILDING #136	1					
M7	COMMUNICATIONS	3913.7	\$23,404	\$27,683	\$30,451	1.3	8.40
	BUILDING #345						
M7	PATCH CENTER	448.3	\$2,343	\$9,367	\$10,304	4.4	2.58
	BUILDING #429						
M7	DB BARRACKS	413.0	\$2,204	\$7,753	\$8,528	3.9	2.92
	BUILDING #470						
M7	DB VOC SHOPS	NOT RECOM	MENDED - CC	NTROLS RECENTL	Y REPLACED)	
	BUILDING #1008						
M7	LPU BARRACKS	NOT RECOM	MENDED - CC	NTROLS RECENTL	Y REPLACED)	
	BUILDING #1009	1					
M7	LPU MESSHALL	253.0	\$1,133	\$622	\$684	0.6	19.74

ALL ECOs INVESTIGATED

ECO	BUILDING NAME	ENERGY SAVINGS MBTU'S/YR	ENERGY SAVINGS (\$)		TOTAL PROJECT COST⁺	SIMPLE PAYBACK YEARS	SIR
STEAM 1	RAP PROGRAM			· · · · · · · · · · · · · · · · · · ·			
M8	A. OWNER TESTING PER 100 TRAPS.	2467.0	\$7,771	\$12,000	\$13,200	1.7	6.1
M8	B. SERVICE TESTING PER 100 TRAPS.	2467.0	\$7,771	\$4,350/YR	\$4785/YR	0.6	142.4
AIR CUR	TAINS						
MQ	BUILDING #470	31.0	\$09	\$2.221	\$2.454	25.0	0.5
		1 01.01		ψ2,201	ψ2, -04		0.0
M10	BUILDING #398 DB GREENHOUSE	439.0	\$2,050	\$39,272	\$43,199	21.1	0.8
ENERGY	SAVING FLUORESCENT						
F1	BUILDING #50	20.3	\$214	\$25,202	\$27.031	89.0	0.1
E1	BUILDING #52	20.0		\$20,592	¢07.400	00.0	0.1
<u> </u>	BUILDING #56	49.5	\$1,084	\$88,572	\$97,429	89.9	0.1
EI	BUILDING #77	44.5	\$732	\$11,291	\$12,420	17.0	0.6
E1	BUILDING #102	62.4	\$968	\$58,392	\$64,231	66.4	0.1
<u>E1</u>	FINANCE BUILDING #136	21.9	\$376	\$9,836	\$10,820	28.8	0.4
E1		31.7	\$690	\$54,682	\$60,150	87.2	0.1
E1	PATCH CENTER	2.7	\$91	\$6,575	\$7,233	79.5	0.1
<u>E1</u>	DB VOC. SHOPS	16.1	\$409	\$33,248	\$36,573	89.4	0.1
INCAND	ESCENT LIGHTING						
E3	BUILDING #50 DATA PROCESSING	7.3	\$113	\$184	\$202	1.8	6.5
E3	BUILDING #52 CACDA, CAORA	2.7	\$87	\$537	\$591	6.8	1.5
E3	BUILDING #56 POST CHAPEL	87.5	\$2,112	\$11,751	\$12,926	6.1	1.7
E3	BUILDING #77 MEDIA CENTER	26.5	\$411	\$984	\$1,082	2.6	4.4
E3	BUILDING #102 FINANCE	1.0	\$67	\$65	\$72	1.1	9.6
E3	BUILDING #136	12.0	\$268	\$442	\$486	1.8	6.7
F3	BUILDING #345	12.3	¢149	¢240	¢204	27	30
<u>_</u>	BUILDING #470	4.2		\$349	\$30 4	2.7	10.1
		1 10.7	\$265	<u> </u>	<u> </u>	0.9	12.1
ENERGY	EFFICIENT MOTORS			1		[]	
E4	WATER TREATMENT	150.1	\$2,327	\$14,793	\$16,272	7.0	1.6
E4	PATCH CENTER	18.9	\$293	\$2,436	\$2,680	9.1	1.2
E4	DB VOC. SHOPS	26.7	\$414	\$3,154	\$3,469	8.4	1.4

* TOTAL PROJECT COST IS CONSTRUCTION COST + 10% SIOH

136.0

\$2,108

<u>E</u>4

USDB OVERALL

1.36

8.6

\$18,206

\$16,551

ALL ECOs INVESTIGATED

							And a second
	BUILDING	ENERGY	ENERGY		TOTAL	SIMPLE	
ECO	NAME	SAVINGS	SAVINGS	CONSTRUCTION	PROJECT	PAYBACK	SIR
		MBTU'S/YR	(\$)	COST	COST*	YEARS	

INSULATION

BUILDING #56		I				
	7400	\$2.202	\$95 691	601 210	27 9	0.62
PUST CHAFEL	740.0		305,001	φ94,249	21.3	0.02
BUILDING #136						
COMMUNICATIONS	6.0	\$19	\$3,403	\$3,743	197.0	0.11
BUILDING #318						
OFFICERS CLUB	245.0	\$895	\$16,846	\$18,531	20.7	0.92
BUILDING #345						
PATCH CENTER	377.0	\$1,267	\$28,139	\$30,953	24.4	0.81
BUILDING #470						
DB VOC. SHOPS	157.5	\$514	\$18,779	\$20,657	40.2	0.50
BUILDING #1008						
DB BARRACKS	131.0	\$487	\$16,359	\$17,995	37.0	0.51
BUILDING #1009						
DB MESS HALL	81.0	\$294	\$9,775	\$10,753	36.6	0.52
	BUILDING #56 POST CHAPEL BUILDING #136 COMMUNICATIONS BUILDING #318 OFFICERS CLUB BUILDING #345 PATCH CENTER BUILDING #470 DB VOC. SHOPS BUILDING #1008 DB BARRACKS BUILDING #1009 DB MESS HALL	BUILDING #56 740.0 POST CHAPEL 740.0 BUILDING #136 6.0 COMMUNICATIONS 6.0 BUILDING #318 245.0 BUILDING #345 245.0 BUILDING #345 9ATCH CENTER PATCH CENTER 377.0 BUILDING #470 0 DB VOC. SHOPS 157.5 BUILDING #1008 0 DB BARRACKS 131.0 BUILDING #1009 0 DB MESS HALL 81.0	BUILDING #56 740.0 \$3,383 POST CHAPEL 740.0 \$3,383 BUILDING #136 6.0 \$19 BUILDING #318 6.0 \$19 BUILDING #318 245.0 \$895 BUILDING #345 77.0 \$1,267 BUILDING #470 0 \$19 DB VOC. SHOPS 157.5 \$514 BUILDING #1008 0 \$487 BUILDING #1009 0 \$294	BUILDING #56 740.0 \$3,383 \$85,681 POST CHAPEL 740.0 \$3,383 \$85,681 BUILDING #136 6.0 \$19 \$3,403 BUILDING #318 9 \$3,403 \$895 OFFICERS CLUB 245.0 \$895 \$16,846 BUILDING #345 9 \$1267 \$28,139 BUILDING #470 0 \$1267 \$28,139 BUILDING #470 0 \$18,779 \$18,779 BUILDING #1008 0 \$18,779 \$16,359 BUILDING #1008 0 \$487 \$16,359 BUILDING #1009 0 \$12,075 \$248 BUILDING #1009 0 \$294 \$9,775	BUILDING #56 740.0 \$3,383 \$85,681 \$94,249 BUILDING #136 \$3,383 \$85,681 \$94,249 BUILDING #136 \$19 \$3,403 \$3,743 BUILDING #318 \$6.0 \$19 \$3,403 \$3,743 BUILDING #318 \$6.0 \$19 \$3,403 \$3,743 BUILDING #318 \$6.0 \$19 \$3,403 \$3,743 BUILDING #318 \$245.0 \$895 \$16,846 \$18,531 BUILDING #345 \$9,775 \$30,953 \$30,953 \$30,953 BUILDING #470 \$12,267 \$28,139 \$30,953 BUILDING #470 \$157.5 \$514 \$18,779 \$20,657 BUILDING #1008 \$131.0 \$487 \$16,359 \$17,995 BUILDING #1008 \$131.0 \$487 \$16,359 \$17,995 BUILDING #1009 \$294 \$9,775 \$10,753	BUILDING #56 740.0 \$3,383 \$85,681 \$94,249 27.9 BUILDING #136 6.0 \$19 \$3,403 \$3,743 197.0 BUILDING #318 9000000000000000000000000000000000000

THERMOPANE GLASS

A2	BUILDING #52 CACDA, CAORA	620.6	\$1,999	\$143,462	\$157,808	78.9	0.26
A2	BUILDING #52 CACDA, CAORA *A	543.9	\$2,403	\$175,654	\$193,219	80.4	0.22
A2	BUILDING #56 POST CHAPEL	243.1	\$1,335	\$16,014	\$17.615	13.2	1.20
A2	BUILDING #470 DB VOC. SHOPS	327.7	\$1,041	\$53,116	\$58,428	56.1	0.36

WEATHERIZATION

	BUILDING #25						
A3	WATER TREATMENT	224.0	\$1,090	\$4,813	\$5,294	4.9	3.43
	BUILDING #52						
<u>A3</u>	CACDA, CAORA	39.2	\$126	\$6,092	\$6,701	53.2	0.38
	BUILDING #56			•			
<u>A3</u>	POST CHAPEL	123.0	\$893	\$4,959	\$5,455	6.1	2.34
	BUILDING #77						
<u>A3</u>	MEDIA CENTER	39.0	\$517	\$5,283	\$5,811	11.2	1.08
	BUILDING #136						
<u>A3</u>	COMMUNICATIONS	4.1	\$13	\$1,604	\$1,764	135.7	0.15
	BUILDING #345						
A3	PATCH CENTER	17.8	\$66	\$285	\$314	4.8	3.96
	BUILDING #429						
A3	M P QUARTERS	10.4	\$37	\$5,064	\$5,570	150.6	0.12
	BUILDING #470						
A3	DB VOC. SHOPS	6.0	\$19	\$1.367	\$1,504	/9.1	0.26
	BUILDING #470						0.57
A3	DB VOC. SHOPS *A	86.0	\$271	\$8,950	\$9,845	36.3	0.57
	BUILDING #470						
<u>A3</u>	DB VOC. SHOPS *B	74.0	\$233	\$29,355	\$32,291	138.6	0.15
	BUILDING #470						
A3	DB VOC. SHOPS *C	114.0	\$359	\$9,396	\$10,336		0.71
	BUILDING #1008						0.45
A3	IDB BARRACKS	130.0	\$621	\$3,866	\$4,253	6.8	2.45

SOLAR FILM

						and the second se	
	BUILDING #52						
<u>A4</u>	UAUDA, CAUNA		VIENDED- ENI	STING WINDOWS IN			
	BUILDING #56						
A4	POST CHAPEL	30.0	\$637	\$4,805	\$5,286	8.3	1.34
	BUILDING #225						
A4	BOQ & DINING	160.3	\$3,926	\$17.076	\$18,784	4.8	2.28
	BUILDING #470						
A4	DB VOC. SHOPS	(\$27)	224	\$2,085	\$2,294	10.2	0.51

VESTIBULES

ALL ECOs INVESTIGATED



ECO	BUILDING NAME	ENERGY SAVINGS MBTU'S/YR	ENERGY SAVINGS (\$)		TOTAL PROJECT COST*	SIMPLE PAYBACK YEARS	SIR
	BUILDING #25						
<u>A5</u>	WATER TREATMENT	166.7	\$525	\$5,799	\$6,379	12.2	4.76
	BUILDING #1008						
A5	D B BARRACKS	VESTIBULES	EXISTING -SE	EE A3 FOR NEW DO	ORS		
	BUILDING #1009						
A5	D B MESS HALL	146.3	\$683	\$6,211	\$6,832	10.0	1.70
	AFH - VESTIBULES						
A5	11-19 ONLY	1759.0	\$8,396	\$535,194	\$588,713	70.1	0.24
	AFH - NEW ENTRY DOOR						
A5 .	11-19 ONLY	2915.0	\$13,963	\$605,672	\$666,239	47.7	0.35
	AFH - NEW PATIO DOOR						
A5	11-19 ONLY	3593.0	\$17,152	\$305,126	\$335,639	19.6	0.86

REDUCE GLASS AREA

	BUILDING #52						
A6	CACDA, CAORA	67.9	\$298	\$13,987	\$15,386	51.6	0.34
	BUILDING #56						
A6	POST CHAPEL	63.9	\$767	\$7,167	\$7,884	10.3	1.21
	BUILDING #345						
A6	PATCH CENTER	60.2	\$206	\$913	\$1,004	4.9	4.04
	BUILDING #470						
A6	DB VOC. SHOPS	204.4	\$585	\$49,273	\$54,200	92.7	0.23
	BUILDING AFH						
A6	AREAS 11-19 ONLY	3906.3	\$17,201	\$287,780	\$316,558	18.4	0.95

LOADING DOCK SEALS

A7	BUILDING #77 MEDIA CENTER	6.7	\$21	\$5,588	\$6,147	292.7	0.07
A7	BUILDING #136 COMMUNICATIONS	8.7	\$26	\$1.645	\$1,810	69.6	0.30



ALL ECOs RECOMMENDED

ECO	BUILDING NAME	ENERGY SAVINGS	ENERGY SAVINGS	CONSTRUCTION	TOTAL PROJECT	SIMPLE PAYBACK	SIR
		I MBIUS/TR	(\$)	0	0001	TEANS_1	<u>,</u>
	BUILDING #56	59.0	\$002	\$5.002	\$5.601	62	1 47
			\$903	\$3,092	\$3,001	0.2	
BOILER	BUILDING #225	1		I			
МЗ	BOQ DINNING	346.0	\$1,091	\$10,209	\$11,230	10.3	1.32
INSULAT	LINES						
	BUILDING #102						
M5	FINANCE	216.3	\$682	\$923	\$1,015	1.5	9.10
	BULDING #470						
M5	DB VOC. SHOPS	39.3	\$124	\$196	\$216	1./	7.75
M5	LPU MESSHALL	78.5	\$248	\$393	\$432	1.7	7.7
M5		1479.0	\$4 658	\$9 533	\$10,486	2.3	6.02
		1 1470.0	<u> </u>	1 40,000	<u> </u>		
	RUILDING #49			1	1		
M7	IEM BABBACKS	290.3	\$4.364	\$8 877	\$9,765	2.2	4.10
	BUILDING #52	200.0	<u>φ+,00+</u>	<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	40,100		
M7	CACDA, CAORA	3723.8	\$36,638	\$23,877	\$26,265	0.7	13.64
	BUILDING #56						
M7	POST CHAPEL	919.7	\$4,068	\$11,063	\$12,169	3.0	4.00
	BUILDING #102						
<u>M7</u>	FINANCE	862.7	\$4,753	\$9,275	\$10,203	2.1	5.2
l	BUILDING #136				000.454		0.4
<u>M7</u>	COMMUNICATIONS	3913.7	\$23,404	\$27,683	\$30,451	1.3	8.4
117	BUILDING #345	440.0	¢0.040	\$0.267	\$10.204	44	25
	RUILDING #420	448.3	\$2,343	\$9,307	\$10,30 4	7.7	<u></u>
M7	DB BARBACKS	413.0	\$2 204	\$7 753	\$8,528	3.9	2.9
1017	BUILDING #1009	413.0	φ2,204	\$1,100			
M7	LPU MESSHALL	253.0	\$1,133	\$622	\$684	0.6	19.74
STEAM	TRAP PROGRAM						
	B. SERVICE TESTING		1		T		
<u>M8</u>	PER 100 TRAPS.	2467.0	\$7,771	\$4,350/YF	\$4785/YF	0.6	142.4
INCAND	ESCENT LIGHTING						
	BUILDING #50		T				
E3	DATA PROCESSING	7.3	\$113	\$184	\$202	1.8	6.5
	BUILDING #52						
E3	CACDA, CAORA	2.7	\$87	\$537	\$591	6.8	1,5
	BUILDING #56			644 7F4	\$10.00G	61	17
E3	PUIL DINC #77	87.5	\$2,112	\$11,751	\$12,920	0.1	1.7
E3	MEDIA CENTER	26.5	\$411	\$984	\$1.082	2.6	4.4
	BUILDING #102				¢70	4.4	0.6
E3	PUIL DING #100		<u>n \$67</u>	\$65		<u> </u>	3.0
E2	COMMUNICATIONS	100	6260	CAND	\$496	1 8	61
	BLUI DING #345	12.5	φ200	φ442		1	<u></u>
E3	PATCH CENTER	4 2	\$143	\$349	\$384	2.7	3.9
<u> </u>	BUILDING #470		1	1	1	1	
E3	DB VOC SHOPS	107	\$265	\$216	\$238	0.9	12.1

* TOTAL PROJECT COST IS CONSTRUCTION COST + 10% SIOH

ALL ECOs RECOMMENDED

	BUILDING	ENERGY	ENEDGY		TOTAL	SIMPLE	
FCO	NAME	ENLINGE	ENLINGE	CONSTRUCTION	PROJECT	DAVDACK	SID
	NAME	MOTINGS	SAVINGS	CONSTRUCTION	COST		Sin
		MBTU S/TH	(\$)	0051		TEANS	
ENERGY	FFFICIENT MOTORS						
	IBUILDING #25	1				<u> </u>	·
F4	WATER TREATMENT	150.1	\$2 327	\$14 793	\$16 272	7.0	1.68
	BUILDING #345	100.1	φ2,027	φι4,700	\$10,272		1.05
E4	PATCH CENTER	18.9	\$293	\$2.436	\$2 680	91	1.28
	BUILDING #470	10.0	φ230	φ2,400		0.1	
E4	DB VOC. SHOPS	26.7	\$414	\$3,154	\$3,469	8.4	1.40
			T				
E4	USDB OVERALL	136.0	\$2,108	\$16,551	\$18,206	8.6	1.36
THERMO	DPANE GLASS	· · ·				· · · · · · · · · · · · · · · · · · ·	
	BUILDING #56						
A2	IPOST CHAPEL	243.1	\$1,335	\$16,014	\$17,615	13.2	1.20
	-DIZATION						
WEATING		1		r		1	
40	DUILUING #25		A 4 AAA		#5 00 4		0.40
A3	BUILDING #50	224.0	\$1,090	\$4,813	\$5,294	4.9	3.43
42	DOST CHAREI	100.0	#000	* * * * *		C 1	2.24
AJ	PUIL DINC #77	123.0	\$893	\$4,959	\$5,455	0.1	2.04
43		20.0	¢C17	¢5 000	65 011	11.0	1.09
	BUILDING #345	39.0		\$5,265	\$5,611		1.00
A3	PATCH CENTER	17.9	\$66	\$285	\$314	4.8	3.96
	BUILDING #1008	17.0		φ205	ψοιΨ	4.0	0.00
A3	DB BARRACKS	130.0	\$621	\$3 866	\$4 253	6.8	2.45
		100.0	QUL	40,000	<u> </u>		
SOLAR	FILM						
	BUILDING #56						
A4	POST CHAPEL	30.0	\$637	\$4,805	\$5,286	8.3	1.34
	BUILDING #225						
A4	BOQ & DINING	160.3	\$3,926	\$17,076	\$18,784	4.8	2.28
VESTIBL	JLES						
	BUILDING #25						
A5	WATER TREATMENT	166.7	\$525	\$5,799	\$6,379	12.2	4.76
	BUILDING #1009						
<u>A5</u>	ID B MESS HALL	146.3	\$683	\$6,211	\$6,832	10.0	1.70
DEDUCT							
	DUIL DING #56		r	1	r	1	r
						10.0	1.04



	BUILDING #56						
A 6	POST CHAPEL	63.9	\$767	\$7,167	\$7,884	10.3	1.21
	BUILDING #345						
A 6	PATCH CENTER	60.2	\$206	\$913	\$1,004	4.9	4.04

ALL ECOs REJECTED

ECO	BUILDING NAME	ENERGY SAVINGS MBTU'S/YB	ENERGY SAVINGS (\$)		TOTAL PROJECT COST*	SIMPLE PAYBACK YEARS	SIR
ECONON							
M1	BUILDING #102 FINANCE	16.0	\$255	\$9,351	\$10,286	40.3	0.23
	ATIFICATION CONTROL						
	BUILDING #52		*************	610.000	£00.000	90.4	0.17
<u>M2</u>	ICACDA, CAOHA BUILDING #56	83.0	\$261	\$19,082	\$20,990	00.4	0.17
M2	POST CHAPEL	38.0	\$120	\$1,963	\$2,159	18.0	0.76
M2	POST CHAPEL(FANS)	38.0	\$120	\$5,782	\$6,360	53.0	0.26
M3	BUILDING #72 BOILER PLANT	Dropped from	study - Buildin	g 72 is being phased	out.		
M4	BUILDING #56	13.0	\$41	\$2,672	\$2,939	71.7	0.19
	BUILDING #345	NOT DECOM				TE	
M4	BUILDING #56	NOT RECOM	MENDED - EX	ISTING CONTROLS	ARE ADEQUA		
M4A	POST CHAPEL	630.0	\$1,985	\$43,610	\$47,971	24.2	0.56
M4A	PATCH COMM. CNTR.	523.0	\$1.647	\$41,384	\$45,522	27.6	0.49
				• · · · · · · · · · · · · · · · · · · ·			
INSULA	BUILDING #72				· · · · · ·		
M5	BOILER PLANT	Dropped from	study - Buildir	ng 72 is being phased	out.	I	
UPGRAI	E HVAC CONTROLS						
M7	BUILDING #470 DB VOC SHOPS	NOT RECOM	MENDED - CO	DNTROLS RECENTL	Y REPLACED		
147	BUILDING #1008	NOT DECOM					
IVI 7	ILPU BARRACKS	INOT RECOM	MENDED - CC	DNTROLS RECENTL	T HEFLAULL	, <u> </u>	
AIR CUP	TAINS		·····		T	······································	
Ма	BUILDING #470	31.0	\$98	\$2 231	\$2,454	25.0	0.54
		01.0	<u> </u>	<u> </u>	1	<u>,</u>	
INFRAR	ED HEATING	- F	1	T	T	1	
M10	DB GREENHOUSE	439.0	\$2,050	\$39,272	\$43,199	21.1	0.8
ENERGY							
ENERG	BUILDING #50	1	1		1	-	
E1	DATA PROCESSING	20.3	\$314	\$25,392	\$27,931	89.0	0.14
F 4	BUILDING #52	40.5	61 004	¢00.570	¢07.420	80.0	0.1
	BUILDING #56	49.5	\$1,084	\$88,572	<u>491,429</u>	09.9	0.11
E1	POST CHAPEL	44.5	\$732	\$11,291	\$12,420	17.0	0.6
E1	BUILDING #77 MEDIA CENTER	62.4	\$968	\$58,392	\$64,231	66.4	0.1
	BUILDING #102			#0.00C	¢10.000	20.0	0.4
	BUILDING #136	21.9	\$376	\$9,836	\$10.820	20.8	0.4
E1	COMMUNICATIONS	31.7	\$690	\$54,682	\$60,150	87.2	0.1
E1	BUILDING #345 PATCH CENTER	27	\$91	\$6.575	\$7.233	79.5	0.1
	BUILDING #470			1			A 4
I E1	IDB VOC SHOPS	1 16.1	\$409	\$33.248	I \$36,573	89.4	0.19



ALL ECOs REJECTED

ECO	BUILDING NAME	ENERGY SAVINGS	ENERGY SAVINGS	CONSTRUCTION	TOTAL PROJECT	SIMPLE PAYBACK	SIR
		MBTU'S/YR	(\$)	COST	COST	YEARS	

INSULATION

INSULAT	ION						
A1	BUILDING #56 POST CHAPEL	740.0	\$3,383	\$85,681	\$94,249	27.9	0.62
A 1	BUILDING #136 COMMUNICATIONS	6.0	\$19	\$3,403	\$3,743	197.0	0.11
A1	BUILDING #318 OFFICERS CLUB	245.0	\$895	\$16,846	\$18,531	20.7	0.92
A1	BUILDING #345 PATCH CENTER	377.0	\$1,267	\$28,139	\$30,953	24.4	0.81
A1	BUILDING #470 DB VOC. SHOPS	157.5	\$514	\$18,779	\$20,657	40.2	0.50
A1	BUILDING #1008 DB BARRACKS	131.0	\$487	\$16,359	\$17,995	37.0	0.51
A1	BUILDING #1009 DB MESS HALL	81.0	\$294	\$9,775	\$10,753	36.6	0.52

THERMOPANE GLASS

	BUILDING #52						
A2	CACDA, CAORA	620.6	\$1,999	\$143,462	\$157,808	78.9	0.26
	BUILDING #52						
A2	CACDA, CAORA *A	543.9	\$2,403	\$175,654	\$193,219	80.4	0.22
	BUILDING #470						
A2	DB VOC. SHOPS	327.7	\$1,041	\$53,116	\$58,428	56.1	0.36

WEATHERIZATION

	BUILDING #52						
<u>A3</u>	CACDA, CAORA	39.2	\$126	\$6,092	\$6,701	53.2	0.38
	BUILDING #136						
A3	COMMUNICATIONS	4.1	\$13	\$1,604	\$1,764	135.7	0.15
	BUILDING #429						
A3	M P QUARTERS	10.4	\$37	\$5,064	\$5,570	150.6	0.12
	BUILDING #470						
A3	DB VOC. SHOPS	6.0	\$19	\$1,367	\$1,504	79.1	0.26
	BUILDING #470						
A3	DB VOC. SHOPS *A	86.0	\$271	\$8,950	\$9,845	36.3	0.57
	BUILDING #470						
A3	DB VOC. SHOPS *B	74.0	\$233	\$29,355	\$32,291	138.6	0.15
	BUILDING #470						
A3	DB VOC. SHOPS C	114.0	\$359	\$9,396	\$10,336	28.8	0.71

SOLAR FILM

	BUILDING #52						
A4	CACDA, CAORA	NOT RECOM	MENDED- EXI	STING WINDOWS IN	POOR CONE	DITION	
	BUILDING #470						
A4	DB VOC. SHOPS	(\$27)	224	\$2,085	\$2,294	10.2	0.51
· · · · · · · · · · · · · · · · · · ·			······		A.,		

VESTIBULES

[BUILDING #1008						
A5	D B BARRACKS	VESTIBULES	EXISTING -SI	EE A3 FOR NEW DO	ORS		
	AFH - VESTIBULES						
A5	11-19 ONLY	1759.0	\$8,396	\$535,194	\$588,713	70.1	0.24
	AFH - NEW ENTRY DOOR						
A5	11-19 ONLY	2915.0	\$13,963	\$605,672	\$666,239	47.7	0.35
ſ	AFH - NEW PATIO DOOR						
A 5	11-19 ONLY	3593.0	\$17,152	\$305.126	\$335,639	19.6	0.86

REDUCE GLASS AREA

	BUILDING #52						
A6	CACDA, CAORA	67.9	\$298	\$13,987	\$15,386	51.6	0.34
	BUILDING #470						
A 6	DB VOC. SHOPS	204.4	\$585	\$49,273	\$54,200	92.7	0.23
	BUILDING AFH						
A6	AREAS 11-19 ONLY	3906.3	\$17,201	\$287,780	\$316,558	18.4	0.95
	A6 A6 A6	A6 CACDA, CAORA BUILDING #52 BUILDING #470 A6 DB VOC. SHOPS BUILDING AFH A6 AREAS 11-19 ONLY	BUILDING #52A6CACDA, CAORABUILDING #470A6DB VOC. SHOPSBUILDING AFHA6AREAS 11-19 ONLY3906.3	BUILDING #52 A6 CACDA, CAORA 67.9 \$298 BUILDING #470 A6 DB VOC. SHOPS 204.4 \$585 BUILDING AFH A6 AREAS 11-19 ONLY 3906.3 \$17,201	BUILDING #52 67.9 \$298 \$13,987 A6 CACDA, CAORA 67.9 \$298 \$13,987 BUILDING #470 BUILDING #470 \$585 \$49,273 A6 DB VOC. SHOPS 204.4 \$585 \$49,273 BUILDING AFH 586 \$287,780 \$287,780	BUILDING #52 67.9 \$298 \$13,987 \$15,386 BUILDING #470 BUILDING #470 \$204.4 \$585 \$49,273 \$54,200 BUILDING AFH BUILDING AFH \$3906.3 \$17,201 \$287,780 \$316,558	BUILDING #52 67.9 \$298 \$13,987 \$15,386 51.6 BUILDING #470 BUILDING #470 8000000000000000000000000000000000000

ALL ECOs REJECTED

ECO	BUILDING NAME	ENERGY SAVINGS MBTU'S/YR	ENERGY SAVINGS (\$)	CONSTRUCTION COST	TOTAL PROJECT COST*	SIMPLE PAYBACK YEARS	SIR
-----	------------------	--------------------------------	---------------------------	----------------------	---------------------------	----------------------------	-----

LOADING DOCK SEALS

۸7	BUILDING #77 MEDIA CENTER	67	\$21	\$5 588	\$6 147	292 7	0.07
<u></u>		0.7		φ0,000	φ0,147		
	BUILDING #136						
A7	COMMUNICATIONS	8.7	\$26	\$1,645	<u>\$1,810</u>	69.6	0.30

* TOTAL PROJECT COST IS CONSTRUCTION COST + 10% SIOH

4

	PROJECT GROUP	ECO	ENERGY SAVINGS MBTU/YR	ENERGY SAVINGS \$	PROJECT COST \$	SIMPLE PAYBACK YRS	SIR
	GROUP 1 Steam Trap Program						
STP-	Service Testing (per 100 traps	ECO-M8	2467.0	\$7,771	\$4,350/YR	0.6	142.41
	GROUP 1 TOTALS		2467.0	\$7,771	\$4,350/YR	0.6	142.41

ECO-E3	10.7	\$265	\$238	0.9	12.14
ECO-M5	39.3	\$124	\$216	1.7	7.79
	50.0	\$389	\$454	1.2	8.83
	ECO-E3 ECO-M5	ECO-E3 10.7 ECO-M5 39.3 50.0	ECO-E3 10.7 \$265 ECO-M5 39.3 \$124 50.0 \$389	ECO-E3 10.7 \$265 \$238 ECO-M5 39.3 \$124 \$216 50.0 \$389 \$454	ECO-E3 10.7 \$265 \$238 0.9 ECO-M5 39.3 \$124 \$216 1.7 50.0 \$389 \$454 1.2

	GROUP 3						
	Opgrade HVAC						
48	Building 48	ECO-M7	290.0	\$4,364	\$9,765	2.2	4.10
52	Building 52	ECO-M7	3724.0	\$36,638	\$26,265	0.7	13.64
56	Building 56	ECO-M1	58.0	\$903	\$5,601	6.2	1.47
56	Building 56	ECO-M7	920.0	\$4,068	\$12,169	3.0	4.00
102	Building 102	ECO-M7	863.0	\$4,753	\$10,203	2.1	5.21
136	Building 136	ECO-M7	3914.0	\$23,404	\$30,451	1.3	8.40
345	Building 345	ECO-M7	448.0	\$2,343	\$10,304	4.4	2.58
429	Building 429	ECO-M7	413.0	\$2,204	\$8,528	3.9	2.92
1009	Building 1009	ECO-M7	253.0	\$1,133	\$684	0.6	19.74
	GROUP 3 TOTALS		10883.0	\$79,810	\$113,970	1.4	7.27

	GROUP 4 Replace Incandescent						
50	Building 50	ECO-E3	7.3	\$113	\$202	1.8	6.57
52	Building 52	ECO-E3	2.7	\$87	\$591	6.8	1.57
77	Building 77	ECO-E3	26.5	\$411	\$1,082	2.6	4.46
102	Building 102	ECO-E3	1.0	\$67	\$72	1.1	4.65
136	Building 136	ECO-E3	12.9	\$268	\$486	1.8	6.15
345	Building 345	ECO-E3	4.2	\$143	\$384	2.7	3.91
	GROUP 4 TOTALS		54.6	\$1,089	\$2,817	2.6	4.35



		FM	ENERGY	ENERGY	PROJECT	SIMPLE	SIR
	FACECT GAOOF		MRTU/YR	SAVINGS \$	\$	YRS	011
	GROUP 5			¥	¥		
	Insulate Steam Lines						
102	Building 102	ECO-M5	216.3	\$682	\$1,015	1.5	9.10
1009	Building 1009	ECO-M5	78.5	\$248	\$432	1.7	7.77
USDB	USDB Overall	ECO-M5	1479.0	\$4,658	\$10,486	2.3	6.02
	GROUP 5 TOTALS		1773.8	\$5,588	\$11,933	2.1	6.35
r		· · · · · · · · · · · · · · · · · · ·	r	· · · · · · · · · · · · · · · · · · ·			
	GROUP 6 Reduce Infiltration						
25	Building 25	ECO -A3	224.0	\$1,090	\$5,294	4.9	3.43
25	Building 25	ECO -A5	167.0	\$525	\$6,379	12.2	4.76
77	Building 77	ECO -A3	39.0	\$517	\$5,811	11.2	1.08
345	Building 345	ECO -A3	. 18.0	\$66	\$314	4.8	3.96
345	Building 345	ECO -A6	60.0	\$206	\$1,004	4.9	4.04
1008	Building 1008	ECO -A3	130.0	\$621	\$4,253	6.8	2.45
1009	GROUP 6 TOTALS	ECO -A5	<u>146.0</u> 784.0	\$683 \$3,708	\$6,832 \$29,887	8.1	2.09
	GROUP 7						
	Replace Motors						
25	Building 25	ECO-E4	150.1	\$2,327	\$14,793	7.0	1.68
345	Building 345	ECO-E4	18.9	\$293	\$2,680	9.1	1.28
470	Building 470	ECO-E4	26.7	\$414	\$3,469	8.4	1.40
USDB	USDB Overall	ECO-E4	136.0	\$2,108	\$18,206	8.6	1.36
	GROUP 7 TOTALS		331.7	\$5,142	\$39,148	7.6	1.54
		<u></u>		1		T	1
	Building 225						
225	Building 225	ECO-A4	160.0	\$3,926	\$18,784	4.8	2.28
225	Building 225	ECO-M3	346.0	\$1,091	\$11,230	10.3	1.32
	GROUP 8 TOTALS		506.0	\$5,017	\$30,014	6.0	2.18

Page-15

	PROJECT GROUP	ECO	ENERGY SAVINGS MBTU/YR	ENERGY SAVINGS \$	PROJECT COST \$	SIMPLE PAYBACK YRS	SIR
	GROUP 9						
	Building 56						
1							
56 Build	ing 56	ECO-A2	243.0	\$1,335	\$17,615	13.2	1.20
56 Build	ing 56	ECO-A3	123.0	\$893	\$5,455	6.1	2.34
56 Build	ing 56	ECO-A4	30.0	\$637	\$5,286	8.3	1.34
56 Build	ing 56	ECO-A6	64.0	\$767	\$7,884	10.3	1.21
56 Build	ing 56	ECO-E3	88.0	\$2,112	\$18,594	8.8	1.24
GRO	UP 9 TOTALS		548.0	\$5,744	\$54,834	9.5	1.34

Page-16

ENERGY AND COST SAVINGS

TOTAL POTENTIAL ENERGY AND COST SAVINGS

		ENERGY SAVINGS MBTU/YB	ENERGY SAVINGS \$/YB
GROUP 1	STEAM TRAP PROGRAM	2,467	\$7,771
GROUP 2	IN HOUSE LOW COST/NO COST	50	\$389
GROUP 3	UPGRADE HVAC	10,883	\$79,810
GROUP 4	REPLACE INCANDESCENT	55	\$1,089
GROUP 5	INSULATE STEAM LINES	1,774	\$5,588
GROUP 6	REDUCE INFILTRATION	784	\$3,708
GROUP 7	REPLACE MOTORS	332	\$5,142
GROUP 8	BUILDING 225	506	\$5,017
GROUP 9	BUILDING 56	548	\$5,744

I	TOTAL	17,398 \$114,258	

PERCENTAGE OF ENERGY CONSERVED

POTENTIAL ENERGY SAVINGS, MBTU	17,398
EXISTING ENERGY CONSUMPTION, MBTU	83,929
PERCENT ENERGY CONSERVED	20.7%

ENERGY USE AND COST

	ENERGY	ENERGY
	MBTU/YR	\$/YR
BEFORE ECO IMPLEMENTATION	83,929	\$841,937
AFTER ECO IMPLEMENTATION	66,531	\$727,679

.

	PROJECT GROUP	ECO	ENERGY SAVINGS MBTU/YR	ENERGY SAVINGS \$	PROJECT COST \$	SIMPLE PAYBACK YRS	SIR
	GROUP 1 Steam Trap Program						
STP-B	Service Testing (per 100 traps	ECO-M8	2467.0	\$7,771	\$4,350/YR	0.6	142.41
	GROUP 1 TOTALS		2467.0	\$7,771	\$4,350/YR	0.6	142.41



ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED FEB. 4, 1987	SHEET OF 1 1				
PROJEC FORT LEAVENWORTH	BASIS FOR CALCULAT	FION				
LOCATION	X HAND CAL	CULATIONS				
ABCHITECT/ENGINEEB	COMPUTE	R CALCULATIONS				
CLARK RICHARDSON & BISKUP	OTHER (SPECIFY)				
ECO MEASURESTEAM TRAP PROGRAM - SERVICE TEST	COMPUTED BY	CHECKED BY DEC				
COST OF STEAM AT FORT LEAVENWORTH	-					
ENTHALPY OF WATER AT 180°F =148ENTHALPY OF STEAM AT 100 PSIG =1,187SYSTEM EFFICIENCY =60%	BTU/LBM BTU/LBM					
NATURAL GAS COST =\$3.15HEAT CONTENT OF NAT. GAS =1,000,000	MCF _BTU/MCF					
((1,187-148)*\$3.15)/0.6*1,000) \$5.45	PER THOUSAND LB S	TEAM				
COST OF INSPECTING TRAPS USING AND OUTSIDE TES	STING SERVICE.					
ASSUMING AN AVERAGE OF 50 TRAPS PER DAY, 8 HOU OF \$20 PER TRAP PLUS THE HOURLY CHARGE. CONTRACT TESTING = 8 MH \$40 PER HOUR = \$320 50 TRAPS PER DAY =	RS PER DAY. THE COST IS A FLAT FEE \$20 PER TRAP \$320 PER DAY \$6 PER TRAP					
TOTAL COST PER TRAP =	\$26 PER TRAP					
SAVINGS FROM TRAP INSPECTION						
USING 100 TRAPS AS A BASE WITH A 10% FAILURE RAT	E; 350 LB/HR F&T TRAF	,				
COST OF INSPECTING TRAPS ONCE DURING THE HEATING SEASON	100 X \$26	= \$2,600 / YEAR				
NUMBER OF TRAPS FAILED	100 X 10%	= 10 TRAPS				
COST OF REPAIRING TRAPS	10 X \$125	5 = \$1,250				
TOTAL COST FOR TESTING AND REPAIRING TRAPS		= \$3,850_				
65lbs/hr X 4380 hrs/yr X 0.5(sys. modulation factor) =	142,350 LBS OF ST	M/ YEAR /TRAP				
#of steam X (1187-148) /1,000,000 =	148 MBTU/ YE	AR /TRAP				
@\$5.45/1000 # steam	• \$776 / YEAR PE	R TRAP				
ENERGY LOST DUE TO FAILED TRAPS) X 148 = 1,480	MBTU/ YEAR				
COST OF STEAM LOST DUE TO FAILED TRAPS 10) X \$776 = \$7,760	/ YEAR				

.

,

INS PR	ENEF STALLATION & OJECT NO. &	LIF RGY C LOC TITLE	E CYCLE CO CONSERVAT ATION: FT L :: DACA41-8	OST ANALYS ION INVESTI LEAVENWOF 36-C-0061	IS SUN MENT RTH FT LE	MMARY PROGRAM (I EAVENWORT	ECIP) RE H ESOS	STUE LO GION NO. S	9Y: FT CCID 7	LVGRUP 1.001
FIS AN	SCAL YEAR 19 ALYSIS DATE	87 : 06 [,]	DIS -2-89	CRETE POR ECONOMIC	TION I C LIFE	NAME: GROL 15 YEARS	JP 1 PR	EPARED B	Y: CR	В
1.	INVESTMENT A. CONSTRU B. SIOH C. DESIGN C D. ENERGY (E. SALVAGE F. TOTAL IN	- ICTIO CRED VALU VESTI	N COST IT CALC(1/ JE COST MENT(1D-1	4 +1B+1C)X.9 ⊨E)	1				\$\$ \$\$ \$\$ \$\$ \$\$ \$	0. 500. 0. 450. 0. 450.
2.	ENERGY SAV ANALYSIS DA	/INGS ATE A	S (+) / COST NNUAL SAV	(-) 'INGS, UNIT (COST	& DISCOUNT	ED SA	/INGS		
	FUEL	L \$	INIT COST /MBTU(1)	SAVINGS MBTU/YR(;	2)	ANNUAL \$ SAVINGS(3)	DIS FA	SCOUNT CTOR(4)	DI: SA	SCOUNTED VINGS(5)
	A. ELECT B. DIST C. RESID D. NAT G E. COAL	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	15.50 .00 .00 3.15 .00	0. 0. 0. 2467. 0.	\$\$ \$\$ \$\$ \$\$ \$\$	0. 0. 0. 7771. 0.		8.59 11.28 12.01 12.76 10.17		0. 0. 0. 99159. 0.
	F. TOTAL			2467.	\$	7771.			\$	99159.
3.	NON ENERG	Y SAV	/INGS(+) / C	OST(-)						
	A. ANNUAL F (1) DISCO (2) DISCO	RECU DUNT DUNTI	RRING (+/-) FACTOR (T/ ED SAVING/	ABLE A) COST (3A X	3A1)	9.11			\$ \$	-3850. -35074.
	B. NON RECU	JRRIN I	NG SAVINGS S, TEM	S (+) / COST AVINGS (+) COST (-) (1)	rs (-) YR OC (2)	DISCNT FACTR (3)	DIS SA CC	SCOUNTEE VINGS (+)/)ST (-) (4))	
	*. TOTAL		\$	0				0		
	C. TOTAL NO	ON EN	IERGY DISC	OUNTED SA	VINGS	S(+) /COST(-)	(3A2+3	3BD4)	\$	-35074.
	D. PROJECT (1) 25% M A IF 3 B IF 3 C IF 3 D IF 3	NON NAX N D1 IS D1 IS D1B I D1B I	ENERGY Q ON ENERG = OR > 3C (< 3C CALC S = > 1 GO S < 1 PROJE	UALIFICATIC Y CALC (2F5 GO TO ITEM SIR = (2F5 TO ITEM 4 ECT DOES N	DN TES X .33 4 +3D1)/ OT QL	ST)) 1F)= JALIFY	\$	32722.		
4.	FIRST YEAR	DOLL	AR SAVING	S 2F3+3A+(3	B1D/(`	EARS ECON		_IFE))	\$	3921.
5.	TOTAL NET	DISCO	UNTED SAV	VINGS (2F5+	3C)				\$	64085.
6.	DISCOUNTED (IF < 1 PROJE	D SAV	INGS RATIO) ∂UALIFY)		(SIR)=(5 / 1F	-)=	142.41		

FACILITIES ENGINEERING WORK REQUE see AR 420-17 and DA Pam 420-6; the proponent For use of this form. DOCUMENT NUMBER BUILDING/FACILITY DATE CHANG TRANS OTHER FUND CITATION TYPE REQ SERIAL NUMBER SUFFIX YR мо DA CODE ۲ NUMBER ID 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 2 3 5 6 1 4 9,00,60,5 Sitean XFA 1 1 1 CHANGE DOCUMENT NUMBER BUILDING/FACILITY BUILDING/FACILITY BUILDING/FACILITY BUILD TRANS TYPE REQ SERIAL NUM: CODE SUFFIX NUMBER SUFFIX NUMBER SUFFIX NUMBER -Ϋ́ NUMBER ID 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 XFB

DESCRIPTION AND JUSTIFICATION OF WORK TO BE ACCOMPLISHED

.eaking steam traps are significant source of energy loss. A properly functioning steam trap passes only a small amount of steam through it. If the traps are not functioning properly, steam passes through or escapes from the trap, reducing the efficiency and capacity of the steam system. The boiler operates at a higher capacity than necessary and more make-up water is required to replace the lost steam.

	REQUESTER INFORMATIO	N	
NAME	ORGANIZATION	TELEPHONE NO.	SIGNATURE

			FORWARD FOR APP	ROVAL			
то	RECOMMENDED ACTION	ENV NO	VIRONMENTAL IMPACT	ESTIMATED	COST	WORK TO BE	FROM
	DAPPROVAL	ନ୍ଦ୍ର ଅ	ENVIRONMENTAL CONSIDERATIONS EIS/EIA INITIATED	FUNDED WC <u>K</u> WC <u>L</u> WC <u></u>	\$ \$_3,850 \$ \$	IN-HOUSE SELF-HELP	FACILIT
APPROVING AUTHORITY		⊠	EIS/EIA COMPLETED	UNFUNDED TOTAL	\$ <u>500</u> \$ <u>4,350</u>	TROOP	c.

Г														APPRO	v		CTION		
		щ	DC	CU	ME	١N٦	ΓN	UM	186	R			<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>		A	ГЕ		۰۴C)R
	CUDE	CHAN	REQ ID		Si Ni	ER	IAI BE	LR	۲ ۲	TYPE			ACTION TAKEN	мо		DA		DES	sig T
	1 2 3 XIF IC	4 C	5 6	7	8	9	<u> </u>		1 1	21	3	14	A - APPROVED D DISAPPROVED	15 1	6	7 18	SIGNATURE OF APPROVAL AUTHORITY	19 20	2

DA 1 AUG 78

ł

i

4283 EDITION OF 1 FEB 78 WILL BE USED UNTIL EXHAUSTED.

WHITE

WORK REQUEST – XFA, XFB, XFC									
	SHOR	T JOB DESCRIPTION		BUILI	DING/FACI	LITY	BLANK		
·						20172174	25 26 22 20 20		
39 40 41 42 43 4	4 45 46 47 48 49	50 51 52 53 54 55 56 57	58 59 60 61 62 63 64 6	5 66 67 68	8 69 70 71	72 73 74	75/6///8/9		
AISItielain	I It Ir Ia Ip I	Ipirioigiriaimi							
Y BUILD	NG/FACILITY	BUILDING/FACILITY	BUILDING/FACIL	ITY	BUILDING	G/FACILI	ITY	Î	
	ER SUFFIX	NUMBER SUFFI	X NUMBER S	UFFIX	NUMBER	r si	IFFIX		
39 40 41 42 43 4	4 45 46 47 48 49	50 51 52 53 54 55 56 57 5	58 59 60 61 62 63 64 6	66 67 68	3 69 70 71	72 73 74	75 76 77 78 79 8	30	
						م			
	DESCRIBE WHA	T WILL HAPPEN IF WORK	K IS NOT ACCOMPLISH	ED		×			
tioning	If ste	eam traps are not	regularly insp	ected a	and fixe	ed,			
ng the	additi	onal make-up wate	er will cause t	he boil	ler to d	corrod	e		
er	quicke	er and shorten the	e boiler life.	This H	ECO will	L save	0		
USL SLEdill.	trap s	system.	TITON BIO S PET	year r	Jaseu UI	i a iu	0		
	-	-							
		PERSON TO	CALL FOR ADDITION	L INFOR	MATION			1	
	NAME		ORGANIZATION				TELEPHONĘ NO		
·	I					I		-	
		APPRO	OVED FOR DESIGN		S	OURCE	OF FUNDS		
FROM									
FACILITI	SENGINEER					DIRECT			
P					AUTOMATIC REIMB.				
C	ATE	SIGNATU	IRE	DATE		FUNDED	REIMB.		
		REMARKS			I			-	
FORM	ARDED TO								
MO C	MO DA								
19 20 21	2223 24 25 26								
WHITE	ORIGINAL) - PRO	DIECT FILE COPY	FTER COMPLETION	GREEN -	- FORWAR	TO TO KE	YPUNCH AFTER	R A	
	OF	"APPROVAL ACTION" BI	LOCK		APPROV	AL" BLO	СК		
•			· .						
								· 4	
•	(2))							
	U							·	
							1		

N' .

	PROJECT GROUP	ECO	ENERGY SAVINGS MBTU/YR	ENERGY SAVINGS \$	PROJECT COST \$	SIMPLE PAYBACK YRS	SIR
	GROUP 2 In House Low Cost No Cost						
470 470	Building 470 Building 470	ECO-E3 ECO-M5	10.7	\$265 \$124	\$238 \$216	0.9 1.7	12.14 7.79
	GROUP 2 TOTALS		50.0	\$389	\$454	1.2	8.83

Page-5

1	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED SHEET OF
	PROJECT	2/87 1 1 BASIS FOR CALCULATION
	ESOS	HAND CALCULATIONS
	FORT LEAVENWORTH	X COMPUTER CALCULATIONS
	ARCHITECT/ENGINEER CLARK RICHARDSON & BISKUP	OTHER (SPECIFY) BIN METHOD
	ECO MEASURE BLDG. #470 E-3 REPLACE INCANDESCENT SAVING	S DLH
	ENERGY SAVINGS	
	EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YF MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER Y	R.) <u>1,740.00</u> R.) <u>1,748.00</u>
	EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YF	1.) <u>233,603</u> R.) <u>228,123</u>
	MBTU'S SAVED PER YR10.70 MBTU	
	HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS P -8.00 X \$3.15	ER MBTU = DOLLARS SAVED PER YEAR = (\$25)
	COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS F 18.70 X \$15.50	PER MBTU = DOLLARS SAVED PER YEAR = \$290
	ENERGY SAVINGS PER YEAR \$265	
	· ·	
,		

•

ENERGY SA	VINGS CALCULATION SHEET	DATE PREPARED 2/87	SHEET OF								
PROJECT		BASIS FOR CALCUL	BASIS FOR CALCULATION								
LOCATION	······································	HAND CA	LCULATIONS								
FORT LEAVE	NWORTH	X COMPUTI	ER CALCULATIONS								
ARCHITECT/ENGINEER		CONTRAC									
ECO MEASURE		COMPUTED BY	CHECKED BY								
BLDG. #470	E-3 LIGHTING FIXTURE SUMMARY	DLH									
SUMMARY C	F INCANDESCENT LIGHTING FIXTURES	:									
QUANTITY	FIXTURE TYPE & DESCRIPTION										
19	[G] -SUSPENDED FIXTURE W/ 1-75W	BARE INCANDESCENT LAN	1P								
1	[I] - SUSPENDED FIXTURE W/ 1-120W	BARE INCANDESCENT LA	MP								
	REPLACE EXISTING 300 WATT LAMPS EQUIPMENT ROOMS AND STORAGE	S IN MECHANICAL ROOMS ROOMS WITH ABOVE LAW	, RESTROOMS, IPS.								

		ENERGY	SAVINGS CALCU	LATION SHEET		DATE PREPA FEB. 10, 1987	RED	SHEET 1	0F 1
	PR	OJECT	FORT LEAVENV	VORTH		BASIS FOR C	ALCULATI	ON	
	LO	CATION	SAVINGS OPPOH	IUNITY SURVEY		x	HAND CAL	CULATION	IS
)		0. UTC 0. T					COMPUTE	R CALCUL	ATIONS
	AH	CHITECT/	ENGINEER	SKUP			OTHER	(SPECIFY)	
	EC	O MEASU	RE			COMPUTED E	3Y	CHECKE) BY
		INSULATI	E STEAM LINES				MAW	.L	DEC
		BUILDING	NO. 470						
		ALL OTEA							
		15 PSI ST	EAM	OLATED EXECPT 50	JME LINES IN I		OM.		
			FEET OF	1000 BTU					
		SIZE	PIPE	PER YEAR SAVED	\$ SAVED	INSUL.\$			
	ļ '								
		2"	25	27,482	\$124	\$196			
			BUILDING TOTA	L = 27,482	\$124	\$196			
		• •							



INST PRO	ENER ALLATION & JECT NO. & 1	LIF GY C LOC	e cycle co Onservat Ation: ft l : daca41-8	DST ANALYSIS S ION INVESTME EAVENWORTH 66-C-0061 FT	SUMM NT PF	ARY IOGRAM (EC /ENWORTH	IP) REGI ESOS	STU L ON NO.	JDY CCI 7	: FTLVGRUP D 1.001
FISC ANA	AL YEAR 198 LYSIS DATE:	87 07	DIS -10-89	CRETE PORTIC ECONOMIC LI	N NA	ME: GROUP YEARS	2 PREF	PARED E	3Y: (CRB
1. 	NVESTMENT A. CONSTRUG B. SIOH C. DESIGN CO D. ENERGY C E. SALVAGE T. TOTAL INV	CTIO OST RED VALL ESTI	N COST NT CALC (1/ JE COST MENT (1D-1	4+1B+1C)X.9 E)					\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	413. 41. 21. 427. ' 0. 427.
2. E /	ENERGY SAV ANALYSIS DA	INGS TE A	S (+) / COST NNUAL SAV	(-) 'INGS, UNIT CO	ST & I) SAVI	NGS		
F	FUEL	L \$	JNIT COST /MBTU(1)	SAVINGS MBTU/YR(2)	A S	NNUAL \$ AVINGS(3)	DISC FAC	OUNT FOR(4)		DISCOUNTED SAVINGS(5)
A E C E E	A. ELECT 3. DIST C. RESID D. NAT G E. COAL	\$ \$ \$ \$ \$ \$	15.50 .00 .00 3.15 .00	19. 0. 0. 31. 0.	\$ \$ \$ \$ \$	295. 0. 0. 98. 0.		8.59 11.28 12.01 12.76 10.17		2530. 0. 0. 1246. 0.
F	F. TOTAL			50.	\$	392.			\$	3776.
3. N	NON ENERGY	SAV	/INGS(+) / C	OST(-)						
,	A. ANNUAL R		RRING (+/-)			0 11			\$	0.
	(1) DISCO	UNT	ED SAVING/	COST (3A X 3A	(1)	0.11			\$	0.
(C. TOTAL NO	N EN	NERGY DISC	OUNTED SAVIN	IGS(+)/COST(-) (3	3A2+3B	D4)	\$	0.
I	D. PROJECT (1) 25% M A IF 3I B IF 3I C IF 3I D IF 3I	NON AX N D1 IS D1 IS D1B I D1B I	ENERGY Q ON ENERG = OR > 3C (< 3C CALC S = > 1 GO S < 1 PROJE	UALIFICATION Y CALC (2F5 X 30 TO ITEM 4 SIR = (2F5+3E TO ITEM 4 ECT DOES NOT	TEST .33) 01)/1F QUAL)= .IFY	\$	1246.		
4. I	FIRST YEAR I	DOLL	AR SAVING	S 2F3+3A+(3B1	D/(YE	ARS ECONO	MIC LIF	E))	\$	392.
5.	TOTAL NET D	ISCO	OUNTED SAV	/INGS (2F5+3C)					\$	3776.
6. [(DISCOUNTED		INGS RATIO) (UALIFY)	(8	SIR)=(5 / 1F)=	:	8.83		

											For us	e of th	nis for	F. m. <u>s</u> i	ACI	LIT 7 42	ES 0-1	EN 7 an	GIN d D	EE A Pa	RIN(m 42	5 N 0-0	/OR 6: th	K R e pro	EQ	UEST ent age
	5 C	OCUMEN	IT NUM	BEF	7	BU	ILDI	NG/FA	CILITY	(DATE														
TRANS CODE		SER NUM	IAL ' BER	FΥ	ТҮРЕ	NU	JMBE	R	SUFF	=IX	YR	мо	DA		от	HER	FU)N 					
123	4 5 6	78	9 10 11	1 12	13	14 15	16 17	18 19	20 21	22	23 24	25 26	5 27 2	8 29	9 30	31	32 3	3 34	35	36	37 38	3 39	40	41 4	2 4	3 44 4
XIFIA	1					PIOI	4 17	1 ⁰⁻¹ -1		1	<u>9 p</u>	0 16	0 6		1_J	<u></u>		1	1				JB	u j	<u>i</u> <u>i</u>	<u>d ji</u>
		OCUMEN	IT NUM	BEF	2	BU	ILDIN	NG/FA	CILITY	<u> </u>	BI	UILDI	NG/F		_ITY		BL	ЛГ	DING	G/FA		<u>TY</u>			BUI	LDING
TRANS CODE		SER	IAL BER	۲. ۲	ТҮРЕ	NL	IMBE	R	SUFF	зіх	N	имве	ER 🗸	s	JFF	IX	٨	IUM	BEF	?	S	UF	FIX		NL	MBER
1 2 3	4 5 6	7 8 9	10 11	12	13	14 15	16 17	18 19	20 21	22	23 24	25 26	27 2	8 29	30	31	2 3	3 34	35	36	37 38	3 39	40	41 4	2 4	3 44 4
XIFIB	c I		11.			1 1	1	1 .14				I_I_					_1_	1	11	1		1	L		1	_ _
DESCRIPTION AND JUSTIFICATION OF WORK TO BE ACCOMPLISHED building 470 USDB Vocational Shop has two low cost energy saving opportunities: <u>Insulate sections of existing steam lines</u> . Some lines are very old and no insulation was installed originally. In other areas the insulation was damaged or missing. Uninsulated steam lines waste energy by allowing the heat to escape uncontrolled into the work areas causing overheating. Uninsulated steam lines are also hazardous to maintenance personnel, and are capable of causing severe burns. <u>Replace incandescent lighting</u> with lower wattage lamps and more efficient fluorescent light fixtures.																										
								BEOU	ESTER		ORM	ATIO	N													1
the second se					_				LJILI		Ontrivi	<u>A110</u>	<u>.</u>						-							

			FORWARD FOR AP	PROVAL			
то	RECOMMENDED ACTION	ENV NO	IRONMENTAL IMPACT	ESTIMATED	COST	WORK TO BE	FROM
APPROVING AUTHORITY	DISAPPROVAL	N N N N	ENVIRONMENTAL CONSIDERATIONS EIS/EIA INITIATED EIS/EIA COMPLETED	FUNDED WC K WC L WC	s s 454 s s s s s s	IN-HOUSE SELF-HELP CONTRACT TROOP	FACILITIES

					¢.	PPROV	AL AC	TION		
	щ	DO	CUMENT NUMBER	٦		DA	TE		·FC)RWAF
` ⊸ NS	ANC	REQ	SERIAL	1	ACTION TAKEN	мо	DA		DES	IGN
CODE	£,	ID	NUMBER	1	~				MO	DA
123	4	56	7 8 9 10 11 12	13 14		15 16	17 18		19 20	21 2.
					A - AFFHOVED			SIGNATURE OF APPROVAL AUTHORITY		
XIFIC	С	1			D DISAPPROVED					

3

. |-

DA 1 AUG 78 4283 EDITION OF 1 FEB 78 WILL BE USED UNTIL EXHAUSTED.

WHITE (O PINK

•

.

	RK REQUES	ST – X	(FA, XFE	, XFC) e Chief of Er	aineers									
1420-0; (1)		agency				- <u>g</u>				80	ILDIN	IG/FAC	ILITY		
N .			SHO	RT JOE	BDESCRIPT	ION				N	имве	R	SUFF	×	BLANK
7 38 39 40	41 42 43 44	45 46	47 48 49	50 51	52 53 54 55	56 57 58	59 60 61	62 63 64	65	66 67	68 6	9 70 71	72 73	74 75 7	6 77 78 79 80
P				7 .0											
		IL III NG/FA	<u>19 14</u> CILITY	/ U BL	I II IIII D	<u>IL IO IV</u> CILITY	BUILD	NICIS		1 TY	BI		G/FAC		
SHEELY	NUMB	FR	SUFFIX	N		SUFFIX	NUM	BER	su	FFIX	r	NUMBE	R	SUFFIX	BLANK
7 38 39 40		45 46	47 48 49	50 51	52 53 54 55	56 57 58	59 60 61	62 63 64	65	66 67	68 69	70 71	72 73	74 75 76	77 78 79 80
		11		<u> </u>	L L	<u>↓</u> ↓	┟──┴──┴──┴	4			<u>+</u> ↓	- 4		1	
												1_1			
		DESC		~ 1 4412		IF NORK				0					
uities:			If the	lin	es remai	n unin	sulated	, stea	am	ener	gy '	will	cont:	inue	
io lamaged	or		to be hazard	waste . H	ed and t igh watt	ne pip age ind	es will candesc	ent li	lnu lgh	its a	are a	a sa a ver	v ine	effi-	
cape			cient	use (of energ	y dolla	ars. T	his EC	Ō	woul	ld s	ave a	pprox	ki-	
e burns	are 5.		matery	50 I	m11110n	BLO.2]	per yea	r.							
fluore	escent														
					PER	SON TO C	ALL FOR	ADDITIO	NA	LINF	ORMA	TION		T	
		NAME					ORGANIZ.	ATION						TELE	PHONĘ NO.
	•														
	2014					APPRO	ED FOR D	DESIGN					SOURC		JNUS
MED															
														_	
-HELP	FACILITIE	SENG	NECH										AUTO	I MATIC I	REIMB.
RACT		ΔΤΕ	.		c			<u></u>		DAT	E		FUNDI	DREI	ив.
					د 	IGNATOF								. <u></u>	
				RE	MARKS										
	FORW	ARDE	о то			-									
	DESIGN	EST													
	MO D 19 20 21	A MC	24 25 26												
THORITY	-														
	WHITE (ORIGI	NAL) – PF		FILE COPY	/			G	REEN	4 — F	ORWA	RD TO	KEYPU	NCH AFTER
	PINK		- FC	RWAF	RD TO KEYP	UNCH AF	TER COMP	LETION			C A	OMPLE APPRON	AL" B	DF "FO	RWARD FOR
ъ.	د في فريغ من حمل المراجع . في المراجع من حمل المراجع .	Egen -	· · · · ·		•										
•		: 1													
· .					r										
					•										۰ د
•	2019-11-12 12	•		2)											
			Coe												
		•	. •												
44 - 2		• . •													
		2										-,			r/ -
													11		

)∱ - 22 1

.

	PROJECT GROUP	ECO	ENERGY SAVINGS MBTU/YR	ENERGY SAVINGS \$	PROJECT COST \$	SIMPLE PAYBACK YRS	SIR
	GROUP 3 Upgrade HVAC						
48	Building 48	ECO-M7	290.0	\$4,364	\$9,765	2.2	4.10
52	Building 52	ECO-M7	3724.0	\$36,638	\$26,265	0.7	13.64
56	Building 56	ECO-M1	58.0	\$903	\$5,601	6.2	1.47
56	Building 56	ECO-M7	920.0	\$4,068	\$12,169	3.0	4.00
102	Building 102	ECO-M7	863.0	\$4,753	\$10,203	2.1	5.21
136	Building 136	ECO-M7	3914.0	\$23,404	\$30,451	1.3	8.40
345	Building 345	ECO-M7	448.0	\$2,343	\$10,304	4.4	2.58
429	Building 429	ECO-M7	413.0	\$2,204	\$8,528	3.9	2.92
1009	Building 1009	ECO-M7	253.0	\$1,133	\$684	0.6	19.74
	GROUP 3 TOTALS		10883.0	\$79,810	\$113,970	1.4	7.27
	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED 6/1/87	SHEET OF				
-----------	--	--	------------------------				
PROJECT	ESOS	BASIS FOR CALCULATION	NC				
LOCATION		HAND CALCU	JLATIONS				
ARCHITEC	FORT LEAVENWORTH T/ENGINEER		CALCULATIONS OR BID				
	CLARK RICHARDSON & BISKUP	X OTHER (SI	PECIFY) BIN METHOD				
BLDG. #48	M7 UPGRADE HVAC CONTROLS	DLH					
	ENERGY SAVINGS						
	EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER	YR.) <u>1,453.00</u> RYR.) <u>1,442.00</u>					
	EXISTING BUILDING COOLING ENERGY USAGE (KWH PER MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER	YR.) <u>327,946.00</u> YR.) <u>246,114.00</u>					
	MBTU'S SAVED PER YR. <u>290.29</u> MBTU						
	HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS 11.00 X \$3.15	PER MBTU = DOLLARS = \$35	SAVED PER YEAR				
	COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS 279.29 X \$15.50	PER MBTU = DOLLARS = \$4,329	SAVED PER YEAR				
	ENERGY SAVINGS PER YEAR \$4,364						
۰.							







ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED	SHEET OF
		<u> 1 1</u>
ESOS	DADIO FUR CALCULAI	
LOCATION	HAND CALC	ULATIONS
FORT LEAVENWORTH		CALCULATIONS
ARCHITECT/ENGINEER		
CLARK RICHARDSON & BISKUP		
BLDG. #52 M7 UPGRADE HVAC CONTROLS	DLH	
ENERGY SAVINGS		
EXISTING BUILDING HEATING ENERGY USAGE (MBTU PI MODIFIED BUILDING HEATING ENERGY USAGE (MBTU P	ER YR.) <u>5,926</u> ER YR.) <u>4,219</u>	<u>.00</u> .00
EXISTING BUILDING COOLING ENERGY USAGE (KWH PE MODIFIED BUILDING COOLING ENERGY USAGE (KWH PI	R YR.) <u>1,430,708</u> -R YR.) 839,769	.00
MBTU'S SAVED PER YR. <u>3,723.87</u> MBTU		
HEATING MBTU SAVED PER YEAR X AVERAGE DOLLAF	RS PER MBTU = DOLLAR	S SAVED PER YEAR
1,707.00 X \$3.15	= \$5,3	77
COOLING MBTU SAVED PER YEAR X AVERAGE DOLLA	rs per Mbtu = Dollar	S SAVED PER YEAR
2,016.87 X \$15.50	= \$31,2	261
ENERGY SAVINGS PER YEAR \$36,638		
1		
1		





	ENERGY SAVINGS CALCULATION	SHEET	DATE PREPARED	SHEET OF
	PROJECT		BASIS FOR CALCULATIC	, N
	ECO MEASURE BLDG #56 M1 DBY BUILD ECONOMIZED	······································	COMPUTED BY	CHECKED BY
	DLUG. #30 MI UNI DULD ECUNUMIZER		MAW	
	ENERGY SAVINGS			
:				
	EXISTING BUILDING COOLING ENERGY MODIFIED BUILDING COOLING ENERGY	USAGE (KWH PER YR.) USAGE (KWH PER YR.) <u>417,025.00</u> .) <u>399,948.00</u>	
	MBTU'S SAVED PER YR58.28	мвти		
	COOLING MBTU SAVED PER YEAR X A 58.28 X	VERAGE DOLLARS PE \$15.50	ER MBTU = DOLLARS S/ = \$903	AVED PER YEAR
	ENERGY SAVINGS PER YEAR	\$903		
			<u>, , , , , , , , , , , , , , , , </u>	

_



	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED	SHEET OF
	O IECT	BASIS FOR CALCULATIO	<u>1 1 1</u>
^_ ^	ESOS		•
LO		HAND CALCU	ATIONS
	CLARK RICHARDSON & BISKUP	X OTHER (SPI	
EĊ	CO MEASURE	COMPUTED BY	CHECKED BY
BL	DG. #56 M7 UPGRADE HVAC CONTROLS	<u> </u>	1
	ENERGY SAVINGS		
	EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PE	R YR.) <u>3,992.00</u> R YR.) <u>3,167.00</u>	
	EXISTING BUILDING COOLING ENERGY USAGE (KWH PER MODIFIED BUILDING COOLING ENERGY USAGE (KWH PEF	YR.) <u>444,791.00</u> RYR.) <u>417,025.00</u>	
	MBTU'S SAVED PER YR. <u>919.77</u> MBTU		
	HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS	PER MBTU = DOLLARS S	SAVED PER YEAR
	020.00 A 93.13	- φ2,099	
	COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS	S PER MBTU = DOLLARS	SAVED PER YEAR
	94.77 X \$15.50	= \$1,469	
	ENERGY SAVINGS PER YEAR \$4,068		
	·		
L			

•





ECO-M7





ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED	SHEET OF
PROJECT	BASIS FOR CALCULAT	<u>1 1 1</u> //ON
ESOS		
ARCHITECT/ENGINEER		OR BID
CLARK RICHARDSON & BISKUP	X OTHER (SPECIFY) BIN METHOD
ECO MEASURE 31.DG. #102 M7 UPGRADE HVAC CONTROLS	COMPUTED BY DLH	CHECKED BY
ENERGY SAVINGS		
EXISTING BUILDING HEATING ENERGY USAGE (MBTU F MODIFIED BUILDING HEATING ENERGY USAGE (MBTU	PER YR.) PER YR.)	<u>3.00</u> <u>9.00</u>
EXISTING BUILDING COOLING ENERGY USAGE (KWH P MODIFIED BUILDING COOLING ENERGY USAGE (KWH F	PER YR.) <u>184,359</u> PER YR.) <u>136,082</u>	<u>.00</u> 00
MBTU'S SAVED PER YR. <u>862.77</u> MBTU		
HEATING MBTU SAVED PER YEAR X AVERAGE DOLLA	ARS PER MBTU = DOLLAR	S SAVED PER YEAR
698.00 X \$3.15	= \$2,1	99
COOLING MBTU SAVED PER YEAR X AVERAGE DOLLA 164.77 X \$15.50	ARS PER MBTU = DOLLAF = \$2.5	S SAVED PER YEAR
	. ,	
ENERGY SAVINGS PER YEAR \$4,753		



1



Page-24



Not to Scale ECOND FLOOR ECO-M7

	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED SHEET OF
PROJECT	E E E E E E E E E E E E E E E E E E E	BASIS FOR CALCULATION
LOCATIO	ESUS N FORT LEAVENWORTH	HAND CALCULATIONS
ARCHITE	CT/ENGINEER	
ECO MEA	ASURE	COMPUTED BY CHECKED BY
BLDG. #1	36 M7 UPGRADE HVAC CONTROLS	
	ENERGY SAVINGS	
	EXISTING BUILDING HEATING ENERGY USAGE (MBTU PEI MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PE	R YR.) <u>5,420.00</u> R YR.) <u>2,403.00</u>
	EXISTING BUILDING COOLING ENERGY USAGE (KWH PER MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER	RYR.) <u>5,442,469.00</u> RYR.) <u>5,179,720.00</u>
	MBTU'S SAVED PER YR. <u>3,913.76</u> MBTU	
	HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS	PER MBTU = DOLLARS SAVED PER YEA
	3,017.00 A \$3.15	≖
	COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS	S PER MBTU = DOLLARS SAVED PER YE
	020.00 × 010.00	= \$13,900
	LENEHGY SAVINGS PER YEAR \$23,404	
÷.		



N Not to Scale

Page-27



PROJECT BASIS FOR CALCULATION ESOS HAND CALCULA LOCATION HAND CALCULA FORT LEAVENWORTH COMPUTER CAL ARCHITECT/ENGINEER CONTRACTOR E CLARK RICHARDSON & BISKUP X ECO MEASURE COMPUTED BY BLDG. #345 M7 UPGRADE HVAC CONTROLS DLH	ATIONS LCULATI BID CIFY) BIN CHECKEI	ONS I METHOD D BY
ESOS HAND CALCULA LOCATION HAND CALCULA ARCHITECT/ENGINEER COMPUTER CAL CLARK RICHARDSON & BISKUP X OTHER (SPEC ECO MEASURE COMPUTED BY BLDG. #345 M7 UPGRADE HVAC CONTROLS DLH	ATIONS LCULATI BID CIFY) BIN CHECKEI	ONS <u>I METHOD</u> D BY
LOCATION HAND CALCULA FORT LEAVENWORTH COMPUTER CAL ARCHITECT/ENGINEER CONTRACTOR E CLARK RICHARDSON & BISKUP X ECO MEASURE COMPUTED BY BLDG. #345 M7 UPGRADE HVAC CONTROLS DLH ENERGY SAVINGS COMPUTED BY	ATIONS LCULATI BID CIFY) BIN CHECKEI	ONS I <u>METHOD</u> D BY
FORT LEAVENWORTH COMPUTER CAL ARCHITECT/ENGINEER CONTRACTOR E CLARK RICHARDSON & BISKUP X OTHER (SPEC ECO MEASURE COMPUTED BY C BLDG. #345 M7 UPGRADE HVAC CONTROLS DLH C ENERGY SAVINGS C C	LCULATI BID <u>CIFY) BIN</u> CHECKEI	ONS I <u>METHOD</u> D BY
CLARK RICHARDSON & BISKUP X OTHER (SPEC ECO MEASURE COMPUTED BY C BLDG. #345 M7 UPGRADE HVAC CONTROLS DLH DLH	CIFY) BIN CHECKEI	I METHOD D BY
ECO MEASURE BLDG. #345 M7 UPGRADE HVAC CONTROLS ENERGY SAVINGS	CHECKEI	D BY
BLDG. #345 M7 UPGRADE HVAC CONTROLS		
ENERGY SAVINGS		
EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)3,300.00MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YR.)2,927.00		
EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.) 138,427.00 MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.) 116,342.00		
MBTU'S SAVED PER YR448.38 MBTU		
HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SA 373.00 X \$3.15 = \$1.175		R YEAR
COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SA 75.38 X \$15.50 = \$1,168	AVED PEI	R YEAR
ENERGY SAVINGS PER YEAR \$2,343		











BUILDING 345 - THIRD FLOOR Not to Scale

ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED SHEET OF 6/1/87 1 1	
PROJECT	BASIS FOR CALCULATION	
	HAND CALCULATIONS	
ARCHITECT/ENGINEER	COMPOTER CALCULATIONS	
CLARK RICHARDSON & BISKUP	COMPUTED BY CHECKED BY	
BLDG. #429 M7 UPGRADE HVAC CONTROLS		
ENERGY SAVINGS		
EXISTING BUILDING HEATING ENERGY USAGE (MBTU PE MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PI	ER YR.) <u>2,931.00</u> ER YR.) <u>2,591.00</u>	
EXISTING BUILDING COOLING ENERGY USAGE (KWH PE MODIFIED BUILDING COOLING ENERGY USAGE (KWH PE	R YR.) <u>330,100.00</u> R YR.) <u>308,680.00</u>	
MBTU'S SAVED PER YR. <u>413.11</u> MBTU		
HEATING MBTU SAVED PER YEAR X AVERAGE DOLLAR 340.00 X \$3.15	S PER MBTU = DOLLARS SAVED PER YEAR = \$1,071	
COOLING MBTU SAVED PER YEAR X AVERAGE DOLLAR 73.11 X \$15.50	RS PER MBTU = DOLLARS SAVED PER YEAR = \$1,133	
ENERGY SAVINGS PER YEAR \$2,204		
L		



BUILDING 429 - BASEMENT LEVEL ECO-M7 Not to Scale



Ŧ





ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED 6/1/87	SHEET OF
PROJECT	BASIS FOR CALCULATIO	N
LOCATION FORT LEAVENWORTH	HAND CALCUI COMPUTER C	LATIONS ALCULATIONS B BID
CLARK RICHARDSON & BISKUP	X OTHER (SP	ECIFY) BIN METHOD
ECO MEASURE BLDG. #1009 M7 UPGRADE HVAC CONTROLS	COMPUTED BY	CHECKED BY
ENERGY SAVINGS		
EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER	RYR.) <u>659.00</u> RYR.) <u>523.00</u>	<u>)</u>
EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER MODIFIED BUILDING COOLING ENERGY USAGE (MBTU PER	R YR.) 212.00 R YR.) 185.00	<u>)</u>
MBTU'S SAVED PER YR. <u>163.00</u> MBTU		
HEATING MBTU SAVED/BOILER EFFICIENCY = TOTAL MBT	U SAVED PER YEAR	
136 / 60%	- 226.67	7
HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS 226.67 X \$3.15	PER MBTU = DOLLARS S = \$714	SAVED PER YEAR
COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS 27.00 X \$15.50	PER MBTU = DOLLARS	SAVED PER YEAR
ENERGY SAVINGS PER YEAR \$1,133		
· · ·		

,



INS PR	ENER STALLATION & OJECT NO. & 1	LIFE GY CC LOCA TITLE:	CYCLE CO NSERVAT TION: FT I DACA41-8	DST ANALYSIS S ION INVESTMEI LEAVENWORTH 36-C-0061 FT	Sumn Nt Pf ' Lea'	IARY ROGRAM (EC VENWORTH	(IP) REGION N ESOS	STUDY LCC IO. 7	': FTLVGRUP ID 1.001
FIS AN	SCAL YEAR 198 ALYSIS DATE:	7 07-1	DIS 0-89	CRETE PORTIC ECONOMIC LI	N NA FE 15	ME: GROUP SYEARS	3 PREPARE	D BY:	CRB
1.	INVESTMENT A. CONSTRUC B. SIOH C. DESIGN CO D. ENERGY C E. SALVAGE F. TOTAL INV	CTION OST REDIT VALUE ESTM	COST CALC (1. COST ENT (1D-1	A+1B+1C)X.9 E)				\$ \$ \$ \$ \$ \$	103610. 10361. 5181. 107236. 0. 107236.
2.	ENERGY SAV ANALYSIS DA	INGS (TE AN	(+) / COST NUAL SAV	(-) 'INGS, UNIT CO	ST &	DISCOUNTEE	SAVINGS		
	FUEL	UN \$/N	IIT COST MBTU(1)	SAVINGS MBTU/YR(2)	A S	NNUAL \$ AVINGS(3)	DISCOUN FACTOR(IT 4)	DISCOUNTED SAVINGS(5)
	A. ELECT B. DIST C. RESID D. NAT G E. COAL	\$ \$ \$ \$ \$ \$ \$ \$	15.50 .00 .00 3.15 .00	3686. 0. 0. 7197. 0.	\$ \$ \$ \$	57139. 0. 0. 22671. 0.	8.5 11.2 12.0 12.7 10.1	59 28 11 76 7	490826. 0. 0. 289276. 0.
	F. TOTAL			10883.	\$	79810.		\$	780102.
3.	NON ENERGY	' SAVI	NGS(+) / C	OST(-)					
	A. ANNUAL R		RING (+/-)			0.11		\$	0.
	(1) DISCO (2) DISCO	UNTE	D SAVING	COST (3A X 3A	(1)	9.11		\$	0.
	C. TOTAL NO	N ENE	RGY DISC	OUNTED SAVIN	IGS(-	-)/COST(-) (3	8A2+3BD4)	\$	0.
	D. PROJECT (1) 25% M. A IF 30 B IF 30 C IF 31 D IF 30	NON 8 AX NC D1 IS ≈ D1 IS < D1 IS S D1B IS	ENERGY C N ENERG OR > 3C 3C CALC = > 1 GO < 1 PROJ	UALIFICATION Y CALC (2F5 X GO TO ITEM 4 SIR = (2F5+3E TO ITEM 4 ECT DOES NOT	TEST .33) 01)/1F QUA)= LIFY	\$ 25743	4.	
4.	FIRST YEAR [R SAVING	S 2F3+3A+(3B1	D/(YE	ARS ECONO	MIC LIFE))	\$	79810.
5.	TOTAL NET D	ISCOL	JNTED SA	VINGS (2F5+3C)				\$	780102.
6.	DISCOUNTED (IF < 1 PROJE	SAVI	NGS RATIO	D QUALIFY)	(3	SIR)=(5 / 1F)=	7.2	27	

Page-38

1948 - 1948 - 19								c	6 - 6		FACILI	TIES EN			REC
-			CUMENT N	UMBER	BUILDI	NG/FA	CILITY		DATE	IS TOFFI		20-17 dr	10 DA Fain 420		
	TRANS Z	REQ ID	SERIAL NUMBER	r F Y	NUMBE	R	SUFFIX	YR	мо	DA	ОТНЕ	R FUND	CITATION		
•	1 2 3 4	56	7 8 9 1	0 11 12 1	3 14 15 16 1	7 18 19	20 21 22	23 24	25 26	27 28	29 30 31	32 33 3	4 35 36 37 38	39 40 4	1 42
	XIFIA		1.1.1.		P10113	1612	 	9 10	06	0,6		<u> </u>		AIRIE	<u>i qı</u> s
	TRANS Z		CUMENT N	UMBER	BUILDI	NG/FA	CILITY	81	JILDIN	NG/FA	<u>CILITY</u>	BUIL	DING/FACILIT		BU
ļ.	CODE	REQ	SERIAL		NUMBE	R	SUFFIX	N	UMBE	R,	SUFFIX	NUM	IBER SL	IFFIX	N
	1 2 3 4	5 6	7 8 9 1	0 11 12 1	3 14 15 16 17	7 18 19	20 21 22	23 24	25 26	27 28	29 30 31	32 33 34	35 36 37 38	39 40 4	1 42
to fait	XIF B C				P101015	1210		P10	1015	6 1	11	P 0 3	14 15 10	L I F	2_10_1
	DESCRIPTIO	DN AND	JUSTIFIC	ATION O	WORK TO B	E ACC	OMPLISH	D							
	f Repair exist must of th New e	ir or ting o be re ne cor election	replace controls eplaced ntrols a ronic co	e exis s are o in oro are or: ontrol	ting buil either ou der to ma iginal pn packages	ding t of linta: eumat are	heatir calibr in AR tic cor more a	ng ar Tatic 1-27 ntrol nccur	nd ai on or ' req .s th rate	r cc non puire at a and	nditic -funct d spac re dif requir	ning c ional. e temp ficult e mini	controls. These c ceratures. to maint mal maint	The contro Mos cain. cenanc	ols st
			······································		OBGANI	ZATIO	ESTER IN	FORM	ATION	TELEP	HONEN	D. SIGN	ATURE		
r							500000		0.400	0014					
ŀ	то			RECOM	MENDED	ENVIR	ONMENTA	LIMPA		ESTIN	ATED CO	DST	WORK TO BE	FRO	M
				ACTION	1	NO 1	res						PERFORMED		
1997) 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -				G APPI	TOVAL	\square		DNMEN DERATI	ONS	FUND WC K	ED S	113,97	D IN-HOUS	e	FACIL
					PPROVAL			A		wc <u>เ</u>	s		SELF-HE	LP	
	APPROVI	NG AUT	HOBITY					ATED		WC	_ \$ NDED \$	5,180			-
ł							СОМР	LETED		тот	AL \$	119_15	þ		
-											<u></u>				
· · ·	w l	DOC	UMENT NU	MBER				DAT							·F
	CODE T	REQ	SERIAL	Ju d	ACTIO	Ν ΤΑΚΙ	EN	мо	DA						DE
ŀ		1D	NUMBER	11 12 13	14	.*		5 16 1	718						MO
F					A - AP	PROVE			-1	SIG	NATURE	OF APPR	OVAL AUTHO	RITY	
· · [XIFICC				D D1	SAPPRO	DVED								
• • • •	DA 1 AUG	vi 78 4	283 ED	DITION O	F 1 FEB 78 W	ונג 88	USED UN	TILEY	CHAUS	TED.					WH: PIN
an each airtean an a		i i sere	e fyr star.	. *	n - Charlesser		1. 1. 1. 1.	*\$\$\$x		···· ····	 ۲ _{۰۱۸} ۰	an a	s - 1/2 - 5		
and a second second	and the second					t . Take t		· · ·	·* 				• •	•	•
								••	•	· · · · · ·	í • , , í				
n san sin tin san an an an a	vátant .	. (•	A. 1978					•			۰.		
	,		\bigcirc	• . •	· · · ·						· · · ·		•	·	
an an the second se	¥	ويسمعن					-								

. --- -

i.

٦

	nent agency is the C	FB, XFC Ifice of the Chief of E	ngineers,					
	S	ORT JOB DESCRIPT	TION		BUILDING	SUFFI	BLANK	
39 40 41 42 4	13 44 45 46 47 48	49 50 51 52 53 54 5	5 56 57 58	3 59 60 61 62 63 64 65	66 67 68 69	70 71 72 73 7	4 75 76 77 78 79 80	
			<u> t</u>					
ARepr	a _l i _l r _{l/l} r _l e	place H	V AIC					4 (
Y BUI		BUILDING/FA		BUILDING/FACILI	14 801		BLANK	
FFIX NU	JMBER SUFF	X NUMBER	SUFFIX	NUMBER SU	IFFIX NU	MBER S	UFFIX	
39 40 41 42 4	3 44 45 46 47 48	19 50 51 52 53 54 55	5 56 57 58	59 60 61 62 63 64 65	66 67 68 69 7	0 71 72 73 74	1 75 76 77 78 79 80	<u>)</u>
_1 P 10 1 1	1 10 12 1A	P101014181A		P101412191		101910		
The controls Most ain. enance.	The tem cau to ene (wh and BTU	buildings wil erature swing is building c ix the proble gy. Opening ch is a commo money. This s per year.	Ll cont: gs and u poccupant em thems a windo on solut ECO wou	inue to waste e uneven temperat ts to register selves which wi ow to correct a tion) is an ext ald save approx	energy by ure contr complaint ll waste n overhea reme wast imately 1	allowing ol. This s, or to even more ting prob e of ener 0,883 mil	wide try olem gy lion	
		PER	SON TO C	ALL FOR ADDITIONAL	LINFORMATI	ON		
- <u></u>	NAME			ORGANIZATION			TELEPHONE NO.	
. <u></u>								1
		י רייי	APPRO\	ED FOR DESIGN		SOURCE	OF FUNDS	
- FACIL	ITIES ENGINEER	•						
-P T	DATE	REMARKS	GNATUR	E	DATE		ATIC REIMB. D REIMB.	
-P T	DATE DRWARDED TO	REMARKS	BIGNATUR	E	DATE		ATIC REIMB. D REIMB.	
-P T 	DATE DRWARDED TO	REMARKS	SIGNATUR	E	DATE	D AUTOM	ATIC REIMB.	
-P T 	DATE DATE DRWARDED TO SIGN ESTIMATO DA MO DA 21 22 23 24 25 2	REMARKS	SIGNATUR	Ē	DATE	D AUTOM	ATIC REIMB.	
-P T 	DATE DRWARDED TO DA MO DA 21 22 23 24 25 2	REMARKS	IGNATUR	E	DATE		ATIC REIMB.	
-P T 	DATE DRWARDED TO DA MO DA 21 22 23 24 25 2 1 1 1 TE (ORIGINAL) -	REMARKS	Y PUNCH AF	E G TER COMPLETION	DATE REEN - FOI	AUTOM	ATIC REIMB. D REIMB. EYPUNCH AFTER "FORWARD FOR	
-P T 	DATE DATE DRWARDED TO DA MO DA 21 2223 24 25 2 I I I I TE (ORIGINAL) -	REMARKS REMARKS	Y PUNCH AF	E TER COMPLETION	DATE REEN - FOI COM APP	AUTOM	ATIC REIMB. D REIMB. EYPUNCH AFTER "FORWARD FOR OCK	
-P T 	DATE DATE DRWARDED TO SIGN ESTIMATO DA MO DA 21 22 23 24 25 2 1 1 1 TE (ORIGINAL) -	REMARKS REMARKS	V V VINCH AF	E TER COMPLETION	DATE REEN - FOI COM	AUTOM	ATIC REIMB. D REIMB. EYPUNCH AFTER "FORWARD FOR DCK	
-P T T FC DES MO 19]20 RITY L WHI PINK	DATE	REMARKS PROJECT FILE COPY CORWARD TO KEYP DF "APPROVAL ACT	Y Y YUNCH AF	E TER COMPLETION OCK	DATE REEN - FOI COM	AUTOM	ATIC REIMB. D REIMB. EYPUNCH AFTER "FORWARD FOR DCK	
T T FC DES MO 1920 RITY U WHI PINK	DATE	REMARKS	Y PUNCH AF	E TER COMPLETION OCK	DATE REEN - FOJ COM	AUTOM	ATIC REIMB. D REIMB. EYPUNCH AFTER "FORWARD FOR DCK	
P T FC DES MO 19 20 RITY WHIT PINK	DATE	REMARKS PROJECT FILE COPY FORWARD TO KEYP FORWARD TO KEYP	PUNCH AF	E TER COMPLETION OCK	DATE REEN - FOI COM APP	AUTOM	ATIC REIMB. D REIMB.	
	DATE	REMARKS	V VINCH AF	E TER COMPLETION CK	DATE REEN - FOJ COM APP	AUTOM	ATIC REIMB. D REIMB.	

	PROJECT GROUP	ECO	ENERGY SAVINGS MBTU/YR	ENERGY SAVINGS \$	PROJECT COST \$	SIMPLE PAYBACK YRS	SIR
	GROUP 4 Replace Incandescent						
50 52 77 102 136 345	Building 50 Building 52 Building 77 Building 102 Building 136 Building 345	ECO-E3 ECO-E3 ECO-E3 ECO-E3 ECO-E3	7.3 2.7 26.5 1.0 12.9	\$113 \$87 \$411 \$67 \$268 \$143	\$202 \$591 \$1,082 \$72 \$486 \$384	1.8 6.8 2.6 1.1 1.8 2.7	6.57 1.57 4.46 4.65 6.15 3 91
	GROUP 4 TOTALS		54.6	\$1,089	\$2,817	2.6	4.35

ENERGY CONSERVATION ANALYSIS ESOS



	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED 2/6/87	
	PROJECT ESOS	BASIS FOR CALCULA	ATION
	LOCATION FORT LEAVENWORTH		LCULATIONS ER CALCULATIONS
)	ARCHITECT/ENGINEER CLARK RICHARDSON & BISKUP	CONTRAC	TOR BID (SPECIFY) BIN METHOD
	ECO MEASURE E-3 INCANDESCENT REPLACEMENT SAVINGS	COMPUTED BY WBF	CHECKED BY MAW

BUILDING WATTS WERE REDUCED IN THE FOLLOWING LOCATIONS

BUILDING #501703 TOTAL WATTS REDUCTIONRECIEVING DOCK - CHANGE 2 LAMPS FROM 100W TO 90WSTORAGE AREA - CHANGE 1 LAMP FROM 70W TO 57WLOUNGE AREA - CHANGE 2 LAMPS FROM 100W TO 90WBSMT STORAGE - CHANGE 4 LAMPS FROM 200W TO 90WMECHANICAL RM - CHANGE 11 LAMPS FROM 200W TO 90W

	ENERGY SAVING	SCALCULA	HON SHE	1		2/87		1	
ROJECT					i	BASIS FOR	CALCULA	TION	
	ESOS					X		CULATIONS	6
OCATION	FORT LEAVENWO	ORTH				^	COMPUTE	R CALCULA	TIONS
RCHITEC	T/ENGINEER						CONTRAC	TOR BID	
	CLARK RICHARD	SON & BISK	UP				OTHER ((SPECIFY)	
CO MEAS			CHENT C	AVINCE	9	COMPUTEL	ЛИ	CHECKE	יםט
LDG. #50	E-3 INCANDESCE	NI REPLACI	EMENT 3	AVING5	1				
	ENERGY SAVING	S							
							10.0	20 WATTS	
	INCANDESCENT I	REPLACEME	NT BUILD	DING LIGHTIN	IG USAG	E -	40,5	27 WATTS	
	WATTS SAVED		<u>1,703</u> V	WATTS					
	HRS. PER DAY X	DAYS PER	WEEK X	WEEKS PER	YEAR LI	ESS HOLID	AYS = HRS	S. USED PEI	R YEAR
	5	х	5	х	52 -	-2	-	- 1,2	50
	-		-			TOTAL	=	1,2	50 HR.
	HRS. USED PER 1	EAR X W	ATTS SA	VED = KWH	SAVED P	PER YEAR			
	1,200	^	1,700	-	, : .				
	KWH SAVED PER	YEAR X W	VATTS PE	$\frac{1}{2} \frac{1}{41} = 03 = 0$	MBTU SA	VED PER Y 7.3	EAR		
	2,123	~		3.410-03 =					
	MBTU SAVED PEI 7.3	RYEAR X A X	VERAGE	DOLLARS PE \$15.50	ER MBTU	I = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	VERAGE	DOLLARS PE \$15.50	ER MBTU	I = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	VERAGE	DOLLARS PE \$15.50	ER MBTU	J = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	YERAGE	DOLLARS PE \$15.50	ER MBTU	J = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	VERAGE	DOLLARS PE \$15.50	ER MBTU	J = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	YERAGE	DOLLARS PE \$15.50	ER MBTU	U = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	YERAGE	DOLLARS PE \$15.50	ER MBTU	J = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	YEAR	\$113	ER MBTU	J = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A	YEAR	DOLLARS PE \$15.50	ER MBTU	J = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	YEAR	\$113	ER MBTU	J = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	YEAR	3.412-03 = DOLLARS PE \$15.50	ER MBTU	D = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A X	YERAGE	3.412-03 = DOLLARS PE \$15.50	ER MBTU	D = DOLLA	RS SAVED \$11	PER YEAR	
	MBTU SAVED PEI 7.3	A YEAR X A X	YERAGE	5.412-03 = DOLLARS PE \$15.50	ER MBTU	U = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A	YEAR	3.412-03 = DOLLARS PE \$15.50	ER MBTU	U = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A	YEAR	\$113	ER MBTU	U = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A	YEAR	\$113	ER MBTU	U = DOLLA	RS SAVED \$11	PER YEAR	
	ENERGY COST S	A YEAR X A	VERAGE	3.412-03 = DOLLARS PE \$15.50	ER MBTU	J = DOLLA	RS SAVED \$11	PER YEAR	
	MBTU SAVED PEI 7.3	A YEAR X A	VERAGE	3.412-03 = DOLLARS PE \$15.50	ER MBTU	D = DOLLA	RS SAVED \$11	PER YEAR	
	MBTU SAVED PEI 7.3	A YEAR X A	VERAGE	3.412-03 = DOLLARS PE \$15.50	ER MBTU	D = DOLLA	RS SAVED \$11	PER YEAR	

-

	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED 2/6/87		- 1_
ROJECT	ESOS	BASIS FOR CALC	ULATION	
	FORT LEAVENWORTH	HAND	CALCULATIONS UTER CALCULATION	NS
RCHITECT	ENGINEER CLARK RICHARDSON & BISKUP		RACTOR BID IER (SPECIFY) BIN M	NETH
CO MEASU	RE E-3 INCANDESCENT REPLACEMENT SAVINGS	COMPUTED BY WBF	CHECKED B	Y IAW
	BUILDING WATTS WERE REDUCED IN THE FOLLOWING LOC	ATIONS		
	BUILDING #52 1220 TOTAL WATTS REDUCTION			
	GRANT HALL 1150 WATTS REDUCTION			
	OFFICE 246 - CHANGE 1 LAMP FROM 100W TO 90W.			
	AUDITORIUM 317 - CHANGE 36 LAMPS FROM 150W TO 120V	v		
	CORRIDOR 318 - CHANGE 1 LAMPS FROM 100W TO 90W			
	PROJECTION ROOM- CHANGE 5 LAMPS FROM 100W TO 90W	۷.		
		- •		
	SHERIDAN HALL 40 WATTS REDUCTION			
	CORRIDOR 150- CHANGE 4 LAMPS FROM 100W TO 90W.			
	SHERMAN HALL 30 WATTS REDUCTION			
	ENTRY 119A - CHANGE 1 LAMPS FROM 100W TO 90W			
	OFFICE 125B - CHANGE 1 LAMPS FROM 100W TO 90W			
	ENTRY 125B - CHANGE 1 LAMPS FROM 100W TO 90W			

,

ENERGY SAV	INGS CALCULATION SHEET	ſ	DATE PREP/ 2/87	RED	SHEET 1	0F 1
PROJECT	w		BASIS FOR (CALCULATIC	ON	
LOCATION	·		Н	AND CALCU	LATIONS	
FORT LEAVER ARCHITECT/ENGINEER	NWORTH			OMPUTER (R BID	IONS
	ARDSON & BISKUP		COMPLITED	OTHER (SP	PECIFY) BI	N METHOD
BLDG. #52 E-3	REPLACE INCANDESCEN	T SAVINGS			ONEONED	<u> </u>
ENERGY SAV	INGS					
EXISTING BUI MODIFIED BU	LDING HEATING ENERGY U ILDING HEATING ENERGY U	ISAGE (MBTU PER JSAGE (MBTU PEF	YR.)	<u>4,219.62</u> 4,223.35		
EXISTING BUI MODIFIED BU	ILDING ELECTRICAL ENERG	BY USAGE (KWH PI BY USAGE (KWH P	ER YR.) ER YR.)	839,769 837,893		
MBTU'S SAVE	D PER YR2.67 MB	TU				
HEATING MBI -3.7	TU SAVED PER YEAR X AV 73 X	ERAGE DOLLARS \$3.15	PER MBTU = =	DOLLARS (\$12)	SAVED PE	R YEAR
ELECTRICAL 6.4	MBTU SAVED PER YEAR X 40 X	AVERAGE DOLLA \$15.50	RS PER MBT =	U = DOLLA \$99	NRS SAVED	PER YEAR
ENERGY SAV	INGS PER YEAR	\$87				
			•			·····
			•			

-

	ENERGY SAVINGS	CALCULATION SHEET	DATE PREPARED	SHEET OF
PROJECT			BASIS FOR CALCULAT	<u> 1 1</u> ION
	ESOS			
LOCATION			HAND CALC	ULATIONS
DOUNTEOT	FORT LEAVENWO	RTH		CALCULATIONS
ARCHITECT			OTHER (S	
CO MEASI	JRF			ICHECKED BY
	E-3 INCANDESCEN	T REPI ACEMENT SAVINGS	WBF	MAW
	BUILDING #77	2985 TOTAL WATTS REDUCTION		
	150 PAPER STORA 150 PAPER STORA	AGE - CHANGE 54 -150W LAMPS TO 12 AGE - CHANGE 26 -100W LAMPS TO 75	zow. sw.	2270 W
	126 CONF. ROOM	- CHANGE 5 -75W LAMPS TO 50W.		125 W
	ELEVATOR ROOM	- CHANGE 3 -300W LAMPS TO 120W.		540 W
	MECHANICAL ROO	OM - CHANGE 2 - 100W LAMPS TO 75W	Ι.	50

	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED 2/87	SHEET OF
PROJEC		BASIS FOR CALCULATI	ON
	ESOS		JLATIONS
	FORT LEAVENWORTH		CALCULATIONS
ARCHITE	CT/ENGINEER	CONTRACTO	
ECO ME	CLAHK RICHARDSON & BISKUP	COMPUTED BY	CHECKED BY
BLDG. #7	7 E-3 INCANDESCENT REPLACEMENT SAVINGS	DLH	
	ENERGY SAVINGS		
	EXISTING BUILDING LIGHTING USAGE INCANDESCENT REPLACEMENT BUILDING LIGHTING USA	GE <u>131,115</u>	WATTS
	WATTS SAVED <u>2,985</u> WATTS		
	HRS. PER DAY X DAYS PER WEEK X WEEKS PER YEAR 8 X 5 X 52 6 X 2 X 52	LESS HOLIDAYS = HRS. 2 -2 = 2 -2 = TOTAL =	USED PER YEAR 2,000
	HRS. USED PER YEAR X WATTS SAVED = KWH SAVED 2,600 X 2,985 = 7,761	PER YEAR	
	KWH SAVED PER YEAR X WATTS PER MBTU = MBTU S 7,761 X 3.41E-03 =	AVED PER YEAR 26.5	
	MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBT 26.5 X \$15.50	U = DOLLARS SAVED P = \$411	ER YEAR
	ENERGY COST SAVINGS PER YEAR \$411		
1			
			·

	SAVINGS CALCULATION SHEET	DATE PREPARED	SHEET OF	
PROJECT				
ESOS		BASIS FOR OALOOLATI		
LOCATION		HAND CALC	ULATIONS	
	AVENWORTH			
CLARK P	R RCHARDSON & BISKUP	OTHER (S	PECIFY) BIN METHOD	
ECO MEASURE		COMPUTED BY	CHECKED BY	
E-3 INCA	NDESCENT REPLACEMENT SAVINGS	WBF	MAW	
BUILDING	3 WATTS WERE REDUCED IN THE FOLLOWIN	NG LOCATIONS		
BUILDING	G #102 170 TOTAL WATTS REDUCTIO	DN		
BUILDING TOILETS	G #102 170 TOTAL WATTS REDUCTION - CHANGE 3 -100W LAMPS TO 90W.	DN	30 W	
BUILDIN TOILETS MECHAN	G #102 170 TOTAL WATTS REDUCTION - CHANGE 3 -100W LAMPS TO 90W. IICAL ROOM - CHANGE 1 - 150W LAMP TO 90	DN .	30 W 60 W	
BUILDIN TOILETS MECHAN LOUNGE	G #102 170 TOTAL WATTS REDUCTION - CHANGE 3 -100W LAMPS TO 90W. IICAL ROOM - CHANGE 1 - 150W LAMP TO 90° - CHANGE 2 -100W LAMPS TO 90W. IICAL ROOM - CHANGE 1 - 150W LAMP TO 90°	DN W.	30 W 60 W 20 W	
		ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED	SHEET OF
---	----------	--	--	--------------------------
	PROJECT	FSOS	BASIS FOR CALCULATION	N
	LOCATION			JLATIONS CALCULATIONS
	ARCHITEC			
	ECO MEAS	SURE BLDG #102 E-3 BEPLACE INCANDESCENT SAVINGS		CHECKED BY
			1	
		EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER	R YR.) <u>950.04</u> R YR.) <u>953.69</u>	_
		EXISTING BUILDING ELECTRICAL ENERGY USAGE (KWH P MODIFIED BUILDING ELECTRICAL ENERGY USAGE (KWH P	ER YR.) <u>136,083</u> ER YR.) <u>134,593</u>	
		MBTU'S SAVED PER YR. <u>1.44</u> MBTU		
		HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS -3.65 X \$3.15	PER MBTU = DOLLARS = (\$11)	SAVED PER YEAR
		ELECTRICAL MBTU SAVED PER YEAR X AVERAGE DOLLA 5.09 X \$15.50	RS PER MBTU = DOLLA = \$79	ARS SAVED PER YEAR
}		ENERGY SAVINGS PER YEAR \$67		

-

CALCULATION SHEET

	ENERGY SAVINGS C	ALCULATION SHEET	DATE PREPARED 2/6/87	SHEET OF 1 1
PROJECT	FSOS		BASIS FOR CALCULAT	ION
LOCATION	FORT LEAVENWORT	ſĦ	HAND CALC	ULATIONS CALCULATIONS
ARCHITECT	ENGINEER CLARK RICHARDSO	N & BISKUP	CONTRACT	OR BID SPECIFY) BIN METHOD
ECO MEASU	IRE E-3 INCANDESCENT	REPLACEMENT SAVINGS	COMPUTED BY WBF	CHECKED BY MAW
	BUILDING WATTS W	ERE REDUCED IN THE FOLLOWING LO	CATIONS	
	BUILDING #136	900 TOTAL WATTS REDUCTION		
	TOILETS- CHANGE 2	24 -100W LAMPS TO 90W.		240 W
	CORRIDORS - CHAN	IGE 9 -100W LAMPS TO 90W		90 W
	STAIRS - CHANGE 4	-100W LAMPS TO 90W		40 W
	JANITOR - CHANGE	1 -100W LAMP TO 90W		10 W
	JANITOR - CHANGE	1 -300W LAMP TO 150W		150 W
	EQUIP. RM 208 - CH	ANGE 2-300W LAMPS TO 150W.		300 W
	EQUIP. RM 209 - CH	ANGE 4-100W LAMPS TO 90W.		40 W
	ENTRY - CHANGE 2-	100W LAMPS TO 90W.		20 W
	KITCHEN - CHANGE	1-100W LAMP TO 90W.		10 W

	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED 2/6/87	SHEET OF
PROJECT	ESOS	BASIS FOR CALCULATI	ÓN .
LOCATION	FORT LEAVENWORTH	HAND CALC	ULATIONS CALCULATIONS
ARCHITECT			
ECO MEASI	IRE	COMPLITED BY	ICHECKED BY
	E-3 INCANDESCENT REPLACEMENT SAVINGS	WBF	MAW
	BOILDING WATTS WERE REDUCED IN THE FOLLOWING LO	CATIONS	
	BUILDING #345 630 TOTAL WATTS REDUCTION		
	TOILETS- CHANGE 4 -100W LAMPS TO 90W.		40 W
	TOILETS- CHANGE 2 -200W LAMPS TO 150W.		100 W
	TOILETS- CHANGE 1 -150W LAMPS TO 90W.		60 W
	CORRIDORS - CHANGE 3 -200W LAMPS TO 150W		150 W
	CORRIDORS - CHANGE 2 -100W LAMP TO 90W		20 W
	CLOSET - CHANGE 1 -100W LAMP TO 90W		10 W
	LOCKER/SHOWERS - CHANGE 21 -100W LAMP TO 90W		210 W
	BREAK RM - CHANGE 2-100W LAMPS TO 90W.		20 W
	HEAT ROOM - CHANGE 1-100W LAMP TO 90W.		10 W
	BOILER ROOM - CHANGE 1-100W LAMP TO 90W.		10 W

	ENERGY SAVINGS CALCULATION SHEET	DATE PREPARED	SHEET OF
PROJECT	ESOS	BASIS FOR CALCULATI	ON .
LOCATIO	FORT LEAVENWORTH	HAND CALC X COMPUTER	ULATIONS CALCULATIONS
ARCHITE	CT/ENGINEER CLARK RICHARDSON & BISKUP	OTHER (S	PECIFY) BIN METHOD
ECO MEA	SURE BLDG. #345 E-3 REPLACE INCANDESCENT SAVINGS	DLH	
	ENERGY SAVINGS		
	EXISTING BUILDING HEATING ENERGY USAGE (MBTU PEF MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PEI	RYR.) <u>2,927.66</u> RYR.) <u>2,934.00</u>	<u>5</u>
	EXISTING BUILDING ELECTRICAL ENERGY USAGE (KWH F MODIFIED BUILDING ELECTRICAL ENERGY USAGE (KWH F	ER YR.) <u>116,342</u> PER YR.) <u>113,266</u>	<u>></u>
	MBTU'S SAVED PER YR4.16 MBTU		
	HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS -6.34 X \$3.15	PER MBTU = DOLLARS = (\$20	SAVED PER YEAR)
	ELECTRICAL MBTU SAVED PER YEAR X AVERAGE DOLLA 10.50 X \$15.50	ARS PER MBTU = DOLL = \$163	ARS SAVED PER YEAR
	ENERGY SAVINGS PER YEAR \$143		

~~~

| INS<br>PR | ENER<br>TALLATION &<br>OJECT NO. & T                                                              | LIFE CYC<br>GY CONSE<br>LOCATION<br>TITLE: DAC                                    | LE COST A<br>RVATION II<br>FT LEAVE<br>A41-86-C-0                           | NALYSIS (<br>NVESTME<br>ENWORTH<br>1061 FT                         | SUMMA<br>NT PRO<br>L                         | ARY<br>OGRAM (EC<br>ENWORTH     | iP)<br>REGI<br>ESOS | STL<br>L<br>ON NO.                        | JDY: F<br>CCID<br>7                                      | TLVGRUP<br>1.001                              |
|-----------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------|---------------------------------|---------------------|-------------------------------------------|----------------------------------------------------------|-----------------------------------------------|
| FIS<br>AN | CAL YEAR 198<br>ALYSIS DATE:                                                                      | 07-10-87                                                                          | DISCRET                                                                     | e portic<br>Dnomic Li                                              | N NAM                                        | IE: GROUP<br>YEARS              | 4<br>PREF           | PARED E                                   | BY: CR                                                   | В                                             |
| 1.        | INVESTMENT<br>A. CONSTRUC<br>B. SIOH<br>C. DESIGN CO<br>D. ENERGY C<br>E. SALVAGE<br>F. TOTAL INV | CTION COS<br>OST<br>REDIT CAL<br>VALUE COS<br>'ESTMENT                            | T<br>C (1A+1B-<br>T<br>(1D-1E)                                              | ⊦1C) X.9                                                           |                                              |                                 |                     |                                           | \$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$ | 2561.<br>256.<br>128.<br>2651.<br>0.<br>2651. |
| 2.        | ENERGY SAV                                                                                        | INGS (+) / (<br>TE ANNUA                                                          | OST (-)<br>_ SAVINGS                                                        | , UNIT CO                                                          | ST & D                                       | ISCOUNTEI                       | D SAVIN             | IGS                                       |                                                          |                                               |
|           | FUEL                                                                                              | UNIT C<br>\$/MBTU                                                                 | OST SAV<br>(1) MB                                                           | /INGS<br>TU/YR(2)                                                  | AN<br>SA                                     | INUAL \$<br>.VINGS(3)           | DISC<br>FACT        | OUNT<br>OR(4)                             | DI:<br>SA                                                | SCOUNTED<br>VINGS(5)                          |
|           | A. ELECT<br>B. DIST<br>C. RESID<br>D. NAT G<br>E. COAL                                            | \$ 15.5<br>\$ .0<br>\$ .0<br>\$ 3.1<br>\$ .0                                      | 0<br>0<br>5<br>0                                                            | 74.<br>0.<br>0.<br>-19.<br>0.                                      | \$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$ | 1149.<br>0.<br>0.<br>-60.<br>0. |                     | 11.05<br>16.73<br>17.67<br>19.36<br>13.47 |                                                          | 12700.<br>0.<br>0.<br>-1171.<br>0.            |
|           | F. TOTAL                                                                                          |                                                                                   |                                                                             | 55.                                                                | \$                                           | 1089.                           |                     |                                           | \$                                                       | 11529.                                        |
| 3.        | NON ENERGY                                                                                        | SAVINGS                                                                           | +) / COST(                                                                  | -)                                                                 |                                              |                                 |                     |                                           |                                                          |                                               |
|           | A. ANNUAL R                                                                                       |                                                                                   | i (+/-)<br>DR (TARLE                                                        | ۸۱                                                                 |                                              | 11 65                           |                     |                                           | \$                                                       | 0.                                            |
|           | (1) DISCO<br>(2) DISCO                                                                            | UNTED SA                                                                          | VING/COST                                                                   | (3A X 3A                                                           | <b>A</b> 1)                                  | 11.00                           |                     |                                           | \$                                                       | 0.                                            |
|           | C. TOTAL NO                                                                                       | N ENERGY                                                                          | DISCOUN                                                                     | TED SAVI                                                           | NGS(+)                                       | /COST(-) (                      | 3A2+3B              | D4)                                       | \$                                                       | 0.                                            |
|           | D. PROJECT<br>(1) 25% M.<br>A IF 30<br>B IF 30<br>C IF 31<br>D IF 31                              | NON ENEF<br>AX NON EN<br>D1 IS = OR<br>D1 IS < 3C (<br>D1B IS = ><br>D1B IS < 1 I | GY QUALII<br>IERGY CAL<br>> 3C GO TO<br>CALC SIR<br>I GO TO IT<br>PROJECT I | FICATION<br>_C (2F5 X<br>D ITEM 4<br>= (2F5+3[<br>EM 4<br>DOES NOT | TEST<br>.33)<br>D1)/1F):<br>QUAL             | =<br>IFY                        | \$                  | 3805.                                     |                                                          |                                               |
| 4.        | FIRST YEAR [                                                                                      | DOLLAR SA                                                                         | VINGS 2F3                                                                   | 3+3A+(3B1                                                          | D/(YEA                                       | RS ECONO                        | MICLIF              | E))                                       | \$                                                       | 1089.                                         |
| 5.        | TOTAL NET D                                                                                       | ISCOUNTE                                                                          | D SAVING                                                                    | S (2F5+3C)                                                         | )                                            |                                 |                     |                                           | \$                                                       | 11529.                                        |
| 6.        | DISCOUNTED<br>(IF < 1 PROJE                                                                       | ) SAVINGS                                                                         | RATIO<br>IOT QUALI                                                          | FY)                                                                | (S                                           | IR)=(5 / 1F)=                   | =                   | 4.35                                      |                                                          |                                               |

|                       |                                            |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   |                                    |                     |                    |              |           |                | FACIL           | TIES EN           |                  | NG WO          | RK REQUE                  | ST -         |
|-----------------------|--------------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------|-------------------|------------------------------------|---------------------|--------------------|--------------|-----------|----------------|-----------------|-------------------|------------------|----------------|---------------------------|--------------|
|                       | <b> </b>                                   | <del>ا</del> ظ   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CUMENT N                        | JMBE               | R                 | BUILDI                             | NG/FA               | CILITY             |              | DATE      | 15 10/11       | , see An        | 420-17 80         | <u>d Briten</u>  |                |                           | <u> </u>     |
|                       | TRANS<br>CODE                              | CHANC            | REQ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SERIAL                          | F                  | TYPE              | NUMBE                              | R                   | SUFFIX             | YR           | мо        | DA             | отн             |                   | CITATION         |                |                           |              |
|                       | 1 2 3                                      | 4                | 56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 7 8 9 10                        | 11 12              | 2 13              | 14 15 16 17                        | 18 19               | 9 20 21 22         | 23 24        | 25 26     | 27 28          | 29 30 3         | 1 32 33 34        | 35 36 37         | 38 39 4        | 0 41 42 43 4              | 4 45         |
|                       | XIFIA                                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   | P 0 0 7                            | 1 <sup>7</sup> -1-2 | s I I              | 9,0          | 0,6       | 0,6            |                 | - <u> </u> LL     |                  |                | Repla                     |              |
|                       |                                            | 10E              | DC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CUMENT NU                       | MBE                | R<br>T            | BUILDIN                            | NG/FA               |                    | BL           | JILDIN    | NG/FA          | <u>CILITY</u>   | BUIL              | DING/FAC         |                | BUILD                     | ING/F        |
|                       | CODE                                       | CHAP             | REQ<br>ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SERIAL<br>NUMBER                |                    | TYPE              | NUMBE                              | R                   | SUFFIX             | N            | UMBE      | R >            | SUFFIX          |                   | IBER             | SUFFIX         |                           | BER          |
|                       | 1 2 3                                      | 4                | 66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 7 8 9 10                        | 11 12              | 2 13              | 14 15 16 17                        | 18 19               | 9 20 21 22         | 23 24        | 25 26     | 27 28          | 29 30 3         | 1 32 33 34        | 135 36 137       | 36 39 4        |                           | -11          |
|                       |                                            | С                | 1<br>DN ANI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | JUSTIFICA                       | TION               | OF                | <u>Р 10 11 10</u><br>work то в     | 1 21 A<br>E ACC     | OMPLISH            | P10          | 015       | 1014           |                 | P 10 11           | <u>13 16 1 A</u> |                | P101314                   | 4 51<br>DE:  |
|                       | e<br>ž                                     | ele<br>aff<br>oy | ectri<br>Tecti<br>Fort                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | cal ener<br>ng light<br>mainter | igy<br>le<br>lance | use<br>vel<br>e E | ed for li<br>ls. Also<br>personnel | ghti<br>, fa        | ing and<br>airly l | air<br>ow co | condost p | ditio<br>proje | oning<br>ect, π | without<br>uch of | t adver<br>which | sely<br>can be | e done                    |              |
|                       |                                            |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   |                                    | REQU                | JESTER IN          | FORM         | ATION     | 1              | <u> </u>        |                   |                  |                |                           |              |
|                       | NAME                                       |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   | ORGANI                             | ZATIC               | N                  |              |           | TELE           | PHONE           | IO. SIGN          | ATURE            |                |                           | NAM          |
|                       |                                            | _                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   |                                    |                     |                    |              |           |                |                 |                   |                  |                |                           |              |
|                       |                                            |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   |                                    |                     | FORWA              | RDFC         | RAPP      | ROVA           | ιL              |                   | 1                |                |                           |              |
|                       | то                                         |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 | REC<br>ACT         |                   | MENDED                             | ENVI<br>NO          | RONMENTA<br>YES    | l impa       | ιcτ ·     | ESTIN          | MATED           | OST               | PERFOR           | MED            | HUM                       |              |
| and the second second |                                            |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    | PPF               |                                    | 53                  |                    | ONMEN        |           |                |                 | 2,817             | SELF-            |                | FACILITI                  | ESEN         |
|                       |                                            | VI               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | THOBITY                         |                    |                   |                                    |                     |                    | ATED         |           | WC L           | -<br>-<br>INDED | s<br>s            |                  | RACT           |                           | DATE         |
|                       | AFFRO                                      | VII              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   |                                    | N N                 | COMP               | LETE         | )         | то             | TAL             | 2,945             |                  |                |                           |              |
|                       |                                            |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   |                                    |                     |                    | BROV         |           | TION           |                 |                   |                  |                |                           |              |
|                       | <u> </u>                                   | <u> </u>         | 000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 | MREE               |                   |                                    |                     |                    | DA           | TE        |                |                 |                   |                  |                | FOR                       | WARD         |
|                       | Thurs                                      | NA I             | REQ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SERIAL                          | Ţ                  | ы<br>Ч            | ACTIO                              |                     |                    | мо           | DA        |                |                 |                   |                  |                | DESIC                     | SN I         |
|                       | CODE                                       | 5                | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | NUMBER                          | L<br>L             | 7                 | • • •                              | -                   |                    | 15/16        | 17118     |                |                 |                   |                  |                | MO<br>19 20 2             | DA<br>1 2222 |
|                       | 1 2 3                                      | 4                | 5 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1819110                         | 1112               | 13                | A - AP                             | PROV                | ED                 |              |           | sig            | NATUR           | OF APPP           | ROVAL AU         | THORIT         | <u>→</u>   - <sup>1</sup> | -1-+         |
|                       | XIF C                                      | c                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                    |                   | D DI                               | SAPPF               | IOVED              |              | 1         |                |                 |                   |                  |                |                           |              |
|                       | DA 1A                                      |                  | M<br>78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4283 ED                         |                    | 101               | - 1 FEB 78 W                       | 1 L L BI            |                    | ITIL E       | XHAU      | STED.          |                 |                   |                  |                | PINK                      |              |
|                       |                                            | in the second    | No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                    |                   | t∮ garne d                         |                     | n<br>Alfan an      | 54 J         |           | 14             |                 |                   |                  |                |                           |              |
| `<br>                 | an a   | e<br>S           | 5 <b>2</b> 940                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ان مان<br>انداد شار ام الام     | 2                  | orie              | ives a lan de                      |                     |                    |              | . 113     | N              | • 3 - 4 V       |                   |                  |                | :                         |              |
|                       |                                            | с. К             | antes de la<br>1<br>1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | and de l'hier gren i            |                    |                   |                                    |                     | Ag Lorden<br>N     | •            |           | · · · ·        | · · ·           |                   |                  |                |                           |              |
|                       | · • • •                                    | . •              | ····                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                    |                   | •                                  |                     |                    |              |           |                |                 |                   |                  | ••             |                           |              |
| •                     | ्राज्य ग्रिये प्रू<br>२०११<br>इतिहास स्थान |                  | section and a section of the section | ()                              | ан<br>19<br>19     |                   |                                    | •                   |                    |              |           |                |                 |                   |                  |                | •                         |              |
|                       | - 999 - S. (1992)                          | - <b>R</b> (1)   | •<br>• • • •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                 |                    |                   |                                    |                     | ·                  |              |           |                |                 |                   |                  |                |                           |              |

معادي شاجه

|             | the proponent ag                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ency is the Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              | t Engineers.                      |                       | BUI        | LDING/FAC                   | ILITY                                 | 1                        |                      |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------|-----------------------|------------|-----------------------------|---------------------------------------|--------------------------|----------------------|
| <br>  .     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SHC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ORT JOB DESCR                                | IPTION                            |                       | NU         | MBER                        | SUFFI                                 | к в                      | LANK                 |
| 39          | 40 41 42 43 44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 45 46 47 48 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 9 50 51 52 53 54                             | 4 55 56 57 58                     | 3 59 60 61 62 63 64   | 65 66 67 6 | 69 70 71                    | 72 73 7                               | 4 75 76 7                | 7 78 79 80           |
| ام          | Repla                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | c <sub>lel lin</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | cande                                        | s c e n                           | t lligh               | tLI        |                             |                                       |                          | 111                  |
| ΓY          | BUILDIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | G/FACILITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | BUILDING                                     | /FACILITY                         | BUILDING/FAC          |            | BUILDIN                     | G/FACIL                               | <u>.ITY</u>              |                      |
| UFF         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | R SUFFIX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NUMBER                                       | SUFFIX                            | NUMBER                | SUFFIX     | NUMBE                       | R S                                   | UFFIX                    | BLANK                |
| 39          | 40 41 42 43 44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 45 46 47 48 49                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 50 51 52 53 54                               | 55 56 57 58                       | 59 60 61 62 63 64     | 65 66 67 6 | 58 69 70 71                 | 72 73 74                              | 4 75 76 7                | 7 78 79 80           |
| 1_1         | P101314                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | P10101512                                    |                                   |                       |            |                             |                                       |                          |                      |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DESCRIBE WH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | IAT WILL HAPP                                | EN IF WORK                        | IS NOT ACCOMPLIS      | HED        |                             |                                       |                          |                      |
| jhts        | or                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ener                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | gy will cor                                  | ntinue to                         | be wasted by          | the l      | ighting                     | and                                   |                          |                      |
| bunt<br>≥ly | . or                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | air d<br>imat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ely 55 mil                                   | ig system<br>lion BTU'            | s per year.           | WOULTU     | save app                    | JION-                                 |                          |                      |
| nt          | e done                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   |                       |            |                             |                                       |                          |                      |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   |                       |            |                             |                                       |                          |                      |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   |                       |            |                             |                                       |                          |                      |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   |                       |            |                             |                                       |                          |                      |
| <u> </u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ۲<br>                                        | PERSON TO C                       | ALL FOR ADDITIO       | NAL INFO   | RMATION                     | · · · · · · · · · · · · · · · · · · · | TELEPI                   | HONĘ NO.             |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   |                       |            |                             |                                       |                          |                      |
|             | · · ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 1                                          | APPRO                             | VED FOR DESIGN        |            |                             | SOURCE                                | OF FUN                   | NDS                  |
| ε           | FROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   | <u> </u>              |            |                             |                                       | <del> </del>             |                      |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   |                       |            |                             |                                       |                          |                      |
| SE          | FACILITIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ENGINEER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |                                   |                       |            |                             | DIRECT                                |                          |                      |
| ст          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   |                       |            |                             | FUNDE                                 | D REIME                  | 3.                   |
|             | DA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              | SIGNATUF                          | RE                    | DATE       |                             |                                       |                          |                      |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | REMARKS                                      |                                   |                       |            |                             |                                       |                          |                      |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                   |                       |            |                             |                                       |                          |                      |
|             | FORWA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RDED TO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              |                                   |                       |            |                             |                                       |                          |                      |
|             | FORWA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RDED TO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              | ·                                 |                       |            |                             |                                       |                          |                      |
|             | FORWA<br>DESIGN<br>MO DA<br>19 20 21 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RDED TO<br>ESTIMATOR<br>MO DA<br>223 24 25 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                   |                       |            |                             |                                       |                          |                      |
| ORIT        | FORWA<br>DESIGN<br>MO DA<br>19 20 21 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RDED TO<br>ESTIMATOR<br>MO DA<br>223 24 25 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                   |                       |            |                             |                                       |                          |                      |
| IORIT       | FORWA<br>DESIGN<br>MO DA<br>19 20 21 2<br>TY<br>I I<br>WHITE (C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RDED TO<br>ESTIMATOR<br>MO DA<br>223 24 25 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ROJECT FILE C                                | OPY                               |                       | GREEN      | - FORWA                     | RD TO K                               | EYPUNG                   | CH AFTER             |
| (ORI1       | FORWA<br>DESIGN<br>MO DA<br>19 20 21 2<br>TY<br>1 1<br>WHITE (C<br>PINK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | RDED TO<br>ESTIMATOR<br>MO DA<br>223 24 25 26<br>I<br>I<br>RIGINAL) – P<br>– F<br>O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ROJECT FILE C<br>ORWARD TO K<br>F "APPROVAL  | OPY<br>EYPUNCH AF<br>ACTION'' BL  | TER COMPLETION        | GREEN      | - FORWA<br>COMPLI<br>APPROV | RD TO K<br>ETION OI                   | EYPUN<br>F "FORV<br>OCK  | CH AFTER<br>VARD FOR |
| ORIT        | FORWA<br>DESIGN<br>MO DA<br>19 20 21 2<br>19 20 2<br>19 20 2<br>19 20 2<br>19 20 2<br>19 2<br>10 2<br>10 2<br>10 2<br>10 2<br>10 2<br>10 2<br>10 2<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | RDED TO<br>ESTIMATOR<br>MO DA<br>223 24 25 26<br>1<br>1<br>0<br>RIGINAL) – P<br>– F<br>O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ROJECT FILE C<br>ORWARD TO K<br>F "APPROVAL  | OPY<br>EYPUNCH AF<br>ACTION" BLO  | TER COMPLETION        | GREEN      | - FORWA<br>COMPLI<br>APPROV | RD TO K<br>ETION O<br>VAL" BL         | EYPUNG<br>F "FORV<br>OCK | CH AFTER<br>VARD FOR |
| ORI"        | FORWA<br>DESIGN<br>MO DA<br>19 20 21 2<br>19 20 21 2<br>19 1<br>1 1<br>1<br>WHITE (C<br>PINK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | RDED TO<br>ESTIMATOR<br>MO DA<br>223 24 25 26<br>I I<br>PRIGINAL) – P<br>– F<br>O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ROJECT FILE C<br>ORWARD TO K<br>F "APPROVAL  | OPY<br>EYPUNCH AF<br>ACTION" BLO  | TER COMPLETION        | GREEN      | - FORWA<br>COMPLI<br>APPROV | RD TO K<br>ETION O<br>VAL" BL         | EYPUNG<br>F "FORV<br>OCK | CH AFTER<br>VARD FOR |
| ORI"        | FORWA<br>DESIGN<br>MO DA<br>192021 1<br>192021 1<br>192021 1<br>WHITE (C<br>PINK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | RDED TO<br>ESTIMATOR<br>MO DA<br>223]24 25 26<br>1 1<br>PRIGINAL) – P<br>– F<br>O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ROJECT FILE C<br>ORWARD TO KI<br>F "APPROVAL | OPY<br>EYPUNCH AF<br>ACTION" BL   | TER COMPLETION        | GREEN      | - FORWA<br>COMPLI<br>APPRO  | RD TO K<br>ETION O<br>VAL" BL         | EYPUNG<br>F "FORV<br>OCK | CH AFTER<br>VARD FOR |
| ioni.       | FORWA<br>DESIGN<br>MO DA<br>192021 2<br>192021 2<br>192021<br>192021<br>192021 2<br>192021 2<br>192021 2<br>192021 2<br>19202 | RDED TO<br>ESTIMATOR<br>MO DA<br>223 24 25 26<br>1<br>PRIGINAL) – P<br>– F<br>O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ROJECT FILE C<br>ORWARD TO KI<br>F "APPROVAL | OPY<br>EYPUNCH AF<br>ACTION'' BL  | TER COMPLETION        | GREEN      |                             | RD TO K<br>ETION O<br>VAL" BL         | EYPUNG<br>F "FORV<br>OCK | CH AFTER<br>VARD FOR |
|             | FORWA<br>DESIGN<br>MO DA<br>1920211<br>1920211<br>TY<br>1 1<br>WHITE (C<br>PINK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RDED TO<br>ESTIMATOR<br>MO DA<br>223 24 25 26<br>1<br>PRIGINAL) – P<br>– F<br>O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ROJECT FILE C<br>ORWARD TO KI<br>F "APPROVAL | OPY<br>EYPUNCH AF<br>ACTION'' BLO | TER COMPLETION        | GREEN      | - FORWA<br>COMPLI<br>APPROV | RD TO K<br>ETION OI<br>VAL" BL        | EYPUNG<br>F "FORV<br>OCK | CH AFTER<br>VARD FOR |
| (ORI)       | FORWA<br>DESIGN<br>MO DA<br>19/20/21/2<br>TY 1 1<br>WHITE (C<br>PINK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RDED TO         ESTIMATOR         MO       DA         223       24       25       26         I       I       I       I         PRIGINAL)       - P       - F       0         OR       O       O       O                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ROJECT FILE C<br>ORWARD TO K<br>F "APPROVAL  | OPY<br>EYPUNCH AF<br>ACTION" BLO  | TER COMPLETION        | GREEN      | - FORWA<br>COMPLI<br>APPROV | RD TO K<br>ETION OI<br>/AL" BL        | EYPUNG<br>F "FORV<br>OCK | CH AFTER<br>VARD FOR |
|             | FORWA<br>DESIGN<br>MO DA<br>19 20 21 1<br>19 20 21 1<br>19 10 21 1<br>19 10 21 1<br>19 10 20 20 20 20 20 20 20 20 20 20 20 20 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | RDED TO         ESTIMATOR         MO       DA         223       24       25       26         I       I       I       I         PRIGINAL)       - P       - F       O         ORIGINAL       - (0,0)       - (0,0)       - (0,0)         I       I       - (0,0)       - (0,0) <td< td=""><td>ROJECT FILE C<br/>ORWARD TO K<br/>F "APPROVAL</td><td>OPY<br/>EYPUNCH AF<br/>ACTION" BL</td><td>TER COMPLETION</td><td>GREEN</td><td>- FORWA<br/>COMPLI<br/>APPRON</td><td>RD TO K<br/>ETION OI<br/>/AL" BL</td><td>EYPUNG<br/>F "FORV<br/>OCK</td><td>CH AFTER<br/>NARD FOR</td></td<> | ROJECT FILE C<br>ORWARD TO K<br>F "APPROVAL  | OPY<br>EYPUNCH AF<br>ACTION" BL   | TER COMPLETION        | GREEN      | - FORWA<br>COMPLI<br>APPRON | RD TO K<br>ETION OI<br>/AL" BL        | EYPUNG<br>F "FORV<br>OCK | CH AFTER<br>NARD FOR |
|             | FORWA<br>DESIGN<br>MO DA<br>19/20/21 [<br>1<br>WHITE (C<br>PINK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RDED TO         ESTIMATOR         MO       DA         223       24       25       26         I       I       I       I         PRIGINAL)       - P       - F       O         ORIGINAL)       - (0,0)       - (0,0)       - (0,0)         I       I       I       I       I         I       I       I       I       I         I       I       I       I       I         I       I       I       I       I         I       I       I       I       I         I       I       I       I       I         I       I       I       I       I         I       I       I       I       I         I       I       I       I       I       I         I       I       I       I       I       I       I         I       I       I       I       I       I       I       I         I       I       I       I       I       I       I       I       I         I       I       I       I       <                                                                                                                                                                                                                                                                                                                                                                       | ROJECT FILE C<br>ORWARD TO K<br>F "APPROVAL  | OPY<br>EYPUNCH AF<br>ACTION" BL   | TER COMPLETION<br>OCK | GREEN      | - FORWA<br>COMPLI<br>APPRO  | RD TO K<br>ETION O<br>VAL" BL         | EYPUNG<br>F "FORV<br>OCK | CH AFTER<br>NARD FOR |

### ENERGY CONSERVATION ANALYSIS ESOS

|      | PROJECT GROUP                   | ECO    | ENERGY<br>SAVINGS<br>MBTU/YR | ENERGY<br>SAVINGS<br>\$ | PROJECT<br>COST<br>\$ | SIMPLE<br>PAYBACK<br>YRS | SIR          |
|------|---------------------------------|--------|------------------------------|-------------------------|-----------------------|--------------------------|--------------|
|      | GROUP 5<br>Insulate Steam Lines |        |                              |                         |                       |                          |              |
| 102  | Building 102<br>Building 1009   | ECO-M5 | 216.3                        | \$682<br>\$248          | \$1,015<br>\$432      | 1.5<br>1.7               | 9.10<br>7.77 |
| USDB | USDB Overall                    | ECO-M5 | 1479.0                       | \$4,658                 | \$10,486              | 2.3                      | 6.02         |
|      | GROUP 5 TOTALS                  |        | 1773.8                       | \$5,588                 | \$11,933              | 2.1                      | 6.35         |



| ENERGY                         | SAVINGS CALCULATION              | SHEET                                  | DATE PRE  | PARED       | SHEET            | 0F          |
|--------------------------------|----------------------------------|----------------------------------------|-----------|-------------|------------------|-------------|
|                                |                                  |                                        | FEB. 10,  | 1987        | 1                | 1           |
| PROJECT FORT LEA<br>ENERGY     | AVENWORTH<br>SAVINGS OPPORTUNITY | SURVEY                                 | BASIS FOF | R CALCULATI | ÔN               |             |
| LOCATION                       |                                  |                                        | <b>X</b>  | HAND CALC   | CULATION         | S<br>ATIONS |
| ARCHITECT/ENGINEER<br>CLARK RI | CHARDSON & BISKUP                | ************************************** |           | CONTRACT    | OR BID<br>ECIFY) |             |
| ECO MEASURE<br>INSULATE        | STEAM LINES                      |                                        | COMPUTE   | DBY<br>MAW  | CHECKE           | DBY<br>DEC  |

HEAT LOSS VALUES OBTAINED FROM TABLE M5-2

HEAT LOSS PER FOOT OF PIPE 15 PSIG STEAM. TEMP =250°F AMBIENT TEMPERATURE = 68°F

COST OF STEAM - \$3.15 / 70% SYSTEM EFF. = \$4.50 PER MILLION BTU

| PIPE<br>SIZE | TEMP<br>DIFF. | BARE PIPE<br>LOSS<br>BTUH/LF/°F | 2" INSUL.<br>LOSS<br>BTUH/LF/°F | SAVINGS<br>DIFF.<br>BTUH/LF/°F | HOURS/<br>YEAR | SAVINGS<br>1000 BTU<br>PER LF/YR | \$ SAVINGS<br>PER LF/YR | \$PER FT<br>INSLU.<br>COST |
|--------------|---------------|---------------------------------|---------------------------------|--------------------------------|----------------|----------------------------------|-------------------------|----------------------------|
| 2"           | 182°F         | 1.53                            | 0.151                           | 1.379                          | 4,380          | 1,099                            | \$4.95                  | \$7.85                     |
| 3"           | 182°F         | 2.15                            | 0.195                           | 1.955                          | 4,380          | 1,558                            | \$7.01                  | \$8.95                     |
| 4"           | 182°F         | 2.65                            | 0.231                           | 2.419                          | 4,380          | 1,928                            | \$8.68                  | \$10.60                    |

HEAT LOSS PER FOOT OF PIPE CONDENSATE LINE TEMP =180°F AMBIENT TEMPERATURE = 68°F

COST OF STEAM - \$3.15 / 70% SYSTEM EFF. = \$4.50 PER MILLION BTU

| PIPE<br>SIZE | TEMP<br>DIFF. | BARE PIPE<br>LOSS<br>BTUH/LF/°F | 2" INSUL.<br>LOSS<br>BTUH/LF/°F | SAVINGS<br>DIFF.<br>BTUH/LF/°F | HOURS/<br>YEAR | SAVINGS<br>1000 BTU<br>PER LF/YR | \$ SAVINGS<br>PER LF/YR | \$PER FT<br>INSLU.<br>COST |
|--------------|---------------|---------------------------------|---------------------------------|--------------------------------|----------------|----------------------------------|-------------------------|----------------------------|
| 1"           | 112°F         | 0.93                            | 0.108                           | 0.822                          | 4,380          | 403                              | \$1.81                  | \$7.85                     |
| 2"           | 112°F         | 1.53                            | 0.151                           | 1.379                          | 4,380          | 676                              | \$3.04                  | \$8.95                     |
| 4"           | 112°F         | 2.65                            | 0.231                           | 2.419                          | 4,380          | 1,187                            | \$5.34                  | \$10.60                    |
| 6*           | 112°F         | 3.7                             | 0.305                           | 3.395                          | 4,380          | 1,665                            | \$7.49                  | \$12.80                    |
| 8"           | 112°F         | 4.75                            | 0.388                           | 4.362                          | 4,380          | 2,140                            | \$9.63                  | \$15.95                    |

| ENERGY SAVINGS CALCULATION SHEET                              | DATE PREPARED SHEET 0F<br>FEB. 10. 1987 1 1  |
|---------------------------------------------------------------|----------------------------------------------|
| PROJECT FORT LEAVENWORTH<br>ENERGY SAVINGS OPPORTUNITY SURVEY | BASIS FOR CALCULATION                        |
| LOCATION                                                      | X HAND CALCULATIONS<br>COMPUTER CALCULATIONS |
| ARCHITECT/ENGINEER<br>CLARK RICHARDSON & BISKUP               | CONTRACTOR BID<br>OTHER (SPECIFY)            |
| ECO MEASURE<br>INSULATE STEAM LINES                           | COMPUTED BY CHECKED BY MAW DEC               |

### BUILDING NO. 1009

## 15 PSI STEAM

| PIPE<br>SIZE | FEET OF<br>UNINSULTED<br>PIPE | 1000 BTU<br>PER YEAR<br>SAVED | \$ SAVED<br>PER YEAR | COST OF<br>INSUL. \$ |
|--------------|-------------------------------|-------------------------------|----------------------|----------------------|
| 2"           | 50                            | 54,964                        | \$247                | \$393                |
|              |                               | _ = 54,964                    | \$247                | \$393                |

## BUILDING NO. 102

# 15 PSI STEAM

| PIPE<br>SIZE | FEET OF<br>UNINSULTED<br>PIPE | 1000 BTU<br>PER YEAR<br>SAVED | \$ SAVED<br>PER YEAR | COST OF<br>INSUL. \$ |
|--------------|-------------------------------|-------------------------------|----------------------|----------------------|
| 2"           | 50                            | 54,964                        | \$247                | \$393                |
| 4"           | 50                            | 96,417                        | \$434                | \$530                |
|              | BUILDING TOTA                 | L = 151,381                   | \$681                | \$923                |

| -   |            |              |                               |                               |                      |                     |             |     |
|-----|------------|--------------|-------------------------------|-------------------------------|----------------------|---------------------|-------------|-----|
|     | ENERGY S   | AVINGS CALCU | LATION SHEET                  |                               | DATE PREPA           | RED                 | SHEET OF    | 1   |
| PR  | DJECT      | FORT LEAVEN  | VORTH                         |                               | BASIS FOR C          | ALCULATIC           | DN          |     |
|     | ENERGY S   | AVINGS OPPOF | TUNITY SURVEY                 |                               | 5/10/10/10/10        |                     |             |     |
| LOC | CATION     |              |                               |                               | X                    | HAND CAL            | CULATIONS   |     |
|     |            | - <u>-</u>   |                               |                               |                      | COMPUTE             | R CALCULATI | ONS |
| ARC | CHITECT/EI | NGINEER      | •••••                         |                               |                      | CONTRAC             | TOR BID     |     |
| 500 | CLARK RIC  | HARDSON & B  | ISKUP                         |                               |                      | OTHER               | (SPECIFY)   | ,   |
| ECC | J MEASURI  |              |                               |                               | COMPUTED             | 5Y<br>N# A \A/      |             | -0  |
|     | INJULATE   | STEAM LINES  |                               |                               |                      |                     | 0.          |     |
|     | USDB OVE   | RALL         |                               |                               |                      |                     |             |     |
| .   | 15 PSI STE | AM           |                               |                               |                      |                     | •           |     |
|     | BUILDING   | PIPE<br>SIZE | FEET OF<br>UNINSULTED<br>PIPE | 1000 BTU<br>PER YEAR<br>SAVED | \$ SAVED<br>PER YEAR | COST OF<br>INSUL.\$ |             |     |
|     | 468        | 2"           | 10                            | 10,993                        | \$49                 | \$79                |             |     |
|     | 471        | 3"           | 170                           | 264,936                       | \$1,192              | \$1,522             |             |     |
|     | 472        | 2*           | 10                            | 10,993                        | \$49                 | \$79                |             |     |
|     | 485        | 2"           | 150                           | 164,893                       | \$742                | \$1,178             |             |     |
|     | 486        | 2"           | 20                            | 21,986                        | \$99                 | \$157               |             |     |
|     | 496        | 2"           | 150                           | 164,893                       | \$742                | \$1,178             |             |     |
|     |            |              | 15 PSI TOTAL =                | 638,693                       | \$2,874              | \$4,191             |             |     |
|     | CONDENS    | ATE LINE     |                               |                               |                      |                     |             |     |
|     | STEAM      | 8"           | 60                            | 128,389                       | \$578                | \$957               |             |     |
|     | 466        | 2"           | 30                            | 20,294                        | \$91                 | \$269               |             |     |
|     | 468        | 1"           | 10                            | 4,032                         | \$18                 | \$79                |             |     |
|     | 471        | 2"           | 170                           | 115,002                       | \$518                | \$1,522             |             |     |
|     | 485        | 1"           | 150                           | 60,486                        | \$272                | \$1,178             |             |     |
|     | 486        | 1"           | 20                            | 8,065                         | \$36                 | \$157               |             |     |
|     | 496        | 1"           | 150                           | 60,486                        | \$272                | \$1,178             |             |     |
|     |            | CONDENSATE   | LINE TOTAL =                  | 396,755                       | \$1,785              | \$5,338             |             |     |





| LIFE CYCL                 | E COST ANALYSIS SUMMARY        | STUDY: FTLVGRUP  |
|---------------------------|--------------------------------|------------------|
| ENERGY CONSEP             | IVATION INVESTMENT PROGRAM (EC | LCCID 1.001      |
| INSTALLATION & LOCATION:  | FT LEAVENWORTH                 | REGION NO. 7     |
| PROJECT NO. & TITLE: DACA | IVA1-86-C-0061 FT LEAVENWORTH  | ESOS             |
| FISCAL YEAR 1987          | DISCRETE PORTION NAME: GROUF   | 9 5              |
| ANALYSIS DATE: 05-31-89   | ECONOMIC LIFE 15 YEARS         | PREPARED BY: CRB |
| 1. INVESTMENT             |                                |                  |

| A. CONSTRUCTION COST                | \$  | 10848. |
|-------------------------------------|-----|--------|
| B. SIOH                             | \$  | 1085.  |
| C. DESIGN COST                      | \$  | 542.   |
| D. ENERGY CREDIT CALC (1A+1B+1C)X.9 | \$  | 11228. |
| E. SALVAGE VALUE COST               | -\$ | 0.     |
| F. TOTAL INVESTMENT (1D-1E)         | \$  | 11228. |

2. ENERGY SAVINGS (+) / COST (-) ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

|    | FUEL                                                                   | 1                                          | UNIT COST<br>\$/MBTU(1)                                                                             | SAVINGS<br>MBTU/YR(2)                                                                       | Al<br>Sa                   | NNUAL \$<br>AVINGS(3)   | DIS<br>FAG | COUNT<br>CTOR(4)                         | DIS<br>SA | SCOUNTED<br>VINGS(5)           |
|----|------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------|-------------------------|------------|------------------------------------------|-----------|--------------------------------|
|    | A. ELECT<br>B. DIST<br>C. RESID<br>D. NAT G<br>E. COAL                 | \$<br>\$<br>\$<br>\$<br>\$<br>\$           | 15.50<br>.00<br>.00<br>3.15<br>.00                                                                  | 0.<br>0.<br>0.<br>1774.<br>0.                                                               | \$<br>\$<br>\$<br>\$<br>\$ | 0.<br>0.<br>5588.<br>0. |            | 8.59<br>11.28<br>12.01<br>12.76<br>10.17 |           | 0.<br>0.<br>0.<br>71300.<br>0. |
|    | F. TOTAL                                                               |                                            |                                                                                                     | 1774.                                                                                       | \$                         | 5588.                   |            |                                          | \$        | 71300.                         |
| З. | NON ENERGY                                                             | SA                                         | VINGS(+) / C                                                                                        | OST(-)                                                                                      |                            |                         |            |                                          |           |                                |
|    | A. ANNUAL R                                                            | ECI                                        | JRRING (+/-)                                                                                        |                                                                                             |                            | 0.11                    |            |                                          | \$        | 0.                             |
|    | (1) DISCO                                                              |                                            | FACTOR (1)                                                                                          | COST (3A X 3A                                                                               | <b>\1</b> )                | 9.11                    |            |                                          | \$        | 0.                             |
|    | C. TOTAL NO                                                            | ΝE                                         | NERGY DISC                                                                                          | OUNTED SAVIN                                                                                | VGS(+                      | ) /COST(-) (            | (3A2+3     | BD4)                                     | \$        | 0.                             |
|    | D. PROJECT (<br>(1) 25% M/<br>A IF 30<br>B IF 30<br>C IF 30<br>D IF 30 | NOI<br>AX I<br>01 I<br>01 I<br>01 B<br>01B | N ENERGY Q<br>NON ENERG <sup>N</sup><br>S = OR > 3C (<br>S < 3C CALC<br>IS = > 1 GO<br>IS < 1 PROJE | UALIFICATION<br>Y CALC (2F5 X<br>GO TO ITEM 4<br>SIR = (2F5+3E<br>FO ITEM 4<br>ECT DOES NOT | TEST<br>.33)<br>D1)/1F     | )=<br>_IFY              | \$         | 23529.                                   |           |                                |
| 4. | FIRST YEAR [                                                           | OL                                         | LAR SAVING                                                                                          | S 2F3+3A+(3B1                                                                               | D/(YE                      | ARS ECONO               | DMIC L     | .IFE))                                   | \$        | 5588.                          |
| 5. | TOTAL NET D                                                            | ISC                                        | OUNTED SAV                                                                                          | /INGS (2F5+3C)                                                                              | )                          |                         |            |                                          | \$        | 71300.                         |
| 6. | DISCOUNTED<br>(IF < 1 PROJE                                            | SA<br>CT                                   | VINGS RATIO                                                                                         | )<br>IUALIFY)                                                                               | (8                         | SIR)=(5 / 1F)           | -          | 6.35                                     |           |                                |



|               |                            |                                     |                    |                              |                 |                      |                                |                                        |                        |                          |                         |                                 |                               |                            |                              |                  |                                | ~                               |                     |                                |                               |                         | FA              | CIL           |                               | IES                       | SE                    | NG                              | INE                      | EER                                                          |                              | 3 W                             | OR                | KR.                      | EQUI  |
|---------------|----------------------------|-------------------------------------|--------------------|------------------------------|-----------------|----------------------|--------------------------------|----------------------------------------|------------------------|--------------------------|-------------------------|---------------------------------|-------------------------------|----------------------------|------------------------------|------------------|--------------------------------|---------------------------------|---------------------|--------------------------------|-------------------------------|-------------------------|-----------------|---------------|-------------------------------|---------------------------|-----------------------|---------------------------------|--------------------------|--------------------------------------------------------------|------------------------------|---------------------------------|-------------------|--------------------------|-------|
|               | Të                         |                                     |                    | UME                          | NT              | NI                   | UMI                            | BEF                                    | 2                      | E                        | 3U1                     | LDI                             | NG/I                          | FA                         |                              | ΤY               | ,                              | For                             | use<br>C            | DATE                           |                               | orm                     | see             |               | 1 4 2                         |                           | 17                    | and                             |                          | ran                                                          | 1 42                         | Ť                               | <u>, (ne</u>      |                          | Jonen |
| TRAN<br>CODE  | S                          | RE                                  |                    | SEI                          | RIA<br>MB       | AL '                 | ,                              | ۲                                      | ТҮРЕ                   |                          | NUI                     | мве                             | R                             |                            | sυ                           | FF               | ıx                             | YI                              | 7                   | мо                             | ٦                             | DA                      | C               | DΤŀ           | IER                           | R FUND CITATIO            |                       |                                 | N                        |                                                              |                              |                                 |                   |                          |       |
| 1 2 3         | 3 4                        | 5                                   | 6 7                | 8                            | 9               | 10                   | 11                             | 12                                     | 13                     | 14 1                     | 51                      | 6 17                            | 18                            | 19                         | 20                           | 21               | 22                             | 23                              | 24                  | 25 26                          | 5 27                          | 28                      | 29              | 30            | 31                            | 32                        | 33                    | 34                              | 35                       | 36 3                                                         | 7 38                         | 3 39                            | 40                | 41 4                     | 2 43  |
| YIEL          |                            |                                     |                    | <b>.</b>                     | . 1             | 1                    | 1                              |                                        |                        | DIT                      | 110                     |                                 | 1123                          | -*                         |                              |                  |                                | <b>a</b> ;                      | or                  | 1 16                           | h                             | ĸ                       | ,               | 1             | ī                             | ļ                         | ı                     | 1                               | I                        | Ŧ                                                            | ,                            |                                 | IT I              | n is                     | : 111 |
|               | <u> </u>                   |                                     | ocu                | JME                          | NT              | NU                   | JME                            | BEF                                    |                        | E                        | 3011                    | LDIN                            | NG/F                          | FAC                        |                              | TΥ               |                                | P                               | BU                  | ILDI                           | NG/                           | FAC                     | ILI             | TΥ            |                               | E                         | SUI                   | LDI                             | NG                       | /FA                                                          |                              | TY                              |                   | E                        | BUILE |
| TRANS<br>CODE | CHANC                      | RE                                  | 2                  | SER                          | RIA<br>MBI      |                      |                                | ۶۲۰                                    | TYPE                   | 1                        | NUN                     | MBE                             | R                             |                            | sυ                           | FF               | ıx                             |                                 | NL                  | ЈМВЕ                           | R >                           |                         | sui             | FFI           | ×                             |                           | NU                    | IMB                             | ER                       |                                                              | St                           | UFF                             | ۰ıx               |                          | NUM   |
| 1 2 3         | 1 4                        | 5 (                                 | 5 7                | 8                            | 9               | 10                   | 11                             | 12                                     | 13                     | 14 1                     | 5 1                     | 6 17                            | 18                            | 19                         | 20                           | 21               | 22                             | 23 2                            | 4                   | 25 26                          | 27                            | 28                      | 29              | 30 :          | 31                            | 32                        | 33                    | 34 3                            | 35 3                     | 6 3                                                          | 7 38                         | 139                             | 404               | 41 4                     | 2 43  |
| XIFIE         |                            |                                     |                    |                              | <b>I</b>        |                      | 1                              |                                        |                        | P 10                     | 11                      | 10                              | 12.1                          |                            |                              | l                |                                | <u>р [</u> 1                    |                     | <u>.</u><br>10                 | 19                            |                         |                 |               |                               |                           |                       | _1                              | 1                        | _1_                                                          |                              |                                 | 1                 |                          | 1     |
| DESCR         | IPTI                       |                                     | L DV               | UST                          | 'IFI            | CA                   | TIC                            | DN I                                   | OF                     | WOR                      | кΤ                      | O 8                             | E A                           | cco                        | омр                          | LIS              | SHE                            | D                               |                     |                                |                               |                         |                 |               |                               |                           |                       |                                 |                          |                                                              |                              |                                 |                   |                          |       |
| (             | In<br>in<br>or<br>un<br>ar | sula<br>sula<br>mis<br>cont<br>e al | ate<br>stic<br>roi | se<br>on<br>ng.<br>lle<br>ha | ect<br>wa<br>ed | ic<br>is<br>Ur<br>ir | ons<br>ir<br>nir<br>ntc<br>lou | s c<br>nst<br>nsu<br>nsu<br>nsu<br>nsu | of<br>ila<br>iti<br>to | exi<br>led<br>ted<br>lit | st<br>o<br>s<br>y<br>in | ing<br>rig<br>tea<br>tun<br>ten | js<br>jin<br>m<br>ine<br>iane | te<br>al<br>li<br>ls<br>ce | am<br>ly.<br>nes<br>or<br>pe | l:<br>5 V<br>c I | ine<br>In<br>was<br>med<br>son | es.<br>n o<br>ste<br>cha<br>nne | th<br>e<br>ni<br>1, | Som<br>er<br>ner<br>cal<br>and | e ]<br>are<br>gy<br>ro<br>d a | lir<br>eas<br>by<br>con | ies<br>a<br>is. | a<br>he<br>11 | re<br>in<br>ow:<br>Un:<br>ab. | v<br>ns<br>in<br>in<br>le | erj<br>ula<br>g<br>su | y c<br>ati<br>the<br>lat<br>f c | old<br>ior<br>= h<br>:ec | l ai<br>n wa<br>nea <sup>.</sup><br>l s <sup>.</sup><br>nsin | nd<br>as<br>t t<br>tea<br>ng | no<br>dar<br>:0 (<br>m :<br>se' | mac<br>esc<br>lir | jed<br>capt<br>nes<br>ce | 9     |
|               | bu                         | rns.                                |                    |                              |                 |                      |                                |                                        |                        |                          |                         |                                 | REC                           | วบเ                        | STI                          | ER               | INI                            | FOR                             | MA                  | TION                           |                               |                         |                 |               |                               |                           |                       |                                 |                          |                                                              |                              | <u>.</u>                        |                   |                          |       |
| NAME          |                            |                                     |                    |                              |                 |                      |                                |                                        |                        | 0                        | RG.                     | ANI 2                           | ZAT                           | 101                        | v                            |                  |                                |                                 |                     |                                | TEI                           | LEP                     | ноі             | NE            | NO.                           | . 9                       | 51G                   |                                 | ruf                      | ۹E                                                           |                              |                                 |                   |                          |       |

|                     |                       |                                                                                                  | FORWARD FOR API                                                                     | PROVAL                                                                   |                                                                          |                                            |         |
|---------------------|-----------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------|---------|
| то                  | RECOMMENDED<br>ACTION | ENV<br>NO                                                                                        | IRONMENTAL IMPACT                                                                   | ESTIMATED                                                                | COST                                                                     | WORK TO BE                                 | FROM    |
| APPROVING AUTHORITY | APPROVAL              | 8<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | ENVIRONMENTAL<br>CONSIDERATIONS     EIS/EIA<br>INITIATED     EIS/EIA -<br>COMPLETED | FUNDED<br>WC <u>K</u><br>WC <u>L</u><br>WC <u>_</u><br>UNFUNDED<br>TOTAL | s<br>s <u>11,933</u><br>s<br>s <u>542</u><br>s <u>12,47</u> <sup>e</sup> | IN-HOUSE<br>SELF-HELP<br>CONTRACT<br>TROOP | FACILIT |

| [                                        |        |           |                  |     |      |                                 | APPRO | V. | AL AC | TION                            |           |    |
|------------------------------------------|--------|-----------|------------------|-----|------|---------------------------------|-------|----|-------|---------------------------------|-----------|----|
| 1                                        | щ      | DO        | CUMENT NUME      | BEF | 1    |                                 | 1     | )A | TE    |                                 | ·F(       | OR |
| ,NS<br>CODE                              | CHAN   | REQ<br>ID | SERIAL<br>NUMBER | F۲  | TYPE | ACTION TAKEN                    | мо    |    | DA    |                                 | DE:<br>MO |    |
| 1 2 3<br>X <sub>I</sub> F <sub>I</sub> C | 4<br>C | 56        | 7 8 9 10 11      | 12  | 13   | A - APPROVED<br>D - DISAPPROVED | 15 1  | 6  | 17 18 | SIGNATURE OF APPROVAL AUTHORITY | 19 20     | 2  |

DA 1 AUG 78 4283 EDITION OF 1 FEB 78 WILL BE USED UNTIL EXHAUSTED.

. •

.

.

WHITE PINK

٠1

and a straight of the and the second states and the and share water as

11.11月1日推动保健家庭的公子1111

. •

1. A.

a series and

.

.....

17.6000533

i

| RING WOF<br>n 420-6; th                       | RK REQUE                                          | ST – XFA, XFB<br>agency is the Offic              | , XFC<br>e of the Chief of Er                                | igineers.                          |                                                             |                        |                         |                            |                             |                         |                      |          |
|-----------------------------------------------|---------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------|------------------------------------|-------------------------------------------------------------|------------------------|-------------------------|----------------------------|-----------------------------|-------------------------|----------------------|----------|
| N                                             |                                                   | SHOP                                              | T JOB DESCRIPT                                               | ION                                |                                                             | -                      | BUILD                   | ING/FAC                    | SUFFI                       | x                       | BLANK                | K. M.    |
| 7 38 39 40                                    | 41 42 43 44                                       | 4 45 46 47 48 49                                  | 50 51 52 53 54 55                                            | 56 57 5                            | 8 59 60 61 62 63 6                                          | 4 65 66                | 67 68                   | 69 70 71                   | 72 73                       | 74 75 76                | 77 78 79 80          |          |
| 1 4 17                                        | In In 1. 13                                       |                                                   |                                                              | 1. 6. 1.                           |                                                             |                        |                         | 1 1.                       | <b>.</b>                    |                         |                      |          |
|                                               |                                                   | NG/FACILITY                                       | ELE A MILI<br>BUILDING/FA                                    |                                    | BUILDING/FA                                                 |                        |                         |                            | G/FACI                      |                         |                      | 1        |
| SUFFIX                                        | NUMB                                              | ER SUFFIX                                         | NUMBER                                                       | SUFFIX                             | NUMBER                                                      | SUFF                   | 'IX                     | NUMBE                      | R                           | SUFFIX                  | BLANK                |          |
| 38 39 40                                      | 41 42 43 44                                       | 45 46 47 48 49                                    | 50 51 52 53 54 55                                            | 56 57 58                           | 59 60 61 62 63 64                                           | 4 65 66                | 67 68                   | 59 70 71                   | 72 73 7                     | 75 76                   | 77 78 79 80          | ]        |
|                                               |                                                   |                                                   |                                                              |                                    |                                                             |                        |                         |                            |                             |                         |                      |          |
| d no<br>s dama<br>to es<br>eam lin<br>g seve: | ged<br>cape<br>nes<br>re                          | If th<br>conti<br>be a<br>tely                    | e lines rema<br>nue to be wa<br>safety hazar<br>1774 million | in uni<br>sted a<br>d. Th<br>BTU's | nsulated, st<br>and the pipes<br>ais ECO would<br>per year. | ceam<br>s wil<br>l sav | energ<br>l con<br>e app | y will<br>tinue<br>roxima  | to<br>a-                    |                         |                      |          |
|                                               |                                                   |                                                   | 0600                                                         |                                    |                                                             |                        | NEORM                   |                            |                             |                         |                      |          |
| - · ·                                         |                                                   | NAME                                              |                                                              |                                    | ORGANIZATION                                                |                        |                         | ATION                      |                             | TELEP                   | HONE NO.             |          |
|                                               |                                                   |                                                   |                                                              |                                    |                                                             |                        |                         |                            |                             |                         |                      |          |
| *••••••••                                     |                                                   |                                                   |                                                              | APPRO                              | VED FOR DESIGN                                              |                        |                         |                            | SOURCE                      | OF FU                   | NDS                  |          |
| USE<br>-HELP<br>RACT<br>P                     |                                                   | S ENGINEER                                        |                                                              | GNATUF                             | E                                                           | D.                     | ATE                     |                            | DIRECT<br>AUTOM<br>FUNDE    | TATIC R                 | EIMB.<br>B.          |          |
| THORITY                                       | -FORW/<br>DESIGN<br>MO D/<br>19 20 21             | ARDED TO<br>ESTIMATOR<br>A MO DA<br>2223 24 25 26 |                                                              |                                    |                                                             |                        |                         |                            |                             |                         |                      |          |
|                                               | WHITE ((<br>Pink                                  | DRIGINAL) - PRO<br>- FOI<br>OF                    | DJECT FILE COPY<br>RWARD TO KEYPU<br>"APPROVAL ACTI          | JNCH AF                            | TER COMPLETION                                              | GRÉ                    | EN -                    | FORWAF<br>COMPLE<br>APPROV | RD TO K<br>TION O<br>AL" BL | EYPUN<br>F "FORI<br>OCK | CH AFTER<br>WARD FOR |          |
| an sa ta                                      |                                                   | in an         |                                                              | •                                  |                                                             |                        |                         |                            | ·<br>·                      |                         |                      | <u> </u> |
|                                               | <ul> <li></li></ul>                               |                                                   | $\overline{(1)}$                                             |                                    |                                                             |                        |                         |                            |                             |                         |                      |          |
| , and the                                     | • • • • • •                                       |                                                   | $\mathcal{A}$                                                |                                    |                                                             |                        |                         |                            |                             |                         | м.<br>Т              |          |
| 1.4 *                                         |                                                   |                                                   | •                                                            |                                    |                                                             |                        |                         |                            |                             |                         |                      |          |
| د.<br>د دوسیور و مرور د                       | میچولیدی د<br>به سر بی از م<br>دهمین از مار مانچه |                                                   |                                                              |                                    | ••••••••••••••••••••••••••••••••••••••                      |                        |                         | •• .                       |                             |                         | ين قو<br>موت         |          |

#### ENERGY CONSERVATION ANALYSIS ESOS

,

|      | PROJECT GROUP                  | ECO     | ENERGY<br>SAVINGS<br>MBTU/YR | ENERGY<br>SAVINGS<br>\$ | PROJECT<br>COST<br>\$ | SIMPLE<br>PAYBACK<br>YRS | SIR  |
|------|--------------------------------|---------|------------------------------|-------------------------|-----------------------|--------------------------|------|
|      | GROUP 6<br>Reduce Infiltration |         |                              |                         |                       |                          |      |
| 25   | Building 25                    | ECO -A3 | 224.0                        | \$1,090                 | \$5,294               | 4.9                      | 3.43 |
| 25   | Building 25                    | ECO -A5 | 167.0                        | \$525                   | \$6,379               | 12.2                     | 4.76 |
| 77   | Building 77                    | ECO -A3 | 39.0                         | \$517                   | \$5,811               | 11.2                     | 1.08 |
| 345  | Building 345                   | ECO -A3 | 18.0                         | \$66                    | \$314                 | 4.8                      | 3.96 |
| 345  | Building 345                   | ECO -A6 | 60.0                         | \$206                   | \$1,004               | 4.9                      | 4.04 |
| 1008 | Building 1008                  | ECO -A3 | 130.0                        | \$621                   | \$4,253               | 6.8                      | 2.45 |
| 1009 | Building 1009                  | ECO -A5 | 146.0                        | \$683                   | \$6,832               | 10.0                     | 1.70 |
|      | GROUP 6 TOTALS                 |         | 784.0                        | \$3,708                 | \$29,887              | 8.1                      | 2.09 |

|       | ENERGY SAVINGS CALCULATION SHEET                                                                           | DATE PREPARED                          | SHEET OF                               |
|-------|------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------|
|       | PROJECT                                                                                                    | BASIS FOR CALCULATIO                   | N                                      |
|       | LOCATION                                                                                                   | HAND CALCU                             | JLATIONS                               |
|       |                                                                                                            |                                        |                                        |
|       | ARCHITECT/ENGINEER<br>CLARK RICHARDSON & BISKUP                                                            | X OTHER (SP                            | ECIFY) BIN METHOD                      |
|       | ECO MEASURE                                                                                                | COMPUTED BY                            | CHECKED BY                             |
|       | BLDG. #25 A3 WEATHERIZATION SAVINGS                                                                        | DLH                                    | <u> </u>                               |
|       | ENERGY SAVINGS                                                                                             |                                        |                                        |
|       | EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.<br>INSULATION BUILDING HEATING ENERGY USAGE (MBTU PER | .) <u>548.00</u><br>YR.) <u>432.00</u> | MBTU<br>MBTU                           |
|       | EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR<br>INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER  | l.) 290.00<br>YR.) 259.00              | MBTU<br>MBTU                           |
|       | MBTU'S SAVED PER YR. <u>147.00</u> MBTU                                                                    |                                        |                                        |
|       | HEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL ME<br>116.00 / 60% = 193.33                               | BTU'S SAVED PER YEAR                   |                                        |
|       | HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PE<br>193.33 X \$3.15                                        | ER MBTU = DOLLARS SA<br>= \$609        | AVED PER YEAR                          |
|       | COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS PI<br>31.00 X \$15.50                                        | ER MBTU = DOLLARS S<br>= \$481         | AVED PER YEAR                          |
|       |                                                                                                            |                                        |                                        |
|       | ENERGY SAVINGS PER YEAR \$1,090                                                                            |                                        |                                        |
|       |                                                                                                            |                                        |                                        |
|       |                                                                                                            |                                        |                                        |
|       |                                                                                                            |                                        |                                        |
|       |                                                                                                            |                                        |                                        |
|       |                                                                                                            |                                        |                                        |
|       |                                                                                                            |                                        |                                        |
|       |                                                                                                            |                                        |                                        |
| A ALA |                                                                                                            |                                        | ······································ |





Page-65

| PROJECT       BASIS FOR CALCULATION         LOCATION       FORT LEAVENWORTH         ARCHITECT/ENGINEER       COMPUTER CALCULATION         CLARK RICHARDSON & BISKUP       X         ECO MEASURE       COMPUTED BY         BLDG. #25 A5 VESTIBULES       COMPUTED BY         EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00 MBTU         INSULATION BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00 MBTU         EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       448.00 MBTU         INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER YR.)                                                                            | DNS<br><u>AETHOD</u><br>3Y |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| LOCATION       FORT LEAVENWORTH       HAND CALCULATIONS         ARCHITECT/ENGINEER       COMPUTER CALCULATIONS         CLARK RICHARDSON & BISKUP       X         ECO MEASURE       COMPUTER CALCULATIONS         BLDG. #25 AS VESTIBULES       COMPUTED BY         EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00         INSULATION BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00         EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       448.00         MBTU       INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER YR.)                                                                                         | DNS<br>METHOD<br>3Y        |
| ARCHITECT/ENGINEER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | AETHOD<br>BY               |
| CLARK RICHARDSON & BISKUP       X       OTHER (SPECIFY) BIN M         ECO MEASURE       COMPUTED BY       CHECKED BY         BLDG. #25 A5 VESTIBULES       DLH       COMPUTED BY       CHECKED BY         ENERGY SAVINGS       EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00 MBTU         INSULATION BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00 MBTU         EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       MBTU         EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR.)                                                                                                                                  | <u>AETHOD</u><br>BY        |
| BLDG. #25 A5 VESTIBULES       DLH         ENERGY SAVINGS       EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00 MBTU         INSULATION BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       448.00 MBTU         EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       -         INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       -         MBTU       MBTU         MBTU'S SAVED PER YR.       100.00 MBTU         HEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL MBTU'S SAVED PER YEAR         100.00       60% =       166.67         MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR       \$525 |                            |
| ENERGY SAVINGS         EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00 MBTU         INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       448.00 MBTU         EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       -       MBTU         INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       -       MBTU         MBTU'S SAVED PER YR.       100.00 MBTU       -       MBTU'S SAVED PER YR.         MBTU'S SAVED PER YR.       100.00 MBTU       -       166.67         MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR       166.67       X       \$3.15       =       \$525                 |                            |
| EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       548.00 MBTU         INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       -         EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       -         INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER YR.)       -         MBTU       MBTU         MBTU'S SAVED PER YR.       100.00 MBTU         HEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL MBTU'S SAVED PER YEAR         100.00       /         MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR         166.67       X                                                                                |                            |
| EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR.)MBTU<br>INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER YR.)MBTU<br>MBTU'S SAVED PER YR100.00 MBTU<br>HEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL MBTU'S SAVED PER YEAR<br>100.00 / 60% = 166.67<br>MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR<br>166.67 X \$3.15 = \$525                                                                                                                                                                                                                                                                                              |                            |
| MBTU'S SAVED PER YR.100.00MBTUHEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL MBTU'S SAVED PER YEAR<br>100.00/ $60\%$ =166.67MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR<br>166.67X\$3.15=\$525                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |
| HEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL MBTU'S SAVED PER YEAR<br>100.00 / 60% = 166.67<br>MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR<br>166.67 X \$3.15 = \$525                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |
| MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR<br>166.67 X \$3.15 = \$525                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
| COOLING MBTU SAVED PER YEAR =0<br>BUILDING NOT AIR CONDITIONED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
| ENERGY SAVINGS PER YEAR \$525                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
| ``````````````````````````````````````                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |



|   | ENERGY SAVINGS CALCULATION SHEET                                                                           | DATE PREPARED<br>2/87                       | SHEET OF                   |
|---|------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------|
|   | PROJECT                                                                                                    | BASIS FOR CALCULATIO                        | ÔN                         |
|   | LOCATION<br>FORT LEAVENWORTH                                                                               | HAND CALCU                                  | JLATIONS<br>CALCULATIONS   |
|   | ARCHITECT/ENGINEER<br>CLARK RICHARDSON & BISKUP                                                            | CONTRACTO                                   | R BID<br>ECIFY) BIN METHOD |
|   | ECO MEASURE<br>BLDG. #77 A3 WEATHERIZATION SAVINGS                                                         |                                             | CHECKED BY                 |
|   | ENERGY SAVINGS                                                                                             |                                             |                            |
|   | EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.<br>INSULATION BUILDING HEATING ENERGY USAGE (MBTU PER | .) <u>1,047.00</u><br>YR.) <u>1,043.00</u>  | MBTU<br>MBTU               |
|   | EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YR<br>INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER  | l.) <u>1,239.00</u><br>YR.) <u>1,207.00</u> | MBTU<br>MBTU               |
|   | MBTU'S SAVED PER YR. 36.00 MBTU                                                                            |                                             |                            |
|   | HEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL ME<br>4.00 / 60% = 6.67                                   | BTU'S SAVED PER YEAR                        |                            |
|   | HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PE<br>6.67 X \$3.15                                          | ER MBTU = DOLLARS S/<br>= \$21              | AVED PER YEAR              |
| Ì | COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS PE<br>32.00 X \$15.50                                        | ER MBTU = DOLLARS S<br>= \$496              | AVED PER YEAR              |
|   |                                                                                                            |                                             |                            |
|   | ENERGY SAVINGS PER YEAR \$517                                                                              |                                             |                            |
|   |                                                                                                            |                                             |                            |
|   |                                                                                                            |                                             |                            |
|   |                                                                                                            |                                             |                            |
|   |                                                                                                            |                                             |                            |
|   |                                                                                                            |                                             |                            |
|   |                                                                                                            |                                             |                            |
|   |                                                                                                            |                                             |                            |
| 1 |                                                                                                            |                                             |                            |

.-

| Γ | ENERGY SAVINGS CALCULATION SHEET                                                                       | DATE PREPARED                              | SHEET OF            |
|---|--------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------|
| P | ROJECT                                                                                                 | BASIS FOR CALCULAT                         | ION                 |
| ŀ |                                                                                                        |                                            | CULATIONS           |
|   | FORT LEAVENWORTH                                                                                       | COMPUTER                                   | CALCULATIONS        |
|   | RCHITECT/ENGINEER                                                                                      | CONTRACT                                   | OR BID              |
|   | CLARK RICHARDSON & BISKUP                                                                              | X OTHER (S                                 | PECIFY) BIN METHOD  |
| Ē |                                                                                                        | COMPUTED BY                                | CHECKED BY          |
| E | SUILD #345 A3 WEATHERIZATON SAVINGS                                                                    |                                            | 1                   |
|   | ENERGY SAVINGS                                                                                         |                                            |                     |
|   | EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER )<br>MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER | YR.) <u>2,927.0</u><br>YR.) <u>2,910.0</u> | 00                  |
|   | EXISTING BUILDING COOLING ENERGY USAGE (KWH PER Y<br>MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER Y | 'R.) <u>116,34</u><br>YR.) <u>116,11</u>   | 2                   |
|   | MBTU'S SAVED PER YR. <u>17.78</u> MBTU                                                                 |                                            |                     |
|   | HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS<br>17.00 X \$3.15                                        | PER MBTU = DOLLARS<br>= \$5                | SAVED PER YEAR<br>4 |
|   | COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS<br>0.78 X \$15.50                                        | PER MBTU = DOLLARS<br>= \$1                | SAVED PER YEAR<br>2 |
|   | ENERGY SAVINGS PER YEAR \$65                                                                           |                                            |                     |
|   |                                                                                                        |                                            |                     |



ł



ECO-A3

| SOS<br>RT LEAVENWORTH<br>NGINEER<br>ARK RICHARDSON & BISKUP                                             | 2/87<br>BASIS FO<br>X                                                                                                                                                                                                                                                                                                                                                                            | R CALCULATION<br>HAND CALCU<br>COMPUTER                                                                                                                                                                                                                                                                                                                                                                                                | L 1 ···································                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SOS<br>PRT LEAVENWORTH<br>NGINEER<br>ARK RICHARDSON & BISKUP<br>IE                                      | X                                                                                                                                                                                                                                                                                                                                                                                                | HAND CALCULATIC<br>HAND CALCU<br>COMPUTER                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| RT LEAVENWORTH<br>NGINEER<br>ARK RICHARDSON & BISKUP                                                    | X                                                                                                                                                                                                                                                                                                                                                                                                | HAND CALCU<br>COMPUTER                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| DRT LEAVENWORTH<br>NGINEER<br>ARK RICHARDSON & BISKUP<br>IE                                             | X                                                                                                                                                                                                                                                                                                                                                                                                | COMPUTER                                                                                                                                                                                                                                                                                                                                                                                                                               | CALCUL ATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| NGINEER<br>ARK RICHARDSON & BISKUP<br>IE                                                                |                                                                                                                                                                                                                                                                                                                                                                                                  | CONTOACTO                                                                                                                                                                                                                                                                                                                                                                                                                              | SUFORTUDINO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| E                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                  | _ UNITRACIC                                                                                                                                                                                                                                                                                                                                                                                                                            | DR BID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1L j                                                                                                    | COMPUTE                                                                                                                                                                                                                                                                                                                                                                                          | OTHER (SF                                                                                                                                                                                                                                                                                                                                                                                                                              | PECIFY) BIN METH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| A-6 REDUCE GLASS AREA SAVINGS                                                                           | COMPUTE                                                                                                                                                                                                                                                                                                                                                                                          | DLH                                                                                                                                                                                                                                                                                                                                                                                                                                    | CHECKED BY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| JERGY SAVINGS                                                                                           | · · · · · · · · ·                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                        | <u></u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR<br>DDIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YF | .)<br><del>.</del> .)                                                                                                                                                                                                                                                                                                                                                                            | 2,927.66                                                                                                                                                                                                                                                                                                                                                                                                                               | <u>}</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| (ISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.                                                      | )                                                                                                                                                                                                                                                                                                                                                                                                | 116,342                                                                                                                                                                                                                                                                                                                                                                                                                                | -<br>-<br>-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                         | •)                                                                                                                                                                                                                                                                                                                                                                                               | 115,964                                                                                                                                                                                                                                                                                                                                                                                                                                | <u>}</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 5105 SAVED PER TR00.19 MBT0                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PI<br>58.90 X \$3.15                                        | ER MBTU                                                                                                                                                                                                                                                                                                                                                                                          | = DOLLARS S.<br>\$186                                                                                                                                                                                                                                                                                                                                                                                                                  | AVED PER YEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  | • • • • •                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1.29 X \$15.50                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                  | = DOLLARS S<br>\$20                                                                                                                                                                                                                                                                                                                                                                                                                    | AVED PER TEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  | •                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| VERGY SAVINGS PER YEAR \$206                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        | and a state of the |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                         | ISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR<br>DIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR<br>DIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR<br>DIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR<br>STU'S SAVED PER YR. <u>60.19</u> MBTU<br>SATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PI<br>58.90 X \$3.15<br>COLING MBTU SAVED PER YEAR X AVERAGE DOLLARS PI<br>1.29 X \$15.50 | ISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)<br>DIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.)<br>ISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.)<br>DIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.)<br>TU'S SAVED PER YR60.19 MBTU<br>ATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU<br>58.90 X \$3.15 -<br>DOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU<br>1.29 X \$15.50 -<br>MBTU 1.29 X \$15.50 - | ISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)<br>DIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YR.)<br>ISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.)<br>DIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.)<br>III6,342<br>DIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.)<br>III6,342<br>SATING MBTU SAVED PER YR. <u>60.19</u> MBTU<br>SATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS S<br>58.90 X \$3.15 - \$186<br>XOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS S<br>1.29 X \$15.50 - \$20<br><u>VERGY SAVINGS PER YEAR</u> <u>S206</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



|                  | ENERGY SAVINGS CALCULATION SHEET                                                                                                                           | DATE PRE         | PARED                               | SHEET                                       | OF 1     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------|---------------------------------------------|----------|
| PROJECT          |                                                                                                                                                            | BASIS FOR        | CALCULATI                           | ON .                                        | <u>'</u> |
| OCATION          | FORT LEAVENWORTH<br>T/ENGINEER                                                                                                                             |                  | HAND CALCI<br>COMPUTER<br>CONTRACTO | ULATIONS<br>CALCULAT<br>OR BID<br>PECIEX) B | TIONS    |
| ECO MEAS         | SURE                                                                                                                                                       | COMPUTE          | D BY                                | CHECKE                                      | D BY     |
| <u>3LDG. #10</u> |                                                                                                                                                            | <u> </u>         |                                     | <u> </u>                                    |          |
|                  | EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER                                                                                                           | YR.)             | 661.00                              |                                             |          |
|                  | EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER<br>INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER<br>INSULATION BUILDING COOLING ENERGY USAGE (MBTU P | YR.)<br>PER YR.) | 368.00<br>351.00                    |                                             |          |
|                  | MBTU'S SAVED PER YR85.00 MBTU                                                                                                                              |                  |                                     |                                             |          |
|                  | HEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL<br>68.00 / 60% = 113.33                                                                                   | MBTU'S SA        | VED PER YE                          | AR                                          |          |
|                  | HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS<br>113.33 X \$3.15                                                                                           | PER MBTU<br>=    | = DOLLARS<br>\$357                  | SAVED PI                                    | ER YEAR  |
|                  | COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS<br>17.00 X \$15.50                                                                                           | PER MBTU<br>=    | = DOLLARS<br>\$264                  | SAVED P                                     | ER YEAR  |
|                  |                                                                                                                                                            |                  |                                     |                                             |          |
|                  | ENERGY SAVINGS PER YEAR \$621                                                                                                                              |                  |                                     |                                             |          |
|                  |                                                                                                                                                            |                  |                                     |                                             |          |
|                  |                                                                                                                                                            |                  |                                     |                                             |          |
|                  |                                                                                                                                                            |                  |                                     |                                             |          |
|                  |                                                                                                                                                            |                  |                                     |                                             |          |
|                  |                                                                                                                                                            |                  |                                     |                                             |          |
|                  |                                                                                                                                                            |                  |                                     |                                             |          |
|                  |                                                                                                                                                            |                  |                                     |                                             |          |



|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                     |            |             |                  |            |            |              |              |           |            |            |            |            |            | Fo         | r us     | e of      | thi       | is foi           | F<br>. m  | AC           | ILI<br>AR 4 | 20-      | S E<br>- <u>17</u> | NC       |           | EEF<br>V Par | (IN(<br>n_42 | WC و<br><u>0-6:</u> | )HK<br>the p | KE<br>prood   | onen       | tage        |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|------------|-------------|------------------|------------|------------|--------------|--------------|-----------|------------|------------|------------|------------|------------|------------|----------|-----------|-----------|------------------|-----------|--------------|-------------|----------|--------------------|----------|-----------|--------------|--------------|---------------------|--------------|---------------|------------|-------------|
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | U                 | Da                  | CUM        | ENT         | NU               | мва        | R          |              | BU           | ILD       | INC        | G/F        | AC         | ILIT       | Y          |            |          | DA        | ΤE        |                  |           |              |             |          |                    |          |           |              |              |                     |              |               |            |             |
|   | TRANS<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CHAN              | REQ<br>ID           | SI<br>NI   | ERIA<br>JMB | AL '<br>ER       | >          | ТҮРЕ       |              | NU           | MB        | ER         |            |            | SUF        | FIX        |            | ŕR       | м         | 0         | D                | •         | OTHER FUND C |             |          |                    |          | TIO       | N<br>        |              |                     |              | <del></del> , |            |             |
|   | 1 2 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4                 | 5 6                 | 7 8        | 9           | 10               | 111        | 2 1:       | 3 14         | 15           | 16 1      | 7          | 18         | 19         | 20 2       | 1 22       | 2 23       | 24       | 25        | 26        | 27               | 28 2      | 29 3         | 0 31        | 32       | 33                 | 34       | 35        | 36 3         | 7 38         | 3 39                | 40 4         | 1 42          | 43         | 44 4        |
|   | XIFIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                     | _1         | 1           | II               |            |            | PI           | 11           | 01        | 01.        | 81         |            |            | _L         | 9_         | 10_      | 01        | 6         | 0.16             | 5         | _1_          | 1           | Ļ        |                    |          |           | _1           | _1           |                     | Ble          | Jd            | hi k       | <u>c</u> le |
|   | TRANS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                     |            |             |                  |            |            |              |              |           |            |            |            |            | DING       |            |          |           |           |                  |           |              |             |          |                    |          |           |              |              |                     |              |               |            |             |
|   | TRANS       Z       DOCUMENT NUMBER       BOILDING/FACIENT       BOILDING/FACIENT       BOILDING/FACIENT       BOILDING/FACIENT       BOILDING/FACIENT         TRANS       Z       REQ       SERIAL       X       X       X       NUMBER       SUFFIX       SUFFIX       NUMBER       SUFFIX       SUFFIX <th>BER</th> |                   |                     |            |             |                  |            |            |              |              |           |            |            |            |            | BER        |            |          |           |           |                  |           |              |             |          |                    |          |           |              |              |                     |              |               |            |             |
|   | 1 2 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4                 | 56                  | 7 8        | 9           | 10               | 111        | 2 13       | 3 14         | 15           | 16 1      | 7 1        | 18 1       | 19 2       | 20 2       | 1 22       | 23         | 24       | 25        | 26        | 27               | 82        | 9 3          | 2 31        | 32       | 33                 | 34       | 35        | 36 3         | 7 38         | 3 39 4              | 10 4 1       | 42            | 43         | 44 4        |
|   | X F B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ·<br>C            | 1                   |            |             |                  |            |            | PI           | <u>)   (</u> | 0 12      | 215        | 5.L        |            | 1          | 1          | P          | 10.1     | 10 T      | 7.1       | <u>7 L</u>       |           |              | 1           | P        | لما                | 31       | 4 1       | 5.14         |              |                     |              | 1             | Ц          |             |
| , |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | סודי              | N ANI               | s nr o     | TIFI        | ICAT             | TION       | I OF       | = woi        | 3K.          | то        | 8E         | AC         | CO         | MPL        | ISH.       | ED         |          |           |           |                  |           |              |             |          |                    |          |           |              |              |                     |              |               |            |             |
|   | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | lea<br>con        | t lo<br>trol        | ss I       | by<br>Kee   | in:<br>epin      | fil<br>ng  | tra<br>in: | atio<br>fil1 | on<br>Era    | is<br>ati | s a<br>.on | n<br>n t   | naj<br>:o  | or<br>a i  | cc<br>nin  | nt:<br>.im | ri<br>um | but<br>wi | or<br>.11 | t to<br>n        | o k<br>ot | oui<br>on    | ldi<br>ly   | nç<br>re | r e<br>du          | ne<br>ce | rgy<br>tł | y u<br>ne    | se<br>hea    | and<br>tin          | i co<br>ig e | omfo<br>enei  | ort<br>rgy |             |
|   | c                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | lir               | ectl                | y, 1       | but         | a                | lĺc        | w (        | occi         | ıpa          | int       | S          | tc         | o u        | se         | lc         | we         | r v      | win       | nte       | er i             | ter       | npe          | rat         | ur       | e                  | se       | tti       | ing          | 5.           | In                  | fil          | tra           | a-         |             |
| ł | t<br>E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | zio<br><u>Vea</u> | n is<br><u>ther</u> | rec<br>iza | duc<br>tic  | ed<br><u>n</u> - | in<br>- i  | tl<br>nc   | he i<br>lude | io]<br>s     | llo<br>ca | wi<br>ul   | .ng<br>.ki | j n<br>.ng | anı<br>, v | her<br>vea | s:<br>th   | ers      | str       | rip       | pi               | ng        | an           | d s         | ea       | li                 | ng       | CI        | rac          | ks,          | dc                  | ors          | s ar          | nd         |             |
|   | v                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | vin               | dows                | • .        | Ves         | tik              | bul        | <u>es</u>  | - v          | vil          | 1         | re         | du         | ice        | tł         | he         | am         | our      | nt        | of        | i i              | nfj       | .lt          | rat         | ic       | n.                 | th       | roi       | ıgh          | CC           |                     | nly          | v us          | sed        |             |
|   | ć                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | doo               | rs.                 | Rea        | duc         | ind              | <u>q t</u> | he         | gla          | 155          | <u>a</u>  | re         | a          | -          | rer        | nov        | in         | зv       | win       | ndc       | ws               | ar        | nd           | rep         | sla<br>: | .C1                | ng       | tr<br>    | nem          | Wl           | .tn                 | ins          | sula          | ate        |             |
|   | j                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | .ns               | ert                 | pane       | els         | , 1              | red        | uc:        | ing          | SC           | JIa       | r          | ga         | 110        | 11         |            | um         | ner      |           |           | iea <sup>-</sup> |           | OS           | S à         |          | nI                 | 11       | tra       | 101          | n            | <u>1n</u>           | WTI          | iter          | L .        |             |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                     |            |             | <u></u>          |            |            |              |              |           | н          | ЕÚ         | UE.        | 215        |            | 1-0        | r Mi     | AII       |           |                  |           |              |             |          |                    |          |           |              |              |                     |              |               |            |             |
| ł |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                     |            |             |                  |            |            | 10           | 00           |           | 171        | A T !      | ON         |            |            |            |          |           |           | TFL              | FPF       | ION          | E N(        | וכ       | SIG                | IN A     | TU        | RE           |              |                     |              |               |            | - [N/       |

|                     |                       |                  | FORWARD FOR AP                                                                  | PROVAL                       |                                                   |                                            |            |
|---------------------|-----------------------|------------------|---------------------------------------------------------------------------------|------------------------------|---------------------------------------------------|--------------------------------------------|------------|
| то                  | RECOMMENDED<br>ACTION | ENV<br>NO        | YES                                                                             | ESTIMATED                    | COST                                              | WORK TO BE                                 | FROM       |
| APPROVING AUTHORITY | DISAPPROVAL           | N<br>N<br>N<br>N | ENVIRONMENTAL<br>CONSIDERATIONS<br>EIS/EIA<br>INITIATED<br>EIS/EIA<br>COMPLETED | FUNDED<br>WC K<br>WC L<br>WC | ss<br>s 38,546<br>ss<br>ss<br>s 1,752<br>s 40,298 | IN-HOUSE<br>SELF-HELP<br>CONTRACT<br>TROOP | FACILITIES |

| <b></b> |         |      |     |     |    |    |     |          |              |      | ļ             | PPROV | ALA   | CTION                           |         |           |
|---------|---------|------|-----|-----|----|----|-----|----------|--------------|------|---------------|-------|-------|---------------------------------|---------|-----------|
|         | T       | w    | DC  | cui | ME | NT | NUN | 188      | R            | Τ    |               | DA    | ATE   |                                 | ·FC     | RWAF      |
|         | IS<br>E | HANC | REQ |     | SE | RI |     | <b>\</b> | ΥPE          | 1    | ACTION TAKEN  | мо    | DA    |                                 | DES     | IGN<br>DA |
| 1 2     | 3       | 4    | 5 6 | 7   | 8  | 9  | 101 | 1 1      | .  -<br>2 1: | 3 14 | 4             | 15 16 | 17 18 |                                 | 19 20   | 21 22     |
| XIEI    | c       | 2    | ,   | Γ,  |    | ,  | ,   | T        |              |      | D DISAPPROVED |       |       | SIGNATURE OF APPROVAL AUTHORITY |         |           |
|         |         |      |     |     |    |    |     | -        | 1            |      | 1             |       |       |                                 | 14/14/1 | TE (OF    |

DA 1 AUG 78 4283 EDITION OF 1 FEB 78 WILL BE USED UNTIL EXHAUSTED.

A standard stand Standard stand Standard stand Standard st Standard stand Standard st Standard stand Standard stand Standard stan

WHITE PINK

. . . . · ·

ana, u a sa

14 1 E S - And the second second

|             | UNK NEUUES                                   | T – XFA, XFB                 | , XFC                                             |          |                   |          |                              |                           |                           |                        |
|-------------|----------------------------------------------|------------------------------|---------------------------------------------------|----------|-------------------|----------|------------------------------|---------------------------|---------------------------|------------------------|
| 420-6       | o; trie proponent a                          | gency is the Utric           | e or the Unier of Er                              | YUNEELS. |                   | BU       | ILDING/FAC                   | LITY                      |                           |                        |
|             |                                              | SHOP                         | RT JOB DESCRIPT                                   | ION      |                   | N1       | UMBER                        | SUFF                      | IX I                      | BLANK                  |
| 38 39       | 40 41 42 43 44                               | 45 46 47 48 49               | 50 51 52 53 54 55                                 | 56 57 58 | 59 60 61 62 63 64 | 65 66 67 | 68 69 70 71                  | 72 73                     | 74 75 76                  | 77 78 79 80            |
|             | Reduc                                        | el li Inlfi                  | j  ]  +  r  =  t                                  | lilolm   | 1 1 1 1 1 1       | P 11     |                              | 1                         |                           |                        |
|             | BUILDIN                                      | G/FACILITY                   | BUILDING/FA                                       | CILITY   | BUILDING/FAC      | LITY     | BUILDIN                      | G/FACI                    | LITY                      |                        |
| SUFF        |                                              | R SUFFIX                     | NUMBER                                            | SUFFIX   | NUMBER            | SUFFIX   | NUMBER                       | ۹                         | SUFFIX                    | BLANK                  |
| 38 39       | 40 41 42 43 44                               | 45 46 47 48 49               | 50 51 52 53 54 55                                 | 56 57 58 | 59 60 61 62 63 64 | 65 66 67 | 68 69 70 71                  | 72 73                     | 74 75 76                  | 77 78 79 80            |
|             |                                              |                              |                                                   | 1 1      |                   |          |                              |                           | 11                        | 1 1 1                  |
|             | ·                                            | DESCRIBE WHA                 | T WILL HAPPEN                                     | FWORK    | IS NOT ACCOMPLIS  | HED      |                              |                           |                           |                        |
|             |                                              |                              |                                                   |          |                   |          |                              |                           |                           |                        |
| e an        | d comfort                                    | Build                        | ings will co                                      | ntinue   | to waste ene      | ergy by  | y heating                    | ſ                         |                           |                        |
| eati        | ng energy                                    | outsi                        | de air leaki<br>ants will pr                      | ng thr   | ough doors ar     | d wind   | lows.                        |                           |                           |                        |
| • ⊥.        | IIIIICIa-                                    | therm                        | ostat to mai                                      | ntain    | some degree o     | f comf   | fort, fur                    | ther                      |                           |                        |
| s, d        | oors and                                     | incre                        | asing the he                                      | ating    | energy requir     | ed. (    | )verall                      | ~                         |                           |                        |
| vith        | insulated                                    | Savin                        | gs for difs                                       | IKO 13   |                   | D10 2    | s per yeu                    | L •                       |                           |                        |
| <u>n in</u> | winter.                                      |                              | PER                                               |          |                   |          | ORMATION                     |                           |                           |                        |
| ·           |                                              | NAME                         |                                                   |          | ORGANIZATION      |          |                              | <u></u>                   | TELE                      | PHONE NO.              |
|             |                                              |                              |                                                   |          |                   |          |                              |                           |                           |                        |
|             |                                              | 7                            |                                                   | APPROV   | ED FOR DESIGN     |          |                              | SOURC                     | E OF FU                   | INDS                   |
| BE          | FROM                                         |                              |                                                   |          |                   |          |                              |                           |                           |                        |
| EU          |                                              |                              |                                                   |          |                   |          |                              |                           |                           |                        |
| USE         | FACILITIES                                   | ENGINEER                     |                                                   |          |                   |          |                              | DIREC                     | т                         |                        |
| HELP        |                                              |                              |                                                   |          |                   |          |                              | AUTO                      | MATIC P                   | IEIMB.<br>IB.          |
|             | DA                                           | TE                           | S                                                 | IGNATUR  | ΙE                | DAT      | E                            |                           |                           |                        |
|             |                                              |                              | REMARKS                                           |          |                   |          |                              |                           |                           |                        |
|             |                                              |                              |                                                   |          |                   |          |                              |                           |                           |                        |
|             |                                              | ESTIMATOR                    | •                                                 |          |                   |          |                              |                           |                           |                        |
|             | MO D                                         | MO DA                        |                                                   |          |                   |          |                              |                           |                           |                        |
|             |                                              | 2223124 25 26                |                                                   |          |                   |          |                              |                           |                           |                        |
|             | 19 20 21                                     |                              |                                                   |          |                   |          |                              |                           |                           |                        |
| гнові       | TY 192021                                    |                              |                                                   |          | <u>.</u>          |          |                              |                           |                           |                        |
| THORI       | 19 20 21  <br>TY        <br>WHITE (C<br>PINK | DRIGINAL) - PR<br>- FO<br>OF | OJECT FILE COPY<br>RWARD TO KEYP<br>"APPROVAL ACT | UNCH AF  | TER COMPLETION    | GREEN    | - FORWAI<br>COMPLE<br>APPROV | RD TO<br>TION (<br>AL" BI | KEYPUN<br>DF "FOP         | ICH AFTER              |
| THORI       | TY 192021<br>TY WHITE (C<br>PINK             | DRIGINAL) - PR<br>- FO<br>OF | OJECT FILE COPY<br>RWARD TO KEYP<br>"APPROVAL ACT | UNCH AF  | TER COMPLETION    | GREEN    | - FORWAI<br>COMPLE<br>APPROV | RD TO<br>TION (<br>AL" BI | KEYPUN<br>DF "FOP<br>LOCK | ICH AFTER              |
| HORI        | TY 192021                                    | DRIGINAL) - PR<br>- FO<br>OF | OJECT FILE COPY<br>RWARD TO KEYP<br>"APPROVAL ACT | UNCH AF  | TER COMPLETION    | GREEN    | - FORWAI<br>COMPLE<br>APPROV | RD TO<br>TION (<br>AL" BI | KEYPUN<br>DF "FOP<br>LOCK | NCH AFTER              |
| THORI       | TY 19 20 21 1<br>TY 1 1<br>WHITE (C<br>PINK  | DRIGINAL) - PR<br>- FO<br>OF | OJECT FILE COPY<br>RWARD TO KEYP<br>"APPROVAL ACT | UNCH AF  | TER COMPLETION    | GREEN    | - FORWAI<br>COMPLE<br>APPROV | RD TO<br>TION (<br>AL" BI | KEYPUN<br>DF "FOR<br>LOCK | ICH AFTER              |
| THORI       |                                              | DRIGINAL) - PR<br>- FO<br>OF | OJECT FILE COPY<br>RWARD TO KEYP<br>"APPROVAL ACT | UNCH AF  | TER COMPLETION    | GREEN    | - FORWAI<br>COMPLE<br>APPROV | RD TO<br>TION (<br>AL" BI | KEYPUN<br>DF "FOR<br>LOCK | NCH AFTER<br>IWARD FOR |
| THORI       |                                              | DRIGINAL) - PR<br>- FO<br>OF | OJECT FILE COPY<br>RWARD TO KEYP<br>"APPROVAL ACT | UNCH AF  | TER COMPLETION    | GREEN    | - FORWAI<br>COMPLE<br>APPROV | RD TO<br>TION (<br>AL" BI | KEYPUN<br>DF "FOR<br>LOCK | ICH AFTER              |
| rhoRi       |                                              | DRIGINAL) - PR<br>- FO<br>OF | OJECT FILE COPY<br>RWARD TO KEYP<br>"APPROVAL ACT | UNCH AF  | TER COMPLETION    | GREEN    | - FORWAI<br>COMPLE<br>APPROV |                           | KEYPUN<br>DF "FOR<br>LOCK | NCH AFTER              |

•

|                          | PROJECT GROUP                                               | ECO                                  | ENERGY<br>SAVINGS<br>MBTU/YR   | ENERGY<br>Savings<br>\$              | PROJECT<br>COST<br>\$                             | SIMPLE<br>PAYBACK<br>YRS | SIR                          |
|--------------------------|-------------------------------------------------------------|--------------------------------------|--------------------------------|--------------------------------------|---------------------------------------------------|--------------------------|------------------------------|
|                          | GROUP 7<br>Replace Motors                                   |                                      |                                |                                      |                                                   |                          |                              |
| 25<br>345<br>470<br>USDB | Building 25<br>Building 345<br>Building 470<br>USDB Overall | ECO-E4<br>ECO-E4<br>ECO-E4<br>ECO-E4 | 150.1<br>18.9<br>26.7<br>136.0 | \$2,327<br>\$293<br>\$414<br>\$2,108 | \$14,793<br>\$2,680<br>\$3,469<br><u>\$18,206</u> | 7.0<br>9.1<br>8.4<br>8.6 | 1.68<br>1.28<br>1.40<br>1.36 |
|                          | GROUP 7 TOTALS                                              |                                      | 331.7                          | \$5,142                              | \$39,148                                          | 7.6                      | 1.54                         |

.

### ENERGY CONSERVATION ANALYSIS ESOS

|                      | ENERGY SAVINGS       | CALCU | LATION  | SHEET    | DATE PRE  | PARED         |           | SHEET    | OF      |  |  |  |  |  |  |
|----------------------|----------------------|-------|---------|----------|-----------|---------------|-----------|----------|---------|--|--|--|--|--|--|
|                      |                      | •     |         |          |           | 7/10/87       |           | 1        | 1       |  |  |  |  |  |  |
| PROJEC               | FORT LEAVENWOR       | тн    |         |          | BASIS FOR |               | ION       |          |         |  |  |  |  |  |  |
|                      | ENERGY SAVINGS       | OPPOR | TUNITY  | SURVEY   |           |               |           |          |         |  |  |  |  |  |  |
| LOCATK               | ON                   |       |         |          | <u> </u>  | HAND CALC     |           |          |         |  |  |  |  |  |  |
|                      | BUILDING 25 WATE     | R TRE | ATMENT  | PLANT    |           |               |           |          |         |  |  |  |  |  |  |
| ARCHITI              | ECT/ENGINEER         |       | 01/110  |          |           | OTUED (S      |           |          |         |  |  |  |  |  |  |
|                      | CLARK RICHARDSO      | N&BI  | SKUP    | COMPLITE | av        |               |           |          |         |  |  |  |  |  |  |
| LECO WE              | ASURE                | NOTO  | De      |          | COMPOTE   | MAW           |           | DEC      |         |  |  |  |  |  |  |
|                      | ENERGI EFFICIEN      | WOIC  | /13     |          |           | I             |           |          |         |  |  |  |  |  |  |
|                      |                      |       |         |          |           |               |           |          |         |  |  |  |  |  |  |
|                      |                      |       |         |          |           |               |           |          |         |  |  |  |  |  |  |
| MOTOR                | MOTOR ENERGY SAVINGS |       |         |          |           |               |           |          |         |  |  |  |  |  |  |
| MOTOR ENERGY SAVINGS |                      |       |         |          |           |               |           |          |         |  |  |  |  |  |  |
|                      |                      |       |         |          |           |               |           | ·        | DAVDAOK |  |  |  |  |  |  |
| QUAN.                | DESCRIPTION          | HP    | WATT    | OPER.    | SAVINGS   | SAVINGS       | INSTALLED | CID      | VEADO   |  |  |  |  |  |  |
|                      |                      |       | LOSS    | HOURS/   |           | PER YEAR      | COST      | SIR      | TEARS   |  |  |  |  |  |  |
|                      |                      |       | SAVINGS | YEAH     | MBIUS     | DOLLARS       |           | <u> </u> |         |  |  |  |  |  |  |
|                      | AIR COMPRESSOR       | 2     | 350     | 4380     | 5.2       | \$81          | \$466     | 1.9      | 5.7     |  |  |  |  |  |  |
| · · · ·              |                      |       |         |          |           |               |           |          |         |  |  |  |  |  |  |
| 1                    | CO2 COMPRESSOR       | 3     | 400     | 4380     | 6.0       | \$93          | \$582     | 1.8      | 6.3     |  |  |  |  |  |  |
|                      | PRIMING & BACK-      |       |         |          |           |               |           |          |         |  |  |  |  |  |  |
| 2                    | WASH PUMPS           | 5     | 500     | 4380     | 14.9      | \$232         | \$1,288   | 2.0      | 5.0     |  |  |  |  |  |  |
|                      | LIME CONVEYOR        | 25    | 1300    | 4380     | 19.4      | \$301         | \$1,780   | 1.9      | 5.9     |  |  |  |  |  |  |
|                      |                      |       |         |          |           |               |           |          |         |  |  |  |  |  |  |
| 1                    | AIR COMPRESSORS      | 40    | 1700    | 4380     | 25.4      | \$394         | \$2,623   | 1.7      | 6.7     |  |  |  |  |  |  |
|                      | HIGH SERVICE         | 100   | 6900    | 1300     | 101 7     | \$1 576       | \$8.520   | 20       | 54      |  |  |  |  |  |  |
| 1                    | IPUMP #1             | 100   | 6800    | 4380     | 101.7     | <u>φ1,570</u> | φ0,520    | 2.0      | <u></u> |  |  |  |  |  |  |
|                      |                      |       |         | TOTALS   | 172.7     | \$2,676       | \$15,259  | 1.9      | 5.7     |  |  |  |  |  |  |

25 YEAR DISCOUNT FACTOR 11.05



ļ



ECO-E4

Page-81

|         | ENERGY SAVINGS                        | CALCU     |          | SHEET  | DATE PRE  | PARED                                 | <u></u>   | SHEET | OF      |
|---------|---------------------------------------|-----------|----------|--------|-----------|---------------------------------------|-----------|-------|---------|
|         |                                       |           |          |        | DACIO 200 | 7/10/87                               |           | 1     | 1       |
| PROJEC  | FORT LEAVENWOR                        |           | TUNITY   | CUDVEV | BASIS FOR | CALCULAT                              | ION       |       |         |
| LOCATI  | ENERGY SAVINGS                        | ОРРОн     | TUNIT    | SURVEI | x         | HAND CALC                             |           |       |         |
|         | UN BUUDING 345 PAT                    | сн сом    |          | CENTER |           | COMPUTER                              | CALCULATI | IONS  |         |
| СНІТ    | ECT/ENGINEER                          |           |          | -      |           | CONTRACT                              | OR BID    |       |         |
|         | CLARK BICHARDSC                       | N & B     | SKUP     |        |           | OTHER (S                              | PECIFY)   |       |         |
| FCO ME  | ASURE                                 |           |          |        | COMPUTE   | O BY                                  | CHECKED E | BY    |         |
| 200 112 | ENERGY EFFICIEN                       | г мото    | DRS      |        |           | MAW                                   |           |       | DEC     |
|         |                                       |           |          |        |           |                                       |           |       |         |
| MOTOR   | ENERGY SAVINGS                        |           |          |        |           |                                       |           |       |         |
| OLIAN   | DESCRIPTION                           | HP        | WATT     | OPER.  | SAVINGS   | SAVINGS                               | INSTALLED |       | PAYBACK |
| GUAN.   |                                       |           | LOSS     | HOURS/ | PER YEAR  | PER YEAR                              | COST      | SIR   | YEARS   |
|         |                                       |           | SAVINGS  | YEAR   | MBTU'S    | DOLLARS                               |           |       |         |
|         | · · · · · · · · · · · · · · · · · · · |           |          |        |           |                                       |           |       |         |
| 3       | AHU FANS 1,2,3.                       | 1.5       | 300      | 4380   | 13.5      | \$209                                 | \$1,326   | 1.7   | 6.4     |
| 1       | AHU FAN 4                             | 2         | 350      | 4380   | 5.2       | \$81                                  | \$466     | 1.9   | 5.7     |
| 1       | HEATING WTR PUMP                      | 5         | 500      | 4380   | 7.5       | \$116                                 | \$644     | 2.0   | 5.6     |
| ·       |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       | J <u></u> | <b>.</b> | TOTALS | 26.2      | \$405                                 | \$2,436   | 1.8   | 6.0     |
|         |                                       |           |          |        | L         | · · · · · · · · · · · · · · · · · · · |           |       |         |
| 25 YEAI | R DISCOUNT FACTOR                     | 11.05     |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |
| 1       |                                       |           |          |        |           |                                       |           |       |         |
| I       |                                       |           |          |        |           |                                       |           |       |         |
|         |                                       |           |          |        |           |                                       |           |       |         |

(

. . ....








|         | ENERGY SAVINGS    | CALCU  | LATION  | SHEET  | DATE PRE                 | PARED     |           | SHEET | OF      |
|---------|-------------------|--------|---------|--------|--------------------------|-----------|-----------|-------|---------|
|         |                   |        |         |        | <b>R</b> 1 0 1 0 0 0 0 0 | 7/10/87   |           |       |         |
| PROJEC  | FORT LEAVENWOR    |        | TIMIT   | CUDVEV | BASIS FOR                | CALCULAI  | ION       |       |         |
| LOCATI  | ENERGY SAVINGS    | OPPOR  |         | SURVET | Y                        | HAND CALC | UI ATIONS |       |         |
| SICATIC |                   | E HALL |         |        |                          | COMPUTER  | CALCULAT  | IONS  |         |
| CHIT    | ECT/ENGINEER      |        |         |        |                          | CONTRACT  | OR BID    |       |         |
| /       | CLARK RICHARDSC   | N & BI | SKUP    |        |                          | OTHER (S  | PECIFY)   |       |         |
| ECO ME  | ASURE             |        |         |        | COMPUTE                  | ) BY      | CHECKED B | BY    |         |
|         | ENERGY EFFICIENT  | r MOTC | RS      |        |                          | MAW       | L         |       | DEC     |
| MOTOR   | ENERGY SAVINGS    |        |         |        |                          |           |           |       |         |
|         |                   |        |         |        | SAVINGS                  | SAVINGS   |           | 1     | PAYBACK |
| QUAN.   | DESCRIPTION       | ΗP     | LOSS    | HOURS/ | PER YEAR                 | PER YEAR  | COST      | SIR   | YEARS   |
|         |                   |        | SAVINGS | YEAR   | MBTU'S                   | DOLLARS   |           |       |         |
| 1       | EXHAUST FAN       | 1      | 300     | 4380   | 4.5                      | \$70      | \$420     | 1.8   | 6.0     |
| 1       | EXHAUST BOOTH     | 5      | 500     | 4380   | 7.5                      | \$116     | \$644     | 2.0   | 5.6     |
| 2       | DUST COLLECTORS   | 15     | 1000    | 4380   | 29.9                     | \$463     | \$2,510   | 2.0   | 5.4     |
|         |                   |        |         |        |                          |           |           |       |         |
|         |                   |        |         |        |                          |           |           |       |         |
|         |                   |        |         |        |                          |           |           |       |         |
|         |                   |        |         | TOTALS | 41.9                     | \$649     | \$3,574   | 2.0   | 5.5     |
| 25 YEAF | R DISCOUNT FACTOR | 11.05  |         |        |                          |           |           |       |         |



| The control of the control o |                                                                                                            | ENERGY SAVINGS     | CALCU    | LATION S      | SHEET    | DATE PRE    | PARED     | i           | SHEET       | OF          |  |         |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------|----------|---------------|----------|-------------|-----------|-------------|-------------|-------------|--|---------|--|--|
| PROJECTORT LEAVENWORTH<br>ENERGY SAVINGS OPPORTUNITY SURVEY         BASIS FOR CALCULATION<br>SUBDE         PARTICIPAL<br>COMPUTER CALCULATIONS<br>COMPUTER CALCULATIONS<br>CONTRACTOR BID<br>CLARK RICHARDSON & BISKUP         DEC           COMPUTE CALCULATIONS<br>CONTRACTOR BID<br>CLARK RICHARDSON & BISKUP         COMPUTER CALCULATIONS<br>CONTRACTOR BID<br>CONTREST SECTION         DEC           BUILDING EFFICIENT MOTORS         COMPUTE CALCULATIONS<br>CONTRACTOR BID<br>CONTREST SECTION         DEC           MOTOR ENERGY SAVINGS         HP         WATT         OPER.<br>LOSS         SAVINGS SAVINGS INSTALLED<br>MAW         DEC           QUAN.         DESCRIPTION         HP         WATT         OPER.<br>LOSS         SAVINGS INSTALLED<br>MBTU'S         SAVINGS INSTALLED<br>COST         SIR         PAYBACC           UTILITY TUNNEL VENTILATION SYSTEM         UTILITY TUNNEL VENTILATION SYSTEM         UTILITY TUNNEL VENTILATION SYSTEM         I         EXHAUST FAN #1         3         400         4380         6.0         \$933         \$582         1.8         6.           2         EXHAUST FAN #1         3         400         4380         7.5         \$116         \$644         2.0         5.           BUILDING #472         I         I         300         4380         5.2         \$81         \$582         1.5         7           BUILDING #466         I         I         300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                            |                    | VALUE .  |               |          |             | 7/10/87   |             | 1           | 2           |  |         |  |  |
| ENERGY SAVINGS OPPORTUNITY SURVEY<br>USDB         X         HAND CALCULATIONS<br>COMPUTER CALCULATIONS<br>COMPUTER CALCULATIONS<br>COMPUTER CALCULATIONS<br>COMPUTER CALCULATIONS<br>CLARK RICHARDSON & BISKUP         X         HAND CALCULATIONS<br>COMPUTER CALCULATIONS<br>COMPUTER CALCULATIONS           CICHTECTÉNOINEER<br>CLARK RICHARDSON & BISKUP         OTHER (SPECIFY)         COMPUTED RD         DEC           COMPUTED SURF<br>ECO MEASURE<br>COMPUTED SURF         COMPUTED RATE         OPER.         SAVINGS INSTALLED<br>MAW         SR           QUAN.         DESCRIPTION         HP         WATT         OPER.         SAVINGS SAVINGS INSTALLED<br>VEARS         SIR           QUAN.         DESCRIPTION         HP         WATT         OPER.         SAVINGS INSTALLED<br>VEARS         SIR           QUAN.         DESCRIPTION         HP         WATT         OPER.         SAVINGS INSTALLED<br>VEARS         SIR           QUAN.         DESCRIPTION         HP         WATT         OPER.         SAVINGS INSTALLED<br>VEARS         SIR           UTILITY TUNNEL VENTILATION SYSTEM         1         LOSS         HOURS 5162         S932         1.9           UILDING #473         1         500         4380         7.5         S116         S644         2.0         5           UILDING #472         1         1         300         4380         5.2         S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PROJEC                                                                                                     | FORT LEAVENWOR     | TH       |               |          | BASIS FOR   | CALCULAT  | ION         |             | l           |  |         |  |  |
| USDB         COMPUTER CALCULATIONS<br>CONTRACTOR BLD           ARCHITECT/ENGINEER<br>CLARK RICHARDSON & BISKUP<br>CLARK RICHARDSON & BISKUP<br>CLARK RICHARDSON & BISKUP<br>COMPUTED BY<br>ENERGY EFFICIENT MOTORS         COMPUTED BY<br>CHECKED BY<br>CHECKED BY<br>CHECKED BY<br>CHECKED BY<br>CHECKED BY<br>CHECKED BY<br>DEC           MOTOR ENERGY SAVINGS         WATT<br>USSS<br>HOURS' PER YEAR<br>BUILDING SAVINGS         OPER.<br>SAVINGS SAVINGS<br>HOURS' PER YEAR<br>MBTUS DOLLARS         SIR<br>PAYBAC<br>COST<br>SIR<br>PAYBAC           UTILITY TUNNEL VENTILATION SYSTEM         1<br>EXHAUST FAN #1<br>3         400         4380         6.0         \$93         \$582         1.8         6.           2         EXHAUST FAN #1<br>9         3         400         4380         6.0         \$93         \$582         1.8         6.           9         EXHAUST FAN #2          2         350         4380         7.5         \$116         \$644         2.0         5           9         I         PUMP #1         5         500         4380         5.2         \$8116         \$644         2.0         5           9         I         PUMP #2         3         400         4380         5.2         \$811         \$552         1.8         6           9         I         9         3550         4380         7.5         \$116         \$644         2.0         5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                            | ENERGY SAVINGS     | OPPUR    | TUNIT         | SURVET   | x           | HAND CALC | ULATIONS    |             | ļ           |  |         |  |  |
| ACHTECT/ENCINEER         CONTRACTOR BID           CLARK RICHARDSON & BISKUP         COMPUTED BY         CHECKED BY           ECO MEASURE         COMPUTED BY         CHECKED BY           ECO MEASURE         COMPUTED BY         CHECKED BY           ECO MEASURE         COMPUTED BY         CHECKED BY           MAW         DEC           MOTOR ENERGY SAVINGS         MAW         DEC           QUAN.         DESCRIPTION         HP         WATT         OPER.         SAVINGS         SAVINGS         INSTALLED         SIR         PAYBAC           QUAN.         DESCRIPTION         HP         WATT         OPER.         SAVINGS         SAVINGS         INSTALLED         SIR         PAYBAC           UTILITY TUNNEL VENTILATION SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                            | USDB               |          |               |          |             | COMPUTER  | CALCULATI   | IONS        | ł           |  |         |  |  |
| CLARK RICHARDSON & BISKUP         Under (brecker)           ECO MEASURE<br>ENERGY EFFICIENT MOTORS         COMPUTED BY<br>MAW         CHECKED BY<br>CHECKED BY<br>MAW         DEC           MOTOR ENERGY SAVINGS         WATT         OPER,<br>SAVINGS         SAVINGS         INSTALLED<br>VERK         PAYBAC           QUAN.         DESCRIPTION         HP         WATT         OPER,<br>SAVINGS         SAVINGS         SAVINGS         INSTALLED<br>VERK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ARCHITE                                                                                                    | CT/ENGINEER        |          |               |          |             | CONTRACT  | OR BID      |             |             |  |         |  |  |
| EUGRASSINE         DEC           MAW         DEC           MAW         DEC           MOTOR ENERGY SAVINGS         MAW         DEC           MOTOR ENERGY SAVINGS         MAW         DEC           OUTOR ENERGY SAVINGS         MAW         DEC           MOTOR ENERGY SAVINGS         MAW         DEC           OUTOR ENERGY SAVINGS         MAW         DEC           QUAN         DESCRIPTION         HP         WATT         OPER.<br>SAVINGS         SAVINGS         INSTALLED         PAYBAC           UTILITY TUNNEL VENTILATION SYSTEM         UTILITY TUNNEL VENTILATION SYSTEM         MBTUS         DOLLARS         S582         1.8         6.           2         EXHAUST FAN #1         3         400         4380         6.0         \$933         \$552         1.8         6.           2         EXHAUST FAN #2          3         400         4380         7.5         \$116         \$644         2.0         5           BUILDING #473         IDULDING #473         IDULDING #472         IDULDING #472         IDULDING #472         IDULDING #472         IDULDING #467         IDULDING #467         IDULDING #467         IDULDING #466         IDULDING #466         IDULDING #466         IDULDING #466         IDULD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ECO ME                                                                                                     | CLARK RICHARDSO    | N & BI   | SKUP          |          | COMPUTE     | OTHER (S  |             | łY          |             |  |         |  |  |
| MOTOR ENERGY SAVINGS<br>QUAN. DESCRIPTION HP WATT LOSS HOURS/ PER YEAR PER YEAR CCST SIR PAYBAC<br>SAVINGS YEAR MBTUS DOLLARS CCST SIR YEAR<br>UTILITY TUNNEL VENTILATION SYSTEM<br>1 EXHAUST FAN #1 3 400 4380 6.0 593 \$582 1.8 6.<br>2 EXHAUST FAN #2  2 350 4380 10.5 5162 \$932 1.9 5.<br>BUILDING #473<br>1 PUMP #1 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 PUMP #2 3 400 4380 6.0 \$93 \$582 1.8 6<br>BUILDING #472<br>1 HOT WATER PUMP 3 350 4380 5.2 \$81 \$582 1.5 7<br>BUILDING #467<br>1 MUA #1 1 300 4380 4.5 \$70 \$4420 1.8 6<br>1 MUA #1 5 500 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #467<br>1 MUA #1 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 PUMP #2 5 500 4380 5.2 \$81 \$582 1.5 7<br>BUILDING #467<br>1 MUA #1 1 300 4380 4.5 \$70 \$4420 1.8 6<br>1 MUA #2 5 500 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #467<br>1 MUA #1 1 5 500 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #467<br>1 MUA #2 5 500 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #466<br>1 HEATING WTR PUMP 2 350 4380 7.5 \$116 \$644 2.0 5<br>3 SHEET TOTALS 59.8 \$927 \$5.496 1.9 5<br>3 SHEET TOTALS 59.8 \$927 \$5.496 1.9 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ECO ME                                                                                                     | ENERGY EFFICIENT   | г мотс   | RS            |          |             | MAW       |             |             | DEC         |  |         |  |  |
| MOTOR ENERGY SAVINGS           QUAN.         DESCRIPTION         HP         WATT<br>LOSS         OPER,<br>HOURS/<br>YEAR         SAVINGS         SAVINGS         INSTALLED<br>COST         SIR         PAYBAC<br>YEARS           UTILITY TUNNEL VENTILATION SYSTEM         1         2         400         4380         6.0         593         5582         1.8         6.           2         EXHAUST FAN #1         3         400         4380         6.0         593         5582         1.8         6.           2         EXHAUST FAN #2          2         350         4380         10.5         \$162         \$932         1.9         5.           BUILDING #473                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                            |                    |          |               |          |             |           |             |             |             |  |         |  |  |
| MOTOR ENERGY SAVINGS           QUAN.         DESCRIPTION         HP         WATT         OPER.         SAVINGS         SAVINGS         INSTALLED         PAYBAC           UTILITY TUNNEL VENTILATION SYSTEM         I         EXHAUST FAN #1         3         400         4380         6.0         533         5582         1.8         6.           2         EXHAUST FAN #1         3         400         4380         6.0         593         5582         1.8         6.           2         EXHAUST FAN #2.8#3         2         350         4380         10.5         \$162         \$932         1.9         5.           BUILDING #473         I         1         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #1         5         500         4380         5.2         \$81         \$582         1.8         6           BUILDING #472         I         I         1300         4380         5.2         \$81         \$582         1.5         7           BUILDING #467         I         I         300         4380         7.5         \$116         \$644         2.0         5           1         MUA #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                            |                    |          |               |          |             |           |             |             |             |  |         |  |  |
| QUAN.         DESCRIPTION         HP         WATT<br>LOSS<br>SAVINGS         COPER.<br>HOURS/ PER YEAR         SAVINGS         INSTALLED<br>COST         SIR         PAYBAC           UTILITY TUNNEL VENTILATION SYSTEM         1         EXHAUST FAN #1         3         400         4380         6.0         \$933         \$582         1.8         6.           2         EXHAUST FAN #1         3         400         4380         6.0         \$933         \$582         1.8         6.           2         EXHAUST FAN #2          2         350         4380         7.5         \$116         \$644         2.0         5           BUILDING #473         1         PUMP #1         5         500         4380         6.0         \$933         \$582         1.8         6           1         PUMP #1         5         500         4380         5.2         \$81         \$582         1.5         7           1         HOT WATER PUMP         3         350         4380         5.2         \$81         \$582         1.5         7           1         HOT WATER PUMP         3         350         4380         7.5         \$116         \$644         2.0         5           1         MUA #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MOTOR                                                                                                      | ENERGY SAVINGS     |          |               |          |             |           |             |             |             |  |         |  |  |
| QUAN.         DESCRIPTION         HP         WATT<br>LOSS         OPER.<br>HOURS/<br>SAVINGS         SAVINGS         SAVINGS         INSTALLED<br>COST         PAYBAC<br>COST           UTILITY TUNNEL VENTILATION SYSTEM         1         EXHAUST FAN #1         3         400         4380         6.0         \$93         \$582         1.8         6.           2         EXHAUST FAN #1         3         400         4380         6.0         \$93         \$582         1.8         6.           2         EXHAUST FAN #2          2         350         4380         10.5         \$162         \$932         1.9         5.           BUILDING #473                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                                                          |                    |          |               |          |             |           |             |             |             |  |         |  |  |
| LOSS         HOURS/ PER YEAR         PER YEAR         COST         SIR         YEAR           UTILITY TUNNEL VENTILATION SYSTEM         1         EXHAUST FAN #1         3         400         4380         6.0         \$93         \$582         1.8         6.           2         EXHAUST FAN #2          2         350         4380         10.5         \$162         \$932         1.9         5.           BUILDING #473         1         5         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #2         3         400         4380         5.2         \$81         \$582         1.8         6           1         PUMP #2         3         4380         5.2         \$81         \$582         1.5         7           8UILDING #472                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | OUAN. I                                                                                                    | DESCRIPTION        | HP       | WATT T        | OPER.    | SAVINGS     | SAVINGS   | INSTALLED   |             | PAYBACK     |  |         |  |  |
| Image: Savings         YEAR         MBTU'S         DOLLARS I         Image: Savings           1         EXHAUST FAN #1         3         400         4380         6.0         \$93         \$582         1.8         6.           2         EXHAUST FAN #1         3         400         4380         6.0         \$93         \$582         1.8         6.           2         EXHAUST FAN #2          2         350         4380         10.5         \$162         \$932         1.9         5.           BUILDING #473                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Gorin.                                                                                                     |                    |          | LOSS          | HOURS/   | PER YEAR    | PER YEAR  | COST        | SIR         | YEARS       |  |         |  |  |
| UTILITY TUNNEL VENTILATION SYSTEM           1         EXHAUST FAN #1         3         400         4380         6.0         \$93         \$582         1.8         6.           2         EXHAUST FAN #2          2         350         4380         10.5         \$162         \$932         1.9         5.           BUILDING #473           1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #2         3         400         4380         6.0         \$93         \$582         1.8         6           BUILDING #472           1         HOT WATER PUMP         3         350         4380         5.2         \$81         \$582         1.5         7           BUILDING #467           1         MUA #2         5         500         4380         7.5         \$116         \$644         2.0         5           BUILDING #466           1         HEATING WTR PUMP         2         350         4380                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                            |                    | <b> </b> | SAVINGS       | YEAR     | MBTU'S      | DOLLARS   |             | L           | L           |  |         |  |  |
| UTILITY TUNNEL VENTILATION SYSTEM           1         EXHAUST FAN #1         3         400         4380         6.0         \$933         \$582         1.8         6.           2         EXHAUST FAN #2          2         350         4380         10.5         \$162         \$932         1.9         5           BUILDING #473                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ļ                                                                                                          |                    |          |               |          |             |           |             |             |             |  |         |  |  |
| UTILITY TUNNEL VENTILATION SYSTEM         1       EXHAUST FAN #1       3       400       4380       6.0       \$93       \$582       1.8       6.         2       EXHAUST FAN #2        2       350       4380       10.5       \$162       \$932       1.9       5         BUILDING #473         1       PUMP #1       5       500       4380       7.5       \$116       \$644       2.0       5         1       PUMP #1       5       500       4380       7.5       \$116       \$644       2.0       5         1       PUMP #2       3       400       4380       6.0       \$93       \$582       1.8       6         BUILDING #472         1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$592       1.5       7         BUILDING #467         I MUA #1       1       300       4380       7.5       \$116       \$644       2.0       5         BUILDING #466         I MUA #2       5       500       4380       7.5       \$116       \$644       2.0       5 <td <="" colspan="4" td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td><u></u></td><td></td><td></td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u></u></td> <td></td> <td></td> |                    |          |               |          |             |           |             |             |             |  | <u></u> |  |  |
| 1         EXHAUST FAN #1         3         400         4380         6.0         \$93         \$582         1.8         6.           2         EXHAUST FAN #2          2         350         4380         10.5         \$162         \$932         1.9         5.           BUILDING #473           1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #2         3         400         4380         6.0         \$93         \$582         1.8         6           BUILDING #472           1         HOT WATER PUMP         3         350         4380         5.2         \$81         \$582         1.5         7           BUILDING #467           1         MUA #1         1         300         4380         7.5         \$116         \$644         2.0         5           BUILDING #466           1         HEATING WTR PUMP         2         350         4380         5.2         \$81 </td <td>UTILITY</td> <td>TUNNEL VENTILATION</td> <td>SYSTEM</td> <td> <br/>• • • • •</td> <td></td> <td><b>T</b>,</td> <td>r</td> <td>T</td> <td><b>T</b></td> <td>r</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | UTILITY                                                                                                    | TUNNEL VENTILATION | SYSTEM   | <br>• • • • • |          | <b>T</b> ,  | r         | T           | <b>T</b>    | r           |  |         |  |  |
| 2         EXAMPLE         2         350         4380         10.5         \$162         \$932         1.9         5.           BUILDING #473           1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5.           1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5.           1         PUMP #2         3         400         4380         6.0         \$93         \$582         1.8         6           BUILDING #472           1         HOT WATER PUMP         3         350         4380         5.2         \$81         \$582         1.5         7           BUILDING #467           I MUA #1         1         300         4380         7.5         \$116         \$644         2.0         5           BUILDING #467           I MUA #1         1         300         4380         7.5         \$116         \$644         2.0         5           I MUA #2         5         500         4380         7.5         \$116         \$644         2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | _                                                                                                          | FXHAUST FAN #1     | 3        | 400           | 4380     | 6.0         | \$93      | \$582       | 1.8         | 6.3         |  |         |  |  |
| 2 EXHAUST FAN #2  2 350 4380 10.5 \$162 \$932 1 1.91 3<br>BUILDING #473<br>1 PUMP #1 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 PUMP #2 3 400 4380 6.0 \$93 \$582 1.8 6<br>BUILDING #472<br>1 HOT WATER PUMP 3 350 4380 5.2 \$81 \$582 1.5 7<br>BUILDING #467<br>1 MUA #1 1 300 4380 4.5 \$70 \$420 1.8 6<br>1 MUA #2 5 500 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #466<br>1 HEATING WTR PUMP 2 350 4380 5.2 \$81 \$466 1.9 5<br>BUILDING #466<br>1 HEATING WTR PUMP 2 350 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #466<br>1 HEATING WTR PUMP 2 350 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #466                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                            |                    | [        |               |          |             |           |             |             |             |  |         |  |  |
| BUILDING #473           1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #2         3         400         4380         6.0         \$93         \$582         1.8         6           BUILDING #472           1         HOT WATER PUMP         3         350         4380         5.2         \$81         \$582         1.5         7           BUILDING #467           1         MUA #1         1         300         4380         4.5         \$70         \$420         1.8         6           1         MUA #1         1         300         4380         7.5         \$116         \$644         2.0         5           BUILDING #466           I           HEATING WTR PUMP         2         350         4380         7.5         \$116         \$644         2.0         5           BUILDING #466           I         HEATING WTR PUMP         2         350         4380         7.5         \$116         \$644         2.0         5           I         HEATING W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2                                                                                                          | EXHAUST FAN #2    | 2        | 350           | 4380     | 10.5        | \$162     | \$932       | 1.9         | 5.7         |  |         |  |  |
| BUILDING #473         1       PUMP #1       5       500       4380       7.5       \$116       \$644       2.0       5         1       PUMP #2       3       400       4380       6.0       \$93       \$582       1.8       6         BUILDING #472         1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #467         1       MUA #1       1       300       4380       4.5       \$70       \$420       1.8       6         1       MUA #1       1       300       4380       7.5       \$116       \$644       2.0       5         BUILDING #466         I HEATING WTR PUMP       2       350       4380       7.5       \$116       \$644       2.0       5         BUILDING #466         1       HEATING WTR PUMP       2       350       4380       7.5       \$116       \$644       2.0       5         SHEET TOTALS       59.8       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                            |                    |          |               |          |             |           |             |             |             |  |         |  |  |
| BUILDING #473         1       PUMP #1       5       500       4380       7.5       \$116       \$644       2.0       5         1       PUMP #2       3       400       4380       6.0       \$933       \$582       1.8       6         BUILDING #472         1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #472         1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #467         BUILDING #466         BUILDING #466         BUILDING #466         I HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         SHEET TOTALS       59.6       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                            |                    |          |               |          |             | <u> </u>  |             |             |             |  |         |  |  |
| 1         PUMP #1         5         500         4380         7.5         \$116         \$644         2.0         5           1         PUMP #2         3         400         4380         6.0         \$93         \$582         1.8         6           BUILDING #472           1         HOT WATER PUMP         3         350         4380         5.2         \$81         \$582         1.5         7           BUILDING #467           1         MUA #1         1         300         4380         4.5         \$70         \$420         1.8         6           1         MUA #1         1         300         4380         7.5         \$116         \$644         2.0         5           BUILDING #467           BUILDING #466           1         MUA #2         5         500         4380         7.5         \$116         \$644         2.0         5           BUILDING #466           1         HEATING WTR PUMP         2         350         4380         7.5         \$116         \$644         2.0         5           SHEET TOTALS         59.8         \$927                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | BUILDIN                                                                                                    | G #473             | T        | <del></del> , | ·····    | <del></del> | 1         | <del></del> | <del></del> | 1           |  |         |  |  |
| 1       PUMP #2       3       400       4380       6.0       \$93       \$582       1.8       6         BUILDING #472       1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #472                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1<br>                                                                                                      | PLIMP #1           | 5        | 500           | 4380     | 7.5         | \$116     | \$644       | 2.0         | 5.6         |  |         |  |  |
| 1 PUMP #2       3       400       4380       6.0       393       3002       1.0       3         BUILDING #472       1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #472       1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #467                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                            |                    |          |               |          |             | ¢02       | ¢592        | 1.8         |             |  |         |  |  |
| BUILDING #472         1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #467                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                                                                                                          | PUMP #2            | 3        | 400           | 4380     | 0.0         | ততত       | \$U02       | 1.0         | <u>v.</u> . |  |         |  |  |
| BUILDING #472         1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #467                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                            |                    |          | ····          |          |             |           |             |             |             |  |         |  |  |
| BUILDING #472         1       HOT WATER PUMP       3       350       4380       5.2       \$81       \$582       1.5       7         BUILDING #467                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                            |                    |          |               |          |             |           |             |             |             |  |         |  |  |
| 1         HOT WATER PUMP         3         350         4380         5.2         \$81         \$582         1.5         7           BUILDING #467                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | BUILDIN                                                                                                    | IG #472            | T        | <b>1</b> ,    | r        | Τ           | Γ         | Т           | 1           | Γ           |  |         |  |  |
| BUILDING #467<br>1 MUA #1 1 300 4380 4.5 \$70 \$420 1.8 6<br>1 MUA #2 5 500 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #466<br>1 HEATING WTR PUMP 2 350 4380 5.2 \$81 \$466 1.9 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 1.9 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 1.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 1.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 1.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 1.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 1.0 5<br>1 AHU FAN MOTOR 5 500 50 50 50 50 50 50 50 50 50 50 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1                                                                                                          | HOT WATER PUMP     | 3        | 350           | 4380     | 5.2         | \$81      | \$582       | 1.5         | 7.:         |  |         |  |  |
| BUILDING #467<br>1 MUA #1 1 300 4380 4.5 \$70 \$420 1.8 6<br>1 MUA #2 5 500 4380 7.5 \$116 \$644 2.0 5<br>BUILDING #466<br>1 HEATING WTR PUMP 2 350 4380 5.2 \$81 \$466 1.9 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 4380 7.5 \$116 \$644 2.0 5<br>1 AHU FAN MOTOR 5 500 500 50 50 50 50 50 50 50 50 50 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                            |                    |          |               |          |             |           |             |             |             |  |         |  |  |
| BUILDING #467         1       MUA #1       1       300       4380       4.5       \$70       \$420       1.8       6         1       MUA #2       5       500       4380       7.5       \$116       \$644       2.0       5         BUILDING #466         1       HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1       HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         3       SHEET TOTALS       59.8       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                            |                    |          |               |          |             |           |             |             | <u></u>     |  |         |  |  |
| 1       MUA #1       1       300       4380       4.5       \$70       \$420       1.8       6         1       MUA #2       5       500       4380       7.5       \$116       \$644       2.0       5         BUILDING #466         1       HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1       SHEET TOTALS       59.8       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BUILDIN                                                                                                    | IG #467            |          |               | <u></u>  |             |           |             |             | T           |  |         |  |  |
| 1 MUA #1       1 300       4300       4.0       0.0       0.00       0.00         1 MUA #2       5       500       4380       7.5       \$116       \$644       2.0       5         BUILDING #466       1       HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1 HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1 AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1 AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         3       SHEET TOTALS       59.8       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                            |                    |          |               | 4380     | 45          | \$70      | \$420       | 1.8         | 6.          |  |         |  |  |
| 1       MUA #2       5       500       4380       7.5       \$116       \$644       2.0       5         BUILDING #466                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                            | MUA #1             | <u> </u> |               | 4000     |             |           | +           |             | <u> </u>    |  |         |  |  |
| BUILDING #466         1       HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         SHEET TOTALS       59.8       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1                                                                                                          | MUA #2             | 5        | 500           | 4380     | 7.5         | \$116     | \$644       | 2.0         | 5.          |  |         |  |  |
| BUILDING #466         1       HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         3       SHEET TOTALS       59.8       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                            | · · ·              |          |               |          | -<br>-      |           |             | • •         |             |  |         |  |  |
| BUILDING #466         1       HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1       SHEET TOTALS       59.8       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b></b>                                                                                                    |                    |          |               |          |             |           |             |             |             |  |         |  |  |
| 1       HEATING WTR PUMP       2       350       4380       5.2       \$81       \$466       1.9       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         1       AHU FAN MOTOR       5       500       4380       7.5       \$116       \$644       2.0       5         3       SHEET TOTALS       59.8       \$927       \$5,496       1.9       5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | BUILDIN                                                                                                    | IG #466            |          |               |          |             |           |             |             | τ           |  |         |  |  |
| 1 HEATING WITH PUMP         2         350         4300         5.2         501         5116         5116         \$644         2.0         5           1 AHU FAN MOTOR         5         500         4380         7.5         \$116         \$644         2.0         5           SHEET TOTALS         59.8         \$927         \$5,496         1.9         5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>—</b>                                                                                                   |                    | Γ,       | 350           | 1380     | 52          | \$81      | \$466       | 1.9         | 5.          |  |         |  |  |
| 1 AHU FAN MOTOR         5         500         4380         7.5         \$116         \$644         2.0         5           SHEET TOTALS         59.8         \$927         \$5,496         1.9         5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | '                                                                                                          | HEATING WIN POWE   | <u></u>  | 300           | 4000     |             |           | <b>W102</b> | +           |             |  |         |  |  |
| SHEET TOTALS 59.8 \$927 \$5,496 1.9 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1                                                                                                          | AHU FAN MOTOR      | 5        | 500           | 4380     | 7.5         | \$116     | \$644       | 2.0         | 5.          |  |         |  |  |
| SHEET TOTALS 59.8 \$927 \$5,496 1.9 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                            |                    |          | <u> </u>      |          |             |           |             |             | 1           |  |         |  |  |
| SHEET TOTALS 59.8 \$927 \$5,496 1.9 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | J                                                                                                          |                    | <u> </u> |               | <u> </u> |             | <u> </u>  | +           |             | <u> </u>    |  |         |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                            |                    |          | SHEE          | T TOTALS | 59.8        | \$927     | \$5,496     | 1.9         | 5.          |  |         |  |  |

25 YEAR DISCOUNT FACTOR 11.05

|          | ENERGY SAVINGS    | CALCUI    | LATION S | SHEET  | EET DATE PREPARED SHEET<br>7/10/87 2<br>BASIS FOR CALCULATION |                       |                   |          |         |  |  |  |
|----------|-------------------|-----------|----------|--------|---------------------------------------------------------------|-----------------------|-------------------|----------|---------|--|--|--|
| PROJEC   | FORT LEAVENWOR    | ГН<br>П   |          |        | BASIS FOR                                                     | CALCULAT              | ON                |          |         |  |  |  |
|          | ENERGY SAVINGS    | OPPOR     | TUNITY   | SURVEY | x                                                             | HAND CALC             | ULATIONS          |          |         |  |  |  |
|          | USDB              |           |          |        |                                                               | COMPUTER              | CALCULATI         | ONS      |         |  |  |  |
| ARCHITE  | CT/ENGINEER       | N 9, DI   | ekiip    |        |                                                               | CONTRACTO             | OR BID<br>PECIEY) |          |         |  |  |  |
| FCO ME   | ASURE             | Ναρι      | SKUP     |        | COMPUTER                                                      | DBY                   | CHECKED B         | IY       |         |  |  |  |
|          | ENERGY EFFICIENT  | мото      | RS       |        |                                                               | MAW                   |                   |          | DEC     |  |  |  |
| MOTOR    | ENERGY SAVINGS    |           |          |        |                                                               |                       |                   |          |         |  |  |  |
| QUAN.    | DESCRIPTION       | HP        | WATT     | OPER.  | SAVINGS                                                       | SAVINGS               | INSTALLED         |          | PAYBACK |  |  |  |
| ſ        |                   |           |          | HOURS/ | PER YEAR                                                      | PER YEAR              | COST              | SIR      | YEARS   |  |  |  |
|          |                   |           | SAVINGS  | TEAN   | WB103                                                         | DOLLAND               |                   | <b>_</b> |         |  |  |  |
|          |                   |           |          |        |                                                               |                       |                   |          |         |  |  |  |
|          | G #465            |           |          |        |                                                               |                       |                   |          |         |  |  |  |
| DOILDIN  |                   |           |          |        |                                                               | <b>6</b> 4 <b>5</b> 4 | ¢000              | 2.0      | 5.4     |  |  |  |
| 1        | HOT WTR PUMP      | 7.5       | 650      | 4380   | 9.7                                                           | \$151                 | \$820             | 2.0      | 5.4     |  |  |  |
| 1        | AHU #1            | 2         | 350      | 4380   | 5.2                                                           | \$81                  | \$466             | 1.9      | 5.7     |  |  |  |
|          |                   | . 4       | 300      | 4380   | 90                                                            | \$139                 | \$840             | 1.8      | 6.0     |  |  |  |
| 2        |                   |           | 000      |        | 0.0                                                           |                       |                   |          |         |  |  |  |
| 1        | CENTRIFUGAL PUMP  | 1.5       | 300      | 4380   | 4.5                                                           | \$70                  | \$442             | 6.4      |         |  |  |  |
|          |                   |           |          |        |                                                               |                       |                   |          |         |  |  |  |
|          |                   |           | <u></u>  | L      | A                                                             |                       |                   |          |         |  |  |  |
| <b>b</b> |                   |           |          |        |                                                               |                       |                   |          |         |  |  |  |
| STEAM    | & ELECTRIC PLANT  |           |          |        |                                                               |                       |                   | 1        |         |  |  |  |
|          |                   | 40        | 1700     | 4380   | 25.4                                                          | \$394                 | \$2.623           | 1.7      | 6.7     |  |  |  |
|          | FORCE DRAFT       | 40        | 1700     | 4000   |                                                               |                       |                   |          |         |  |  |  |
| 3        | FAN #1, #2, & #3  | 10        | 800      | 4380   | 35.9                                                          | \$556                 | \$2,898           | 2.1      | 5.2     |  |  |  |
| 2        | CONDENSATE        | 10        | 800      | 4380   | 23.9                                                          | \$371                 | \$1,932           | 2.1      | 5.2     |  |  |  |
|          | AIR COMPRESSOR    |           |          |        |                                                               |                       | ¢500              | 1.0      | 6.2     |  |  |  |
| 1        | STARTUP           | 3         | 400      | 4380   | 6.0                                                           | \$93                  | \$582             | 1.0      | 0.3     |  |  |  |
| 1        | AIR COMPRESSOR    | 25        | 1300     | 4380   | 19.4                                                          | \$301                 | \$1,780           | 1.9      | 5.9     |  |  |  |
|          |                   |           |          |        |                                                               |                       |                   |          |         |  |  |  |
|          |                   | <u>,,</u> |          |        |                                                               |                       |                   |          |         |  |  |  |
| BUILDIN  | IG #472           |           |          | T      | T                                                             | r                     | Т                 | T        | 1       |  |  |  |
| 4        |                   | 1 1       | 300      | 4380   | 4.5                                                           | \$70                  | \$420             | 1.8      | 6.0     |  |  |  |
|          |                   |           |          |        |                                                               |                       |                   |          |         |  |  |  |
| 1        | HOT WATER PUMP    | 3         | 400      | 4380   | 6.0                                                           | \$93                  | \$582             | 1.8      | 6.3     |  |  |  |
|          |                   | 1         |          |        |                                                               |                       |                   |          | ļ       |  |  |  |
|          |                   |           | 0        |        | 140.5                                                         | 60.217                | \$12.295          | 1 1 0    | 58      |  |  |  |
|          |                   |           | SHEE     | TOTALS | 149.5                                                         | \$2,317               | \$13,365          | 1.3      | 10.0    |  |  |  |
| 25 YEAF  | R DISCOUNT FACTOR | 11.05     | ;        |        |                                                               |                       | 1                 |          | T       |  |  |  |
| ا        |                   |           |          |        | 209.2                                                         | \$3,244               | \$18.881          | 1.9      | 5.8     |  |  |  |
|          |                   |           |          | 101AL  | L 209.3 \$3,244 \$18,881 1.9                                  |                       |                   |          |         |  |  |  |

## STUDY: FTLVGRUP

LIFE CYCLE COST ANALYSIS SUMMARY ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.001 INSTALLATION & LOCATION: FT LEAVENWORTH REGION NO. 7 PROJECT NO. & TITLE: DACA41-86-C-0061 FT LEAVENWORTH ESOS

FISCAL YEAR 1987 DISCRETE PORTION NAME: GROUP 7 ANALYSIS DATE: 07-10-87 ECONOMIC LIFE 25 YEARS PREPARED BY: CRB

| INVESTMENT                          |                                                                                                                                                                |                                                                                                                                                 |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| A. CONSTRUCTION COST                | \$                                                                                                                                                             | 35589.                                                                                                                                          |
| B. SIOH                             | \$                                                                                                                                                             | 3559.                                                                                                                                           |
| C. DESIGN COST                      | \$                                                                                                                                                             | 1779.                                                                                                                                           |
| D. ENERGY CREDIT CALC (1A+1B+1C)X.9 | \$                                                                                                                                                             | 36835.                                                                                                                                          |
| E. SALVAGE VALUE COST               | -\$                                                                                                                                                            | 0.                                                                                                                                              |
| F. TOTAL INVESTMENT (1D-1E)         | \$                                                                                                                                                             | 36835.                                                                                                                                          |
|                                     | INVESTMENT<br>A. CONSTRUCTION COST<br>B. SIOH<br>C. DESIGN COST<br>D. ENERGY CREDIT CALC (1A+1B+1C)X.9<br>E. SALVAGE VALUE COST<br>F. TOTAL INVESTMENT (1D-1E) | INVESTMENT A. CONSTRUCTION COST B. SIOH C. DESIGN COST D. ENERGY CREDIT CALC (1A+1B+1C)X.9 E. SALVAGE VALUE COST F. TOTAL INVESTMENT (1D-1E) \$ |

2. ENERGY SAVINGS (+) / COST (-) ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

|    | FUEL                                                                   |                                        | UNIT COST<br>\$/MBTU(1)                                                                                   | SAVINGS<br>MBTU/YR(2)                                                                       | Al<br>S/                   | NNUAL \$<br>AVINGS(3)         | DISCOUNT<br>FACTOR(4)                     | D<br>S | ISCOUNTED<br>AVINGS(5)         |
|----|------------------------------------------------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------|-------------------------------|-------------------------------------------|--------|--------------------------------|
|    | A. ELECT<br>B. DIST<br>C. RESID<br>D. NAT G<br>E. COAL                 | \$ \$ \$ \$ \$                         | 15.50<br>.00<br>.00<br>3.15<br>.00                                                                        | 332.<br>0.<br>0.<br>0.                                                                      | \$<br>\$<br>\$<br>\$<br>\$ | 5142.<br>0.<br>0.<br>0.<br>0. | 11.05<br>16.73<br>17.67<br>19.36<br>13.47 |        | 56820.<br>0.<br>0.<br>0.<br>0. |
|    | F. TOTAL                                                               |                                        |                                                                                                           | 332.                                                                                        | \$                         | 5142.                         |                                           | \$     | 56820.                         |
| 3. | NON ENERGY                                                             | SÆ                                     | VINGS(+) / C                                                                                              | OST(-)                                                                                      |                            |                               |                                           |        |                                |
|    | A. ANNUAL R                                                            | EC                                     | URRING (+/-)                                                                                              |                                                                                             |                            | 14.05                         |                                           | \$     | 0.                             |
|    | (1) DISCOU<br>(2) DISCOU                                               |                                        | TED SAVING/                                                                                               | COST (3A X 3A                                                                               | <b>A1</b> )                | 11.65                         |                                           | \$     | 0.                             |
|    | C. TOTAL NO                                                            | N E                                    | NERGY DISC                                                                                                | OUNTED SAVI                                                                                 | NGS(+                      | )/COST(-) (3                  | 3A2+3BD4)                                 | \$     | 0.                             |
|    | D. PROJECT (<br>(1) 25% M/<br>A IF 30<br>B IF 30<br>C IF 30<br>D IF 30 | NO<br>AX<br>01 I<br>01 I<br>01E<br>01E | N ENERGY Q<br>NON ENERGY<br>S = OR > 3C (<br>S < 3C CALC<br>S < 3C CALC<br>S  S = > 1 GO T<br>S < 1 PROJE | UALIFICATION<br>( CALC (2F5 X<br>GO TO ITEM 4<br>SIR = (2F5+3E<br>TO ITEM 4<br>ECT DOES NOT | TEST<br>.33)<br>D1)/1F)    | I=<br>IFY                     | \$ 18751.<br>                             |        |                                |
| 4. | FIRST YEAR D                                                           | DOL                                    | LAR SAVING                                                                                                | S 2F3+3A+(3B1                                                                               | D/(YE/                     | ARS ECONO                     | MIC LIFE))                                | \$     | 5142.                          |
| 5. | TOTAL NET D                                                            | ISC                                    | OUNTED SAV                                                                                                | /INGS (2F5+3C)                                                                              | )                          |                               |                                           | \$     | 56820.                         |
| 6. | DISCOUNTED<br>(IF < 1 PROJE                                            | SA<br>CT                               | VINGS RATIO                                                                                               | )<br>UALIFY)                                                                                | (S                         | SIR)=(5 / 1F)=                | 1.54                                      |        |                                |



|   |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                |                         |                                                 |                           | For use of                                              | this form                       | FACILITI    | ES ENGINEER          | RING WC<br>n 420-6: | RK REQUEST                                                                                                                             | •<br>€      |  |  |
|---|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------|-------------------------------------------------|---------------------------|---------------------------------------------------------|---------------------------------|-------------|----------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------|--|--|
|   |                                                     | 5                                                                                                                                                                                                                                                                                                              | DOCUMENT N                                                     | UMBER                   | BUILDI                                          | NG/FACILITY               | DAT                                                     | Έ                               | <u> </u>    |                      |                     |                                                                                                                                        |             |  |  |
|   | TRANS<br>CODE                                       |                                                                                                                                                                                                                                                                                                                | SERIAL                                                         | ∼<br>F ۲<br>T Y PE      | NUMBE                                           | R SUFFIX                  | YR MC                                                   | DA                              | OTHER       |                      | N .                 |                                                                                                                                        | -           |  |  |
|   | 1 2 3                                               | 4 5                                                                                                                                                                                                                                                                                                            | 6 7 8 9 1                                                      | 0 11 12 13              | 3 14 15 16 17                                   | 18 19 20 21 22            | 2 23 24 25                                              | 26 27 28                        | 29 30 31 3  | 2 33 34 35 36 3      | 7 38 39 4           | 40 41 42 43 44 4                                                                                                                       | 4           |  |  |
|   | XFA                                                 |                                                                                                                                                                                                                                                                                                                |                                                                |                         | U <sub>I</sub> S <sub>I</sub> D <sub>I</sub> B  |                           | 9 10 0 16                                               | 506                             |             |                      |                     | Replan                                                                                                                                 | C           |  |  |
|   |                                                     | ш<br>С                                                                                                                                                                                                                                                                                                         | DOCUMENT N                                                     | UMBER_                  | BUILDI                                          | NG/FACILITY               | BUILS                                                   | ING/FA                          |             | BUILDING/FAC         |                     | BUILDING                                                                                                                               | 1           |  |  |
| ŀ | TRANS<br>CODE                                       | Z<br>V RE<br>U ID                                                                                                                                                                                                                                                                                              | O SERIAL<br>NUMBER                                             | F Y F                   | NUMBE                                           | R SUFFIX                  | NUME                                                    |                                 | SUFFIX      | NUMBER               | SUFFI               |                                                                                                                                        | ٦<br>-      |  |  |
|   | 1 2 3                                               | 4 6                                                                                                                                                                                                                                                                                                            | 6 7 8 9 10                                                     | 2 11 12 13              | 14 15 16 17                                     | 18 19 20 21 22            | 23 24 25 2                                              | 6 27 28                         | 29 30 31 32 | 2 33 34 35 36 3      | 7 38 39 4           |                                                                                                                                        | -           |  |  |
|   | X F B                                               | c I                                                                                                                                                                                                                                                                                                            |                                                                |                         | P <sub>1</sub> 0 <sub>1</sub> 4 <sub>1</sub> 7  |                           | P 10 13 14                                              |                                 |             |                      |                     |                                                                                                                                        | -<br>r      |  |  |
|   | same<br>exte                                        | hors<br>nding                                                                                                                                                                                                                                                                                                  | epower re<br>their li                                          | quirem<br>fe and        | ents at a<br>in some                            | a lower cos<br>cases, red | luce the                                                | air                             | conditio    | ning load.           |                     |                                                                                                                                        |             |  |  |
|   |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                |                         |                                                 | REQUESTER IN              | FORMATIC                                                | N                               |             |                      |                     | -                                                                                                                                      |             |  |  |
|   | NAME                                                |                                                                                                                                                                                                                                                                                                                |                                                                |                         | ORGANI                                          | ZATION                    |                                                         | TELE                            | PHONE NO.   | SIGNATURE            |                     | ſ                                                                                                                                      | 4           |  |  |
| [ |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                |                         |                                                 |                           |                                                         |                                 |             | 1                    |                     | h                                                                                                                                      | -           |  |  |
| ſ |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                |                         |                                                 | FORWA                     | ARD FOR A                                               | PPROVA                          | PROVAL      |                      |                     |                                                                                                                                        |             |  |  |
| ł | то                                                  |                                                                                                                                                                                                                                                                                                                |                                                                | RECOM                   | MENDED                                          | ENVIRONMENTA              | AL IMPACT                                               | ESTIN                           | ATED COS    | T WORK               | FROM                |                                                                                                                                        |             |  |  |
|   |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                | ACTION                  | I                                               | NO YES                    |                                                         |                                 |             | PERFOR               | RMED                |                                                                                                                                        |             |  |  |
| ł |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                |                         | ROVAL                                           |                           | NONMENTAL                                               | FUNC                            | 29          | .887 II IN-H         | IOUSE               | FACILITIES                                                                                                                             | -           |  |  |
|   |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                |                         | PPROVAL                                         |                           | IA                                                      | WC L                            | S<br>S      |                      | -HELP               |                                                                                                                                        |             |  |  |
|   |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                |                         |                                                 |                           | ATED                                                    | we                              | - s_        | TRACT                |                     | -                                                                                                                                      |             |  |  |
|   |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                |                         |                                                 |                           |                                                         | 1                               |             | ) ( ) ( ) ( )        |                     |                                                                                                                                        |             |  |  |
|   | APPRO                                               | VING A                                                                                                                                                                                                                                                                                                         | UTHORITY                                                       |                         |                                                 |                           |                                                         | UNFL                            | INDED S     | , 360 🗆 тво<br>, 247 | OP                  | DA                                                                                                                                     | -           |  |  |
|   | APPRO                                               |                                                                                                                                                                                                                                                                                                                |                                                                |                         |                                                 |                           | IA<br>PLETED                                            | UNFL                            | INDED S     | ,360 П тво<br>,247   | OP                  | DA                                                                                                                                     |             |  |  |
|   | ΑΡΡΑΟ                                               |                                                                                                                                                                                                                                                                                                                |                                                                |                         |                                                 |                           | IA<br>PLETED                                            |                                 | INDED \$    | ,360 П тво<br>,247   | OP                  |                                                                                                                                        | _           |  |  |
| F | APPRO                                               |                                                                                                                                                                                                                                                                                                                | OCUMENT NU                                                     | UMBER                   |                                                 |                           | IA<br>PLETED<br>PPROVAL A<br>DATE                       |                                 | TAL \$      | ,360 П тро<br>,247   | OP                  | -FORWA                                                                                                                                 | -<br>I<br>I |  |  |
|   |                                                     |                                                                                                                                                                                                                                                                                                                |                                                                | JMBER                   | ACTIO                                           |                           | A<br>PLETED<br>PPROVAL A<br>DATE<br>MO DA               |                                 | TAL \$      | ,360    TRO          | OP                  |                                                                                                                                        |             |  |  |
|   | APPRO<br>1 JS<br>CODE                               |                                                                                                                                                                                                                                                                                                                |                                                                |                         | ACTIO                                           |                           | PROVAL A<br>DATE<br>MO DA<br>15 16 17 1                 |                                 | INDED \$    | ,360    TRO          | OP                  | 04<br>•FORWA<br>0ESIGN<br>MO 04<br>19 20 21 2                                                                                          |             |  |  |
|   | APPRO                                               | UNG A<br>UNG A<br>UNG A<br>UNG A<br>UNG A<br>UNG A                                                                                                                                                                                                                                                             | OCUMENT NU<br>SERIAL<br>NUMBEF<br>7 8 9 10                     | JMBER<br>4<br>11 12 13  | ACTIO                                           |                           | A<br>PLETED<br>PPROVAL A<br>DATE<br>MO DA<br>15 16 17 1 |                                 | NATURE O    | , 360 TRO            | UTHORI              | DA<br>-FORWA<br>DESIGN<br>MO DA<br>19 20 21 2<br>FY                                                                                    |             |  |  |
|   | APPRO                                               | UNG A<br>UD<br>VING A<br>D<br>VING A<br>REC<br>UD<br>VING A                                                                                                                                                                                                                                                    | OCUMENT NU<br>SERIAL<br>NUMBEF<br>7 8 9 10                     | JMBER<br>34<br>11 12 13 | ACTIO<br>14<br>A – AP<br>D – DI                 | EIS/E<br>COMP             | A<br>PLETED<br>PROVAL A<br>DATE<br>MO DA<br>15 16 17 1  |                                 | NATURE O    | , 360   TRO          | UTHORI              | DA<br>+FORWA<br>DESIGN<br>MO DA<br>19 20 21 2<br>TY<br>WHITE (C                                                                        |             |  |  |
|   | APPRO<br>1 .15<br>CODE<br>1 2 3<br>XIF IC<br>DA 1 A |                                                                                                                                                                                                                                                                                                                | OCUMENT NU<br>SERIAL<br>NUMBEF<br>7 8 9 10                     |                         | ACTIO<br>14<br>A – AP<br>D – DI<br>F 1 FEB 78 W |                           | A<br>PLETED<br>PPROVAL A<br>DATE<br>MO DA<br>15 16 17 1 | UNFL<br>TO<br>CTION<br>B<br>SIG | NDED \$     | , 360   TRO          | UTHORI              |                                                                                                                                        |             |  |  |
|   | APPRO<br>1 .15<br>CODE<br>1 2 3<br>XIF IC<br>DA 1 A | UNG A<br>UNG A<br>UNG A<br>UNG A<br>UNG 78                                                                                                                                                                                                                                                                     | OCUMENT NU<br>SERIAL<br>NUMBEF<br>7 8 9 10<br>1 1 1<br>4283 E  |                         | ACTIO<br>14<br>A – AP<br>D DI<br>F 1 FEB 78 W   | EIS/E<br>COMP             | A<br>PLETED<br>DATE<br>MO DA<br>15 16 17 1              |                                 | NATURE O    | , 360   TRO          | UTHORI              | DA<br>FORWA<br>DESIGN<br>MO DA<br>19 20 21 2<br>FY<br>WHITE (C<br>PINK                                                                 |             |  |  |
|   | APPRO                                               |                                                                                                                                                                                                                                                                                                                | OCUMENT NU<br>SERIAL<br>NUMBEF<br>7 8 9 10<br>L 1 1<br>4283 Ef |                         | ACTIO<br>14<br>A – AP<br>D – DI<br>F 1 FEB 78 W |                           | PROVAL A<br>DATE<br>MO DA<br>15 16 17 1                 |                                 | NATURE O    | F APPROVAL A         | UTHORI              | DA<br>FORWA<br>DESIGN<br>MO DA<br>19 20 21 2<br>TY<br>WHITE (C<br>PINK                                                                 |             |  |  |
|   | APPRO                                               | UNG A<br>US A<br>A<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                                                                                                                                   | OCUMENT NL<br>SERIAL<br>NUMBEF<br>7 8 9 10<br>1 1 1<br>4283 E1 |                         | ACTIO<br>14<br>A – AP<br>D – DI<br>F 1 FEB 7R W | EIS/E<br>COMP             | A<br>PLETED<br>DATE<br>MO DA<br>15 16 17 1              |                                 | NATURE O    | F APPROVAL A         | UTHORI              | DA<br>FORWA<br>DESIGN<br>MO DA<br>19 20 21 ]<br>TY<br>I<br>WHITE (C<br>PINK                                                            |             |  |  |
|   | APPRO                                               | UNG A<br>D<br>Z<br>REC<br>J<br>J<br>D<br>A<br>5<br>6<br>C<br>I<br>D<br>C<br>I<br>D<br>C<br>I<br>D<br>C<br>I<br>D<br>C<br>I<br>D<br>S<br>C<br>I<br>D<br>S<br>C<br>I<br>D<br>S<br>C<br>I<br>D<br>S<br>C<br>I<br>D<br>S<br>C<br>S<br>S<br>C<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S | OCUMENT NU<br>SERIAL<br>NUMBEF<br>7 8 9 10                     |                         | ACTIO<br>14<br>A – AP<br>D – DI<br>F 1 FEB 78 W |                           | IA<br>PLETED<br>DATE<br>MO DA<br>15 16 17 1             |                                 | NATURE O    | F APPROVAL A         | UTHORI              | FORWA           DESIGN           MO           19           20           19           20           TY           WHITE (C           PINK |             |  |  |
|   | APPRO                                               | VING A<br>US A<br>A<br>B<br>C<br>C<br>D<br>R<br>M<br>UG 78                                                                                                                                                                                                                                                     | OCUMENT NL<br>SERIAL<br>NUMBEF<br>7 8 9 10<br>1 1 1<br>4283 Ef |                         | ACTIO<br>14<br>A – AP<br>D – DI<br>F 1 FEB 78 W | EIS/E<br>COMP             | A<br>PLETED<br>DATE<br>MO DA<br>15 16 17 1              |                                 | NATURE O    | F APPROVAL A         | UTHORI              | TY                                                                                                                                     |             |  |  |

1. . . . <del>. . .</del> . . . .

. . . . . . . .

计读出 计算机

• 

| EERING W<br>Pam 420–6       | ORK REQUE                                                                                                             | ST – X<br>agency i | FA, XFB<br>s the Offic                              | 3, XI<br>ce of                | FC<br>the Chief of En                                                                                           | gineers.                                            |                                                                                   | - <u> </u>                          |                                               |                                | <del></del> |              |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------|--------------------------------|-------------|--------------|
| TION                        |                                                                                                                       |                    | SHO                                                 |                               |                                                                                                                 | CHEFTS                                              |                                                                                   | BLANK                               |                                               |                                |             |              |
|                             | <del></del>                                                                                                           |                    |                                                     |                               |                                                                                                                 |                                                     |                                                                                   | N                                   | UMBEN                                         | SUFFIX                         | 4 75 70     | 77 78 70 100 |
| 36 37 38 39                 | 40 41 42 43 4                                                                                                         | 4 45 46            | 47 48 49                                            | 50                            | 51 52 53 54 55                                                                                                  | 56 57 58                                            | 3 59 60 61 62 63 64                                                               | 165166167                           | P8 P3 10 11                                   | 12/3/2                         | • / ] / !   | 1,118,18,0   |
|                             | Repla                                                                                                                 | lcle               | <u>m o</u>                                          | <sup>t</sup> l                | orisi                                                                                                           | <u>t t i </u>                                       |                                                                                   | P <sub>1</sub> 0                    | 10 12 15 IA                                   |                                |             |              |
| /FACILITY                   | BUILDI                                                                                                                | NG/FAC             |                                                     | $\vdash$                      | BUILDING/FA                                                                                                     |                                                     | BUILDING/FAC                                                                      |                                     | BUILDIN                                       | G/FACIL                        | ITY         | BLANK        |
| SUFF                        |                                                                                                                       | ER                 | SUFFIX                                              |                               | NUMBER                                                                                                          | SUFFIX                                              | NUMBER                                                                            | SUFFIX                              | NUMBEI                                        | R SI                           |             |              |
| 36 37 38 39                 | 40 41 42 43 4                                                                                                         | 4 45 46            | 47 48 49                                            | 50 5                          | 51 52 53 54 55                                                                                                  | 56 57 58                                            | 59 60 61 62 63 64                                                                 | 65 66 67                            | 68 69 70 71                                   | 72 73 74                       | 75 76       | 77 78 79 80  |
|                             |                                                                                                                       | 1 1                | 1 1                                                 | ,                             |                                                                                                                 |                                                     |                                                                                   |                                     |                                               |                                | 1.1.        |              |
|                             |                                                                                                                       | DESC               | RIBE WH                                             | ATV                           | VILL HAPPEN I                                                                                                   | FWORK                                               | IS NOT ACCOMPLIS                                                                  | HED                                 |                                               |                                |             |              |
| provide<br>prs run<br>ad.   | the<br>cooler,                                                                                                        |                    | fail, t<br>low eff<br>are alm<br>operati<br>imately | the<br>fic<br>nos<br>ing<br>7 | y are more<br>iency moto<br>t always r<br>as soon a<br>84 million                                               | e likel<br>or thar<br>require<br>as poss<br>a BTU's | y to be repland<br>a high effice<br>ad quickly to<br>sible. This h<br>s per year. | aced w<br>ciency<br>get t<br>ECO wi | ith a sir<br>one. Ma<br>he equip<br>ll save a | nilar<br>ost<br>ment<br>approx | : <b></b> - |              |
|                             | ar enar , , a conserva a s                                                                                            |                    |                                                     |                               | PER                                                                                                             |                                                     |                                                                                   | NAL INF                             | ORMATION                                      | <u> </u>                       |             |              |
|                             |                                                                                                                       | NAME               |                                                     |                               | FCR                                                                                                             |                                                     | ORGANIZATION                                                                      |                                     |                                               | TELE                           | PHONĘ NO.   |              |
|                             |                                                                                                                       |                    |                                                     |                               |                                                                                                                 |                                                     |                                                                                   |                                     |                                               |                                |             |              |
|                             |                                                                                                                       |                    |                                                     |                               |                                                                                                                 | APPRO                                               | VED FOR DESIGN                                                                    |                                     |                                               | SOURCE                         | OF FL       | JNDS         |
| ELF-HELP<br>ONTRACT<br>ROOP |                                                                                                                       | ATE                |                                                     | SIGNATURE DATE                |                                                                                                                 |                                                     |                                                                                   |                                     |                                               |                                |             |              |
| LAUTHORI                    | -FORM<br>DESIGN<br>MO (C<br>19/20/21<br>TY<br>WHITE                                                                   | ARDEC              | ) TO<br>IMATOR<br>) DA<br>24 25 26<br>1             |                               | ECT FILE COPY                                                                                                   |                                                     |                                                                                   | GREEN                               | - FORWA                                       |                                | EYPUI       |              |
|                             | PINK                                                                                                                  | 1                  | - FC<br>OF                                          | 5RW<br>F ''A                  | PPROVAL ACT                                                                                                     | UNCH AF                                             | OCK                                                                               |                                     | APPROV                                        | AL" BL                         | OCK         |              |
|                             |                                                                                                                       | ta de la fi        |                                                     | , seja<br>e                   | g for a state of the |                                                     | •<br>•                                                                            | · ·                                 | -                                             | •                              |             |              |
|                             | and a second                                                                                                          |                    |                                                     |                               |                                                                                                                 |                                                     |                                                                                   |                                     |                                               |                                |             |              |
|                             |                                                                                                                       |                    |                                                     | /                             |                                                                                                                 |                                                     |                                                                                   |                                     |                                               |                                |             | •            |
| ર કે સુકેરે                 | Sa                                                                                                                    |                    |                                                     |                               |                                                                                                                 |                                                     |                                                                                   |                                     |                                               |                                |             |              |
|                             | ्र<br>स्टब्स्<br>स्टब्स्                                                                                              |                    | · •,                                                |                               |                                                                                                                 |                                                     | •-<br>•                                                                           |                                     | •, ,                                          |                                |             | - 14         |
| ••••                        | i.<br>Tana ing katalan sa kat |                    |                                                     |                               |                                                                                                                 |                                                     |                                                                                   |                                     |                                               |                                |             |              |

|            | PROJECT GROUP                | ECO              | ENERGY<br>SAVINGS<br>MBTU/YR | ENERGY<br>SAVINGS<br>\$ | PROJECT<br>COST<br>\$ | SIMPLE<br>PAYBACK<br>YRS | SIR          |
|------------|------------------------------|------------------|------------------------------|-------------------------|-----------------------|--------------------------|--------------|
| ·          | GROUP 8<br>Building 225      |                  |                              |                         |                       |                          |              |
| 225<br>225 | Building 225<br>Building 225 | ECO-A4<br>ECO-M3 | 160.0<br>346.0               | \$3,926<br>\$1,091      | \$18,784<br>\$11,230  | 4.8<br>10.3              | 2.28<br>1.32 |
| 220        | GROUP 8 TOTALS               |                  | 506.0                        | \$5,017                 | \$30,014              | 6.0                      | 2.18         |

## ENERGY CONSERVATION ANALYSIS ESOS

|      | ENERGY SAVINGS CALCULATION SHEET                     | DATE PREPARED                           | SHEET OF          |
|------|------------------------------------------------------|-----------------------------------------|-------------------|
|      | PROJECT                                              | BASIS FOR CALCULATIC                    | N .               |
|      | ESOS                                                 |                                         |                   |
|      | LOCATION                                             |                                         |                   |
|      | FORT LEAVENWORTH                                     |                                         |                   |
|      | RCHITECT/ENGINEER                                    | X OTHER (SP                             | ECIFY) BIN METHOD |
|      |                                                      | COMPUTED BY                             | CHECKED BY        |
|      | BLDG. #225 A4 SOLAR FILM                             | DLH                                     |                   |
|      |                                                      |                                         |                   |
|      | ENERGY SAVINGS                                       |                                         |                   |
|      | EVICTING BUILDING HEATING ENERGY USAGE (MRTI LPER YR | 611.00                                  | MBTU              |
|      | INSULATION BUILDING HEATING ENERGY USAGE (MBTU PER   | YR.) 681.00                             | MBTU              |
|      |                                                      |                                         |                   |
|      | EXISTING BUILDING COOLING ENERGY USAGE (MBTU PER YF  | $\frac{1,077.00}{200.00}$               | MBIU              |
|      | INSULATION BUILDING COOLING ENERGY USAGE (MBTU PER   | ( ( ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) |                   |
|      | MBTU'S SAVED PER YR. 207.00 MBTU                     |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      | HEATING MBTU'S SAVED / BOILER EFFICIENCY = TOTAL M   | BIUS SAVED PER TEAR                     |                   |
|      | -/0.00 / 60% = -116.67                               |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      | HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS P      | ER MBIU = DOLLARS SA                    | NED PER TEAR      |
|      | -116.67 X \$3.15                                     | ≖ (≎300)                                |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      | COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS P      | PER MBTU = DOLLARS S                    | AVED PER YEAR     |
| المد | 277.00 X \$15.50                                     | <b>≖</b>                                |                   |
|      |                                                      | •                                       |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      | ENERGY SAVINGS PER YEAR \$3,926                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      | •                                       |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |
|      |                                                      |                                         |                   |





| - |                        |              |                            |                     |                     |           |                          | 12        |         |
|---|------------------------|--------------|----------------------------|---------------------|---------------------|-----------|--------------------------|-----------|---------|
| Γ |                        | ENERGY S     | SAVINGS C                  | ALCUL               | ATION SHE           | ET        | DATE PREPARED<br>7/10/87 | ISHEET    | 0F<br>1 |
| F | PROJECT                | FORT LEA     |                            | H                   | UNITY SUF           | RVEY      | BASIS FOR CALCUL         | ATION     |         |
| h | OCATION                | ERENGI       |                            |                     | <u> </u>            |           | X HAND CA                | LCULATIO  | NS      |
| " | DALUTCATCN             | BUILDING#    | 225                        |                     |                     |           |                          |           | _ATIONS |
| ľ | ARCHITECTIEN           | CLARK RI     | CHARDSON                   | & BIS               | KUP                 |           | OTHER                    | (SPECIFY) |         |
| Ē | CO MEASURE             |              |                            |                     |                     |           | COMPUTED BY              | CHECKE    | O BY    |
| L |                        | BOILER O     | XYGEN TR                   | IM CON              | TROL                |           | MAW                      |           | DEC     |
|   |                        |              |                            |                     |                     |           |                          |           |         |
|   | BUILDING 2             | 25 - BOQ     |                            |                     |                     |           |                          |           |         |
|   | TEST DATA              | , BOILER #1, | KEWANEE F                  | FIRE TUB            | E, 125 HP           |           |                          |           |         |
|   | 4,184,375 B            | TUH INPUT    |                            | 0.0/                |                     |           |                          |           |         |
|   | % OXYGEN<br>STACK TEN  | PERATURE     |                            | 8. %<br>245 ° F     | )                   |           |                          |           |         |
|   | % EXCESS               | AIR          |                            | 58. %               | ,                   |           |                          |           |         |
|   | EFFICIENCY             | 1            |                            | 82.20%              |                     |           |                          |           |         |
|   | %002                   |              |                            | 7.0 %               |                     |           |                          |           |         |
|   | BOILER WA<br>BOILER OP | S AT APPRO   | XIMATELY 50<br>L TIME CYCL | 0% CAPA<br>_ING APP | CITY<br>PROX. 50% O | N 50% OFF |                          |           |         |
|   | BOILER TRI             | M CONTROL    | REDUCES E                  | XCESS A             | NR TO 15%           |           |                          |           |         |
|   | FROM "GAS<br>KANSAS ST | COMBUSTIC    | ON EFFICIEN<br>SITY, MANH  | ICY CHAF<br>ATTAN K | rt" Publish<br>S.   | ED BY COC | PERATIVE EXTENSIO        | ON SERVIC | Ε,      |
|   | 15% EXCES              | S AIR AT 317 | °F =                       | 84.50%              |                     | ON EFF.   |                          |           |         |
|   | 84.50%                 | , -          | 82.20%                     | =                   | 2.30%               | INCREASE  | IN COMB. EFF.            |           |         |
|   | 7 MONTHS               | /YR X 24 HRS | / DAY =                    | 5000                | HOURS OF            | OPERATIO  | ON PER YEAR              |           |         |
|   | ASSUMING               | BOILER OPE   | RATES AT C                 | CONSTAN             | NT 50% OF P         | EAK       |                          |           |         |
|   | 4.185                  | MBTUH X      | 0.5                        | х                   | 5000                | =         | 10,462.50 MBTU/Y         | R         |         |
|   | 10,462.50              | י כ          | 82.20%                     | =                   | 12,728.10           | MBTU / YR |                          |           |         |
|   | 10,462.50              | o /          | 84.50%                     | =                   | 12,381.66           | MBTU/YR   |                          |           |         |
|   | SAVINGS                |              |                            |                     |                     |           |                          |           |         |
|   | 12,728.10              | 0 -          | 12,381.66                  | =                   | 346.44              | MBTU/YR   |                          |           |         |
|   | 3.1!                   | 5 X          | 346.44                     | a                   | \$1,091             | PER YEAR  |                          |           |         |



| IN<br>P | ENE<br>ISTALLATION<br>ROJECT NO.                                                       | LIFE<br>ERGY C(<br>& LOCA<br>& TITLE:                                | CYCLE CO<br>DNSERVAT<br>TION: FT L<br>DACA41-8                             | OST ANALYSIS S<br>ION INVESTME!<br>LEAVENWORTH<br>36-C-0061 FT                               | SUMM/<br>NT PR<br>LEAV               | ARY<br>OGRAM (EC<br>ENWORTH     | IP)<br>REGION<br>ESOS      | STUDY<br>LCC<br>NO. 7                 | Y: FTLVGRU<br>ID 1.001                        | IP                                         |
|---------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------|----------------------------|---------------------------------------|-----------------------------------------------|--------------------------------------------|
| F<br>A  | ISCAL YEAR 1<br>NALYSIS DAT                                                            | 1987<br>E: 07- <sup>-</sup>                                          | DIS<br>10-87                                                               | CRETE PORTIO<br>ECONOMIC LI                                                                  | N NAN<br>FE 25                       | IE: GROUP<br>YEARS              | 8<br>PREPAR                | ED BY:                                | CRB                                           |                                            |
|         | INVESTMEN<br>A. CONSTR<br>B. SIOH<br>C. DESIGN<br>D. ENERGY<br>E. SALVAG<br>F. TOTAL I | NT<br>RUCTION<br>COST<br>Y CREDI<br>NVESTM                           | I COST<br>T CALC (1/<br>E COST<br>IENT (1D-1                               | A+1B+1C)X.9<br>IE)                                                                           |                                      |                                 |                            | 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 272<br>273<br>3 13<br>3 282<br>3 282<br>3 282 | 285.<br>729.<br>364.<br>240.<br>0.<br>240. |
| 2       | . ENERGY S.<br>ANALYSIS                                                                | AVINGS<br>DATE AN                                                    | (+) / COST<br>INUAL SAV                                                    | (-)<br>/INGS, UNIT CO                                                                        | ST & C                               | ISCOUNTE                        | D SAVINGS                  |                                       |                                               |                                            |
|         | FUEL                                                                                   | U!<br>\$/                                                            | NIT COST<br>MBTU(1)                                                        | SAVINGS<br>MBTU/YR(2)                                                                        | AN<br>SA                             | NUAL \$<br>VINGS(3)             | DISCOU<br>FACTOR           | NT<br>(4)                             | DISCOUNT<br>SAVINGS(                          | FED<br>5)                                  |
|         | A. ELECT<br>B. DIST<br>C. RESID<br>D. NAT G<br>E. COAL                                 | \$<br>\$<br>\$<br>\$<br>\$                                           | 15.50<br>.00<br>.00<br>3.15<br>.00                                         | 277.<br>0.<br>0.<br>229.<br>0.                                                               | \$ <del>\$</del> \$ <del>\$</del> \$ | 4296.<br>0.<br>0.<br>721.<br>0. | 11<br>16<br>17<br>19<br>13 | 05<br>73<br>67<br>36<br>47            | 474<br>139                                    | 469.<br>0.<br>0.<br>965.<br>0.             |
|         | F. TOTAL                                                                               |                                                                      |                                                                            | 506.                                                                                         | \$                                   | 5017.                           |                            | \$                                    | ₿ 61-                                         | 434.                                       |
| 3       | . NON ENER                                                                             | GY SAV                                                               | INGS(+) / C                                                                | OST(-)                                                                                       |                                      |                                 |                            |                                       |                                               |                                            |
|         | A. ANNUA                                                                               |                                                                      | RRING (+/-)                                                                |                                                                                              |                                      | 11 65                           |                            | S                                     | \$                                            | 0.                                         |
|         | (1) DIS(<br>(2) DIS(                                                                   | COUNTE                                                               | D SAVING                                                                   | ABLE A)<br>COST (3A X 3A                                                                     | \1)                                  | 11.05                           |                            | 5                                     | \$                                            | 0.                                         |
|         | C. TOTAL                                                                               | NON EN                                                               | ERGY DISC                                                                  | COUNTED SAVIN                                                                                | IGS(+)                               | )/COST(-) (                     | 3A2+3BD4)                  | ę                                     | \$                                            | 0.                                         |
|         | D. PROJEC<br>(1) 25%<br>A IF<br>B IF<br>C IF<br>D IF                                   | CT NON<br>MAX NO<br>3D1 IS<br>3D1 IS<br>3D1 IS<br>3D1B IS<br>3D1B IS | ENERGY C<br>ON ENERG<br>= OR > 3C<br>< 3C CALC<br>S = > 1 GO<br>S < 1 PROJ | QUALIFICATION<br>Y CALC (2F5 X<br>GO TO ITEM 4<br>SIR = (2F5+3E<br>TO ITEM 4<br>ECT DOES NOT | TEST<br>.33)<br>)1)/1F)<br>QUAL      | =<br>IFY                        | \$ 202                     | 73.                                   |                                               |                                            |
| 2       | . FIRST YEA                                                                            | R DOLL                                                               | AR SAVING                                                                  | S 2F3+3A+(3B1                                                                                | D/(YE                                | ARS ECONC                       | MIC LIFE))                 | :                                     | \$5                                           | 017.                                       |
| Ę       | 5. TOTAL NE                                                                            | T DISCO                                                              | UNTED SA                                                                   | VINGS (2F5+3C)                                                                               | )                                    |                                 |                            | :                                     | \$ 61                                         | 434.                                       |
| 6       | 5. DISCOUNT<br>(IF < 1 PRC                                                             | ED SAV                                                               | INGS RATI                                                                  | O<br>QUALIFY)                                                                                | (S                                   | 5IR)=(5 / 1F):                  | = 2                        | .18                                   |                                               |                                            |

. . ... .

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     |                                   |                     |                                   |                                      |                           |                                           |                                                   |                                    |                                   |                               |                    | is form                              | FAC                          |                                | TIE                     | S EN                             | IGI<br>nd D                   | NEEI<br>A Pai                    | RIN<br>m 42                    | G WOF                                    | K R<br>e pro | EQU          | ES'<br>ita    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------|--------------------------|----------------------|--------------------|--------------------------------|------------------|-------------------------------------------------|-------------------------------------|-----------------------------------|---------------------|-----------------------------------|--------------------------------------|---------------------------|-------------------------------------------|---------------------------------------------------|------------------------------------|-----------------------------------|-------------------------------|--------------------|--------------------------------------|------------------------------|--------------------------------|-------------------------|----------------------------------|-------------------------------|----------------------------------|--------------------------------|------------------------------------------|--------------|--------------|---------------|
| OF USE OF this form, see AH 420-17 and CA Pain 420-0, the Did         OF USE OF this form, see AH 420-17 and CA Pain 420-0, the Did         OP USE OF this form, see AH 420-17 and CA Pain 420-0, the Did         TRANS       OP USE OF this form, see AH 420-17 and CA Pain 420-0, the Did         TRANS       OP USE OF this form, see AH 420-17 and CA Pain 420-0, the Did         TRANS       OP USE OF this form, see AH 420-17 and CA Pain 420-0, the Did         TRANS       Vert of the Did       DATE         ODE       SERIAL       Vert of the Did       OTHER FUND CITATION         ID       NUMBER       Vert of the Did       OTHER FUND CITATION         I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     |                                   |                     |                                   |                                      |                           |                                           |                                                   |                                    |                                   |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                |                                          |              |              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TRANS<br>CODE                              | HAN                                 | RI                       | EQ<br>D              |                    | SEF                            |                  | L'<br>B                                         | ۴                                   | ТҮРЕ                              |                     | N                                 | UME                                  | BER                       |                                           | SUFF                                              | IX                                 | YR                                | м                             | 0                  | DA                                   | 0                            | тне                            | RF                      | UND                              | CIT                           | ATIC                             | N                              |                                          |              |              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1 2 3                                      | 4                                   | 5                        | 6                    | 7                  | 8                              | 9                | 101                                             | 1 12                                | 13                                | 14                  | 15                                | 16                                   | 17                        | 18 19                                     | 20 21                                             | 22                                 | 23 24                             | 4 25                          | 26                 | 27 28                                | 29 3                         | 031                            | 32                      | 33 3                             | 4 35                          | 36                               | 37 3                           | 8 39 40                                  | 41 4         | 2 43         | 44            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | XIFIA                                      |                                     |                          |                      |                    |                                |                  |                                                 |                                     |                                   | P                   | 10                                | 21                                   | 2                         |                                           |                                                   |                                    | 0 0                               | 0                             | 6                  | 016                                  |                              |                                | -                       |                                  |                               |                                  |                                |                                          | <u>n i</u> e |              | ап            |
| Image: Second state in the second s |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     |                                   |                     |                                   |                                      | <u>3/FA</u>               | SUFF                                      | іх                                                | ۲<br>۲                             |                                   | BE                            | R -                | SUF                                  | FIX                          |                                | NU                      | ABEI                             | <del>م، م</del>               | s                                |                                |                                          | NUM          | IBE          |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1 2 3                                      | 4                                   | 5                        | 6                    | 7                  | 8                              | 9                | 101                                             | 1 12                                | 13                                | 14                  | 15                                | 16                                   | 17 1                      | 18 19                                     | 20 21                                             | 22 2                               | 3 24                              | 25                            | 26                 | 27 28                                | 29 3                         | 0 31                           | 32                      | 33 3                             | 4 35                          | 36                               | 37 3                           | 8 39 40                                  | 41 4         | 2 43         | 44            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                                     |                          |                      | ل                  |                                |                  |                                                 |                                     | OF                                |                     |                                   | то                                   | <br>BE                    |                                           |                                                   | SHEI                               |                                   | <u>   </u>                    |                    |                                      |                              | 1                              |                         |                                  | 1                             |                                  |                                | 1_1_                                     |              |              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Inst<br>and<br>wall<br>mont<br>Oxyc<br>and | ldi<br>we<br>ls<br>ths<br>gen<br>pr | ng<br>l<br>st<br>is<br>t | So<br>fa<br>g<br>rin | 25<br>Lac<br>Lac   | , E<br>r f<br>inc<br>ss<br>cor | 300<br>J W<br>wh | ) &<br><u>m</u> -<br>vinc<br>nich<br><u>col</u> | Di<br>- w<br>low<br>n r<br>fo<br>fo | nn<br>vil<br>vs.<br>es<br>r<br>ea | in<br>1<br>ul<br>th | ng :<br>rec<br>App<br>.ts<br>ng h | fac<br>duc<br>pro<br>in<br>ooi<br>at | il<br>xi<br>s<br>le:<br>a | ity<br>the<br>mate<br>ign:<br>rs v<br>lov | , has<br>sola<br>ely 1<br>ifica<br>would<br>wer c | s tw<br>ar h<br>1/4<br>ant<br>l ir | vo o<br>neat<br>of<br>so:<br>mpro | opp<br>tg<br>th<br>lar<br>ove | or<br>ai<br>h<br>t | tuni<br>n in<br>wall<br>wall<br>heat | tie:<br>the<br>gai:<br>effic | s f<br>e s<br>ea<br>n d<br>cie | ior<br>sum<br>on<br>lur | ene<br>mer<br>the<br>ing<br>y o: | erg<br>fr<br>e s<br>th<br>f t | y s<br>om<br>outi<br>e s<br>he l | avi<br>the<br>h a<br>um<br>boi | ings.<br>e sout<br>and we<br>her<br>lers | ∴h<br>≥st    |              |               |
| ŀ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     |                                   |                     |                                   |                                      |                           |                                           | ESTER                                             | INF                                | 08/                               |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                |                                          |              |              | $\rightarrow$ |
| t                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NAME                                       |                                     |                          |                      |                    |                                |                  |                                                 |                                     |                                   |                     | оя                                | GAN                                  | 112                       | ATIO                                      | N                                                 |                                    | 01111                             |                               |                    | TELE                                 | ном                          | EN                             | o.                      | SIGN                             | IATU                          | RE                               |                                |                                          |              |              | 7             |
| NAME OHGANIZATION TELEPHONE NO. SIGNATORE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     |                                   |                     |                                   |                                      |                           |                                           |                                                   |                                    |                                   |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                |                                          |              |              |               |
| r                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                                     |                          |                      | -                  |                                |                  |                                                 |                                     |                                   |                     | _                                 |                                      |                           |                                           | FOR                                               | NAR                                | DF                                | OR A                          | \PP                | ROVA                                 | Ļ                            |                                | <u> </u>                |                                  |                               |                                  |                                |                                          |              |              |               |
| ŀ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | то                                         |                                     |                          |                      |                    | 2.                             |                  | R                                               | ECO                                 | M                                 | NEI                 | NDE                               | D                                    | E                         | ENVIF                                     | ONMEN                                             | ITAL                               | IMP/                              | ACT                           |                    | ESTIN                                | ΙΑΤΕ                         | D C                            | OST                     |                                  | W(                            | ORK<br>RFO                       | TO I<br>RME                    | BE FF                                    | юм           |              |               |
| İ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                                     |                          |                      |                    |                                |                  |                                                 | CII                                 | UN                                |                     |                                   |                                      | r                         | NO Y                                      | YES                                               |                                    |                                   |                               |                    | FUNC                                 | ED                           | \$                             | . <u> </u>              |                                  |                               |                                  |                                |                                          |              |              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     | PA                                |                     | AL                                | • •                                  |                           | ⊠                                         |                                                   | VSIDE                              | RAT                               | 1005                          | s                  | wc <u>k</u>                          | -                            | \$                             | 30                      | ,01                              |                               | IN-I                             | HOU                            | SE                                       | FA           | CILIT        | 165           |
| ĺ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     | 54                                |                     | 10 V                              | A L                                  |                           | Ø                                         |                                                   | /EIA                               | TED                               |                               |                    | wc _                                 | -                            | s<br>5                         |                         |                                  |                               | CON                              | TRA                            | ACT                                      |              |              |               |
| •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | APPRO                                      |                                     | IG A                     | AUT                  | нс                 | RIT                            | ΓY               | -                                               |                                     |                                   |                     |                                   |                                      |                           | Ø                                         |                                                   | VEIA                               | ETE                               | D                             |                    | UNFU                                 | NDE                          | D \$<br>\$                     | 1<br>31                 | 364                              |                               | TRO                              | ОР                             |                                          |              |              | DA            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     | _                                 |                     |                                   |                                      |                           |                                           |                                                   |                                    |                                   |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                |                                          |              |              |               |
| F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                                     |                          |                      |                    |                                |                  |                                                 |                                     |                                   |                     |                                   |                                      |                           |                                           |                                                   | APP                                | ROV                               |                               |                    | TION                                 |                              |                                |                         |                                  |                               |                                  |                                |                                          |              | FOF          | w.            |
| K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | .NS                                        | ANGE                                | RE                       | 0100                 |                    | SER                            |                  |                                                 |                                     | w                                 |                     | A                                 | сті                                  | ÓN                        | так                                       | EN                                                | ┣.                                 |                                   |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                |                                          | E            | DESI         | GN            |
| L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CODE                                       | 5                                   | 10                       |                      | ן<br>דד            | NUN                            | ABE              | R                                               | <u>≻</u><br>⊾                       | <u>Σ</u><br>13                    | 14                  |                                   |                                      |                           |                                           |                                                   | 15                                 | 116                               | 171                           | 8                  |                                      |                              |                                |                         |                                  |                               |                                  |                                |                                          |              | MO<br>9 20 2 | 21            |
| ┟                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.1.2                                      | -                                   | <u> </u>                 | +                    | <u> </u>           | - 1-                           |                  | <u> </u>                                        |                                     | -                                 |                     | A                                 | . – A                                | A P P I                   | ROVE                                      | D                                                 |                                    |                                   |                               | ٦                  | SIG                                  | NATI                         | JRE                            | OF                      | APP                              | ROV                           | ALA                              | UTH                            | HORITY                                   | -  -         |              |               |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | XIFIC                                      | С                                   |                          |                      |                    | 1                              | <u> </u>         | 1                                               |                                     |                                   |                     |                                   | [                                    | 5154                      |                                           | OVED                                              | 1                                  |                                   |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                |                                          | <u></u>      |              | <u> </u>      |
| I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DA 1                                       |                                     | 78<br>78                 | 4                    | 128                | 33                             | E                | DIT                                             | ION                                 | OF                                | : 1                 | FEB                               | 78                                   | WIL                       | L BE                                      | USED                                              | UNT                                | IL E                              | хни                           | AUS                | STED.                                |                              |                                |                         |                                  |                               |                                  |                                |                                          | 1            | PINK         |               |
| è                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.0 <sup>2</sup> 38(1.091                  | 19.<br>19. juli                     | ÷.                       |                      | i<br>jeri          |                                |                  |                                                 |                                     | •.                                | t.                  | e Mitt                            |                                      |                           |                                           |                                                   |                                    |                                   |                               |                    |                                      | <br>                         | • • •                          | 78 j                    | s.<br>Status                     |                               |                                  |                                |                                          |              |              |               |
| :<br>ان                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | an a   | A. 2001                             |                          |                      |                    | . <i>2</i> 9.                  | 1994 -           |                                                 |                                     |                                   |                     |                                   | <br>                                 |                           |                                           | Jet s                                             |                                    | r" s                              | ta ju                         |                    |                                      | r<br>Lift Li                 | <i>.</i> .                     |                         | e çeti.                          |                               | . ,                              | , <i>1</i>                     | -                                        | •            |              |               |
| Ċ,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 999 - A. 1989<br>Alian (Marine)            |                                     | ¥. 0                     | reș a                |                    |                                |                  |                                                 |                                     |                                   |                     | ÷                                 |                                      |                           | 351212<br>                                | erija -                                           |                                    |                                   |                               |                    |                                      |                              | ,                              |                         |                                  |                               |                                  |                                |                                          |              |              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                                     |                          | 1                    |                    |                                |                  | []                                              | <u>_</u> .                          |                                   |                     | ,                                 |                                      | •                         |                                           |                                                   |                                    |                                   |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                | •                                        |              |              |               |
| ÷                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            | (\$1.2                              | <b>.</b>                 |                      |                    |                                | (                |                                                 | /                                   | Ϊ                                 | ,                   |                                   |                                      | ۰.                        |                                           |                                                   |                                    |                                   |                               |                    | ۰.                                   |                              |                                |                         |                                  |                               |                                  |                                | -                                        |              |              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 38 ( <sup>12</sup> , 1                     | . <b>.</b>                          |                          | . •                  |                    | • .                            |                  | Ć                                               | /                                   |                                   |                     |                                   |                                      |                           |                                           |                                                   |                                    |                                   |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                | •                                        |              |              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            | 578                                 | Ŧ                        | •                    |                    |                                |                  |                                                 |                                     |                                   |                     |                                   |                                      | •••                       |                                           | . •                                               |                                    |                                   |                               |                    |                                      |                              |                                |                         |                                  |                               |                                  |                                |                                          |              |              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                                     |                          | N.C                  | •                  | . ··                           | •                | . •                                             |                                     |                                   |                     |                                   |                                      |                           |                                           |                                                   |                                    |                                   |                               |                    |                                      | ۰,                           | .*                             |                         | NB - 14                          |                               |                                  | ىيو                            |                                          |              |              |               |
| い、茨                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | इंट्राइट्राइट्रि                           |                                     | eg :                     |                      | <b>م</b> ر.<br>. ۲ |                                | -                | . مە                                            |                                     | . <del>1</del> 7                  |                     |                                   | ,                                    |                           |                                           | , , <u>)</u> , , ,                                |                                    | •                                 | -                             | . •                | 4. *                                 |                              |                                |                         | . "                              |                               | •                                |                                | '                                        |              |              |               |

| EERING<br>Parn 420-                               | WOR<br>-6; th                   |                                | ST – X<br>agency is                 | FA, XFE<br>the Offic                 | 3, XFC<br>ce of th   | ;<br>e Chief of E                   | ingineers.        |                                | · ·                |                                         |                |                         |                                          |          |
|---------------------------------------------------|---------------------------------|--------------------------------|-------------------------------------|--------------------------------------|----------------------|-------------------------------------|-------------------|--------------------------------|--------------------|-----------------------------------------|----------------|-------------------------|------------------------------------------|----------|
| TION                                              |                                 |                                |                                     | SHO                                  | RT JOE               | B DESCRIP                           | TION              |                                | BL                 | JILDING/FA                              | SUFF           | -ix                     | BLANK                                    | R. S. S. |
| 36 37 38 3                                        | 39 40                           | 41 42 43 4                     | 4 45 46                             | 47 48 49                             | 50 51                | 52 53 54 5                          | 5 56 57 58        | 3 59 60 61 62 63 64            | 65 66 6            | 7 68 69 70 7                            | 1 72 73        | 74 75 7                 | 6 77 78 79 80                            | 0        |
|                                                   |                                 |                                |                                     | S IA NZ                              | .i m !               |                                     | ามษุษ             | 1 12 12 5 1 1                  | 1 1                |                                         |                |                         |                                          |          |
| FACILITY                                          | Y                               | BUILD                          | ING/FAC                             |                                      | BL                   | JILDING/F                           | ACILITY           | BUILDING/FAC                   |                    | BUILDI                                  | NG/FAC         | LITY                    |                                          | 1        |
| SUF                                               | FFIX                            | NUME                           | BER                                 | SUFFIX                               | N                    | IUMBER                              | SUFFIX            | NUMBER                         | SUFFIX             | NUMB                                    | ER             | SUFFIX                  | BLANK                                    |          |
| 6 37 38 3                                         | 39 40                           | 41 42 43 4                     | 4 45 46                             | 47 48 49                             | 50 51                | 52 53 54 5                          | 5 56 57 58        | 59 60 61 62 63 64              | 65 66 67           | 68 69 70 7                              | 1 72 73        | 74 75 76                | 5 77 78 79 80                            | 2        |
|                                                   | 1                               |                                |                                     |                                      |                      | L HAPPEN                            |                   | IS NOT ACCOMPLIS               |                    |                                         |                | <u> </u>                |                                          |          |
| saving<br>a the s<br>ath and<br>summer<br>e boile | gs.<br>sout<br>d we<br>r<br>ers | h<br>st                        | E                                   | The bu<br>energy<br>per yea          | ildir<br>. Tř<br>ar. | ng will<br>nis ECO                  | contin<br>will sa | ue to waste k<br>ave approxima | neating<br>ately S | g and co<br>506 mill                    | oling<br>ion B | TU's                    |                                          |          |
|                                                   |                                 |                                |                                     |                                      |                      | PEI                                 | RSON TO C         | ALL FOR ADDITIC                | NAL INF            | ORMATION                                |                |                         |                                          |          |
| E                                                 |                                 |                                | NAME                                |                                      |                      |                                     |                   | ORGANIZATION                   |                    |                                         |                | TELE                    | PHONĘ NO.                                |          |
|                                                   |                                 |                                |                                     |                                      |                      |                                     | APPRO             | VED FOR DESIGN                 |                    |                                         | SOUR           | CE OF F                 | UNDS                                     | 1        |
| -HOUSE<br>LF-HELI<br>NTRACT                       | P<br>r                          | FACILITI                       | DATE                                | NEER                                 | RE                   | MARKS                               | SIGNATU           | RE                             | DAT                | C                                       | ] DIRE         | CT<br>MATIC<br>DED REIM | REIMB.<br>MB.                            |          |
| AUTHOR                                            | RITY                            | -FORV<br>DESIG<br>MO<br>192021 | VARDED<br>N ESTI<br>DA MO<br>222323 | TO<br>MATOR<br>DA<br>4 25 26         |                      |                                     |                   |                                |                    |                                         |                |                         |                                          |          |
|                                                   |                                 | WHITE<br>PINK                  | (ORIGIN                             | AL) - PF<br>- FC<br>OF               | OJECT<br>RWAF        | R FILE COP<br>RD TO KEY<br>ROVAL AC | PUNCH AF          | TER COMPLETION                 | GHEE               | COMPL<br>APPRC                          | ETION          | OF "FO                  | RWARD FOR                                | I        |
|                                                   |                                 |                                |                                     | ning an di<br>San an di<br>San an di | ін хол<br>-<br>      | • • • • • • • •                     |                   |                                | • • •              | •<br>•<br>• • • •                       |                |                         | n an |          |
| •.•                                               | •••••                           |                                | ÷.                                  | · · ·                                |                      | *.                                  |                   |                                |                    | ·<br>·                                  |                | . •                     |                                          |          |
|                                                   |                                 | 古德国英格格                         | <b>)</b> .                          | /                                    |                      |                                     | <i>*</i>          |                                |                    |                                         |                |                         | ٠.                                       |          |
|                                                   |                                 | e e dette i di seren.          |                                     | 4                                    | ( )                  | )                                   |                   |                                |                    |                                         |                |                         | <b>,</b>                                 |          |
|                                                   | 4.5 e 5                         |                                | J'''                                |                                      |                      |                                     |                   |                                |                    |                                         |                |                         |                                          |          |
| ,                                                 | e<br>Startes                    | - ALLANDER                     |                                     |                                      |                      | -                                   |                   |                                |                    | _                                       |                |                         | - <u>.</u>                               |          |
| مار<br>میں ۲۰<br>مار العراقی ال                   | جن چې                           | e<br>Se this follow            | <u>.</u>                            |                                      | ·•*                  |                                     |                   | • · · · · ·                    |                    | - , , , , , , , , , , , , , , , , , , , |                |                         | ست میں<br>امید                           |          |

|    | PROJECT GROUP          | ECO    | ENERGY<br>SAVINGS<br>MBTU/YR | ENERGY<br>SAVINGS<br>\$ | PROJECT<br>COST<br>\$ | SIMPLE<br>PAYBACK<br>YRS | SIR  |
|----|------------------------|--------|------------------------------|-------------------------|-----------------------|--------------------------|------|
|    | GROUP 9<br>Building 56 |        |                              |                         |                       |                          |      |
| 56 | Building 56            | ECO-A2 | 243.0                        | \$1,335                 | \$17,615              | 13.2                     | 1.20 |
| 56 | Building 56            | ECO-A3 | 123.0                        | \$893                   | \$5,455               | 6.1                      | 2.34 |
| 56 | Building 56            | ECO-A4 | 30.0                         | \$637                   | \$5,286               | 8.3                      | 1.34 |
| 56 | Building 56            | ECO-A6 | 64.0                         | \$767                   | \$7,884               | 10.3                     | 1.21 |
| 56 | Building 56            | ECO-E3 | 88.0                         | \$2,112                 | \$18,594              | 8.8                      | 1.24 |
|    | GROUP 9 TOTALS         |        | 548.0                        | \$5,744                 | \$54,834              | 9.5                      | 1.34 |

## ENERGY CONSERVATION ANALYSIS ESOS

| PROJECT<br>LOCATION<br>ARCHITEC       | ESOS                                                                                                       | BASIS FOR CALCULATION                         |                   |
|---------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------|
|                                       | ESOS                                                                                                       |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
| ARCHITEC                              |                                                                                                            |                                               |                   |
|                                       | T/ENGINEER                                                                                                 |                                               | RBID              |
|                                       | CLARK RICHARDSON & BISKUP                                                                                  | X OTHER (SP                                   | ECIFY) BIN METHOD |
|                                       | URE                                                                                                        | COMPUTED BY                                   | CHECKED BY        |
|                                       | 0 A-2 THERMOPANE GLASS                                                                                     |                                               | L                 |
|                                       | ENERGY SAVINGS                                                                                             |                                               |                   |
|                                       | EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YF<br>MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YI | R.) <u>3,167.00</u><br>R.) <u>2,970.00</u>    | _                 |
| ;                                     | EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR<br>MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YF   | .) <u>417,025.00</u><br>R.) <u>403,530.00</u> | -                 |
|                                       | MBTU'S SAVED PER YR. 243.06 MBTU                                                                           |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
| 1                                     | HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS P                                                            | ER MBTU = DOLLARS SA                          | VED PER YEAR      |
|                                       | 197.00 X \$3.15                                                                                            | = \$621                                       |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
| (                                     | COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS P                                                            | ER MBTU = DOLLARS SA                          | AVED PER YEAR     |
|                                       | 46.06 X \$15.50                                                                                            | = \$714                                       |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
| -                                     |                                                                                                            |                                               |                   |
|                                       | ENERGY SAVINGS PER YEAR \$1,334                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
|                                       |                                                                                                            |                                               |                   |
| · · · · · · · · · · · · · · · · · · · |                                                                                                            |                                               |                   |







| PROJECT       BASIS FOR CALCULATION         LOCATION       HAND CALCULATIONS         COMPUTER CALCULATIONS       COMPUTER CALCULATIONS         ARCHITECT/ENGINEER       COMPUTER CALCULATIONS         CLARK RICHARDSON & BISKUP       X OTHER (SPECIFY) BIN MI         ECO MEASURE       COMPUTED BY         BUILD #56 A3 WEATHERIZATON SAVINGS       COMPUTED BY         ENERGY SAVINGS       DLH         EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       3,167.00         MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       3,085.00         EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.)       417,025         MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.)       405,035         MBTU'S SAVED PER YR.       122.92         MBTU'S SAVED PER YR.       122.92         MBTU'S SAVED PER YR.       122.92         MBTU       HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR         82.00       X       \$3.15       =       \$258                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| LOCATION       HAND CALCULATIONS         FORT LEAVENWORTH       COMPUTER CALCULATIONS         ARCHITECT/ENGINEER       COMPUTER CALCULATIONS         CLARK RICHARDSON & BISKUP       X         ECO MEASURE       OTHER (SPECIFY) BIN MI         BUILD #56 A3 WEATHERIZATON SAVINGS       COMPUTED BY         ENERGY SAVINGS       COMPUTED BY         EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       3,167.00         MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YR.)       3,085.00         EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.)       417,025         MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.)       417,025         MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.)       405,035         MBTU'S SAVED PER YR.       122.92         MBTU'S SAVED PER YR.       122.92         MBTU'S SAVED PER YR.       22.92         MBTU       HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR         82.00       X       \$3.15       =       \$258                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
| ARCHITECT/ENGINEER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | IS |
| CLARK HICHARDSON & BISKOP       A OTHER (SF LOIN (SF |    |
| BUILD #56 A3 WEATHERIZATON SAVINGSIDLHENERGY SAVINGSEXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.) $3,167.00$ MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YR.) $3,085.00$ EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.) $417,025$ MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.) $405,035$ MBTU'S SAVED PER YR. $122.92$ MBTUHEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR82.00X $$3.15$ $=$ \$258                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | /  |
| ENERGY SAVINGS<br>EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.) $3,167.00$<br>MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YR.) $3,085.00$<br>EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.) $417,025$<br>MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.) $405,035$<br>MBTU'S SAVED PER YR. $122.92$ MBTU<br>HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR X $33.15$ = $3258$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |
| EXISTING BUILDING HEATING ENERGY USAGE (MBTU PER YR.) $3,167.00$ MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PER YR.) $3,085.00$ EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.) $417,025$ MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.) $405,035$ MBTU'S SAVED PER YR. $122.92$ MBTUHEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEA82.00X\$3.15=\$258                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |
| EXISTING BUILDING COOLING ENERGY USAGE (KWH PER YR.) $417,025$<br>$405,035$ MODIFIED BUILDING COOLING ENERGY USAGE (KWH PER YR.) $405,035$ MBTU'S SAVED PER YR. $122.92$ MBTUHEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR<br>$82.00$ X $$3.15$ =\$258                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |
| MBTU'S SAVED PER YR. <u>122.92</u> MBTU<br>HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEA<br>82.00 X \$3.15 = \$258                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |
| HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YEAR X $3.15 = $ \$258                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | AR |
| COOLING MBTU SAVED PER YEAR X AVERAGE DOLLARS PER MBTU = DOLLARS SAVED PER YE<br>40.92 X \$15.50 = \$634                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | AR |
| ENERGY SAVINGS PER YEAR \$893                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |

.











| ENERGY S                   | AVINGS CALCULATION                           | DN SHEET                                       | DATE PREPARED<br>2/87                      | SHEET OF           |
|----------------------------|----------------------------------------------|------------------------------------------------|--------------------------------------------|--------------------|
| PROJECT                    |                                              |                                                | BASIS FOR CALCULATIO                       | ÔN                 |
| ESOS                       |                                              |                                                | HAND CALC                                  |                    |
| FORT LEA                   | VENWORTH                                     |                                                | COMPUTER                                   | CALCULATIONS       |
| ARCHITECT/ENGINEER         |                                              |                                                |                                            | RBID               |
| CLARK RIC                  | CHARDSON & BISKUP                            |                                                | OTHER (SF                                  | PECIFY) BIN METHOD |
| ECO MEASURE                |                                              |                                                | DIH                                        | CHECKED BT         |
| BLUG. #56 A-4 SUL          | AR FILM SAVINGS                              |                                                |                                            |                    |
| ENERGY S                   | SAVINGS                                      |                                                |                                            |                    |
| EXISTING BL<br>MODIFIED BI | JILDING HEATING ENERG                        | GY USAGE (MBTU PER YF<br>GY USAGE (MBTU PER YI | R.) <u>3.167.61</u><br>R.) <u>3.181.55</u> |                    |
| EXISTING BU<br>MODIFIED B  | JILDING COOLING ENER<br>UILDING COOLING ENER | GY USAGE (KWH PER YR<br>GY USAGE (KWH PER YF   | .) <u>417,025</u><br>R.) <u>404,152</u>    | 5                  |
| MBTU'S SAV                 | ZED PER YR 30.0                              | <u>00 MBTU</u>                                 |                                            |                    |
| HEATING MI<br>-13          | BTU SAVED PER YEAR 3<br>3.94 X               | K AVERAGE DOLLARS P<br>\$3.15                  | ER MBTU = DOLLARS S<br>= (\$44)            | AVED PER YEAR<br>) |
| COOLING M<br>43            | BTU SAVED PER YEAR 1<br>9.94 X               | X AVERAGE DOLLARS F<br>\$15.50                 | PER MBTU = DOLLARS S<br>= \$681            | AVED PER YEAR      |
| ENERGY SA                  | VINGS PER YEAR                               | \$637                                          |                                            |                    |
|                            |                                              |                                                |                                            |                    |

CALCULATION SHEET

....







|                                         | ENERGY SAVINGS CALCULATION SHEET                                                        | DATE<br>2/87                  | PREPARED                | SHEET                   | 0F<br>1 |
|-----------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------|-------------------------|-------------------------|---------|
| PROJECT                                 | ESOS                                                                                    | BASIS                         | FOR CALCULA             | TION                    |         |
| LOCATION                                | FORT LEAVENWORTH                                                                        | ×                             | HAND CAL<br>COMPUTE     | CULATIONS<br>R CALCULAT | IONS    |
| ARCHITEC                                | CT/ENGINEER<br>CLARK RICHARDSON & BISKUP                                                |                               | CONTRAC<br>OTHER (      | TOR BID<br>SPECIFY) BIN |         |
| ECO MEA<br>BLDG.#                       | SURE<br>56 A-6 REDUCE GLASS AREA SAVINGS                                                | COMF                          | DLH                     | CHECKED                 | ) BY    |
|                                         | ENERGY SAVINGS                                                                          |                               |                         |                         |         |
|                                         | EXISTING BUILDING HEATING ENERGY USAGE (MI<br>MODIFIED BUILDING HEATING ENERGY USAGE (M | BTU PER YR.)<br>IBTU PER YR.) | <u>3,167.</u><br>3,149. | 61<br>52                |         |
|                                         | EXISTING BUILDING COOLING ENERGY USAGE (K<br>MODIFIED BUILDING COOLING ENERGY USAGE (K  | WH PER YR.)<br>WH PER YR.)    | <u>417,0</u><br>403,6   | <u>25</u><br>08         |         |
|                                         | MBTU'S SAVED PER YR. 63.88 MBTU                                                         |                               |                         |                         |         |
|                                         |                                                                                         |                               |                         |                         |         |
|                                         |                                                                                         |                               |                         |                         |         |
|                                         |                                                                                         |                               |                         |                         |         |
|                                         | HEATING MBTU SAVED PER YEAR X AVERAGE I<br>18.09 X \$3.15                               | DOLLARS PER MB<br>=           | TU = DOLLARS<br>\$5     | SAVED PER<br>57         | YEAR    |
|                                         | COOLING MBTU SAVED PER YEAR X AVERAGE                                                   | DOLLARS PER ME                | TU = DOLLARS            | SAVED PER               | YEAR    |
|                                         | 45.79 X \$15.50                                                                         | =                             | φγι                     | 0                       |         |
|                                         |                                                                                         |                               |                         |                         |         |
|                                         |                                                                                         |                               |                         |                         |         |
|                                         |                                                                                         |                               |                         |                         |         |
|                                         | ENERGY SAVINGS PER YEAR \$767                                                           | 1                             |                         |                         |         |
|                                         | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |
|                                         | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |
|                                         | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |
|                                         | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |
| ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |
|                                         | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |
|                                         | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |
|                                         | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |
| *                                       | ENERGY SAVINGS PER YEAR \$767                                                           | ]                             |                         |                         |         |



ŧ

| Г |          | ENERGY SAVINGS CALCULATION SHEET                                                                     | DATE PRE            | PARED                              | SHEET     | OF 1       |
|---|----------|------------------------------------------------------------------------------------------------------|---------------------|------------------------------------|-----------|------------|
|   | PROJECT  |                                                                                                      | BASIS FOR           | R CALCULATIO                       | DN N      |            |
|   |          | ESOS                                                                                                 |                     | HAND CALC                          | II ATIONS |            |
|   | LOCATION | FORT LEAVENWORTH                                                                                     | x                   | COMPUTER                           | CALCULAT  | IONS       |
|   | ARCHITEC | T/ENGINEER                                                                                           |                     |                                    | R BID     |            |
| ł | FCO MEA  | CLARK RICHARDSON & BISKUP                                                                            | COMPUTE             | D BY                               | CHECKEL   | ) BY       |
|   |          | BLDG. #56 E-3 REPLACE INCANDESCENT SAVINGS                                                           |                     | DLH                                |           |            |
|   |          | ENERGY SAVINGS                                                                                       |                     |                                    |           |            |
|   |          | EXISTING BUILDING HEATING ENERGY USAGE (MBTU PEF<br>MODIFIED BUILDING HEATING ENERGY USAGE (MBTU PEF | YR.)<br>RYR.)       | <u>3,167.61</u><br><u>3,228.83</u> |           |            |
|   |          | EXISTING BUILDING ELECTRICAL ENERGY USAGE (KWH P<br>MODIFIED BUILDING ELECTRICAL ENERGY USAGE (KWH F | er yr.)<br>Yer yr.) | <u>417,025</u><br><u>373,461</u>   | _         |            |
|   |          | MBTU'S SAVED PER YR. <u>87.46</u> MBTU                                                               |                     |                                    |           |            |
|   |          | HEATING MBTU SAVED PER YEAR X AVERAGE DOLLARS<br>-61.22 X \$3.15                                     | PER MBTU<br>=       | J = DOLLARS<br>(\$193)             | SAVED PE  | ER YEAR    |
|   |          | ELECTRICAL MBTU SAVED PER YEAR X AVERAGE DOLLA<br>148.68 X \$15.50                                   | ARS PER M<br>=      | BTU = DOLL/<br>\$2,305             | ARS SAVEI | ) PER YEAR |
| • |          | ENERGY SAVINGS PER YEAR \$2,112                                                                      | ·                   |                                    |           |            |
|   |          |                                                                                                      |                     |                                    |           |            |
|   |          |                                                                                                      |                     |                                    |           |            |
|   |          |                                                                                                      |                     |                                    |           |            |
|   |          |                                                                                                      |                     |                                    |           |            |



| ESOS<br>FORT LEAVENWORTH<br>ENGINEER                                                                    | BASIS FOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CALCULATIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESOS<br>FORT LEAVENWORTH<br>ENGINEER                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | HAND CALCU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         | <u> </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | HAND CALCU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | COMPLITER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                          | IONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CONTRACTO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | RBID                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | OTHER (SF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PECIFY) BI                                                                                                                                                                                                                                                                                                                                                                                                                               | N METH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| HE<br>F-3 INCANDESCENT REDI ACEMENT SAVINGS                                                             | COMPUTE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U BY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CHECKED                                                                                                                                                                                                                                                                                                                                                                                                                                  | ) BY<br>MAW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| BUILDING WATTS WERE REDUCED IN THE FOLLOWING LOCA                                                       | ATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| BUILDING #56 10926 TOTAL WATTS REDUCTION                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| EXTERIOR - CHANGE 14 -100W CHANDELIER TO 40W.<br>ENTRY VEST - CHANGE 9 -100W LAMPS TO 50W.              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1290                                                                                                                                                                                                                                                                                                                                                                                                                                     | W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| KITCHEN - CHANGE 18 -100W LAMPS TO 90W.                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| OFFICES - CHANGE 41 -100W LAMPS TO 90W.                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| DRESSING RM - CHANGE 5 - 100W LAMPS TO 90W                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| JANITOR - CHANGE 2 - 100W LAMPS TO 90W                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| STORAGE - CHANGE 1 - 100W LAMPS TO 90W                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4004                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SOUTH ENT CHANGE 2 - 100W LAMPS TO 90W                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1890                                                                                                                                                                                                                                                                                                                                                                                                                                     | ) VV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BAPTIS/CHAPLE FRONT - CHANGE 15 - 150W FLOOD LAMPS<br>LOUNGE/ACT ROOM - CHANGE 36 - 150W FLOODS TO 55W. | TO 120W.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 450<br>3420                                                                                                                                                                                                                                                                                                                                                                                                                              | W<br>W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| CORR./TOILETS - REPLACE 57 -100W INCAN. FIXTURES WITH                                                   | 1 32W FLUC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | R. FIXTURES.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | . 3876                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| · · · · · · · · · · · · · · · · · · ·                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                         | BUILDING WATTS WERE REDUCED IN THE FOLLOWING LOCA<br>BUILDING #56 10926 TOTAL WATTS REDUCTION<br>EXTERIOR - CHANGE 14 - 100W LAMPS TO 50W.<br>CHTOLEN - CHANGE 18 - 100W LAMPS TO 90W.<br>OFFICES - CHANGE 120 - 1100W LAMPS TO 90W.<br>CHAPEL - CHANGE 120 - 1100W LAMPS TO 90W<br>STORAGE - CHANGE 2 - 100W LAMPS TO 90W<br>STORAGE - CHANGE 2 - 100W LAMPS TO 90W<br>SOUTH ENT CHANGE 2 - 100W LAMPS TO 90W<br>SOUTH ENT CHANGE 2 - 100W LAMPS TO 90W<br>CORR./TOILETS - REPLACE 57 - 100W INCAN. FIXTURES WITH | BUILDING WATTS WERE REDUCED IN THE FOLLOWING LOCATIONS<br>BUILDING #50 10926 TOTAL WATTS REDUCTION<br>EXTERIOR - CHANGE 14 -100W LAMPS TO 50W.<br>KITCHEN - CHANGE 18 -100W LAMPS TO 90W.<br>OFFICES - CHANGE 41 -100W LAMPS TO 90W.<br>CHAPESL - CHANGE 41 -100W LAMPS TO 90W.<br>DRESSING M - CHANGE 5 - 100W LAMPS TO 90W.<br>SOUTH ENT CHANGE 2 - 100W LAMPS TO 90W.<br>SOUTH ENT CHANGE 2 - 100W LAMPS TO 90W.<br>BAPTIS/CHAPLE FRONT - CHANGE 15 - 150W FLOOD LAMPS TO 120W.<br>LOUNGE/ACT ROOM - CHANGE 36 - 150W FLOOD LAMPS TO 120W.<br>CORR./TOILETS - REPLACE 57 -100W INCAN. FIXTURES WITH 32W FLUOD | BUILDING #55 10926 TOTAL WATTS REDUCTION EXTERIOR - CHANGE 14 - 100W CHANDELIER TO 40W. EXTERIOR - CHANGE 18 - 100W LAMPS TO 90W. OFFICES - CHANGE 18 - 100W LAMPS TO 90W. OFFICES - CHANGE 5 - 100W LAMPS TO 90W. SOUTH ENT CHANGE 5 - 100W LAMPS TO 90W SOUTH ENT CHANGE 2 - 100W LAMPS TO 90W BAPTIS/CHAPLE FRONT - CHANGE 15 - 150W FLOOD LAMPS TO 120W. CORR./TOILETS - REPLACE 57 - 100W INCAN. FIXTURES WITH 32W FLUOR. FIXTURES. | BUILDING WATTS WERE REDUCED IN THE FOLLOWING LOCATIONS BUILDING #56 10926 TOTAL WATTS REDUCTION EXTERIOR - CHANGE 14 -100W CHAMPS TO 50W. ENTRY VEST - CHANGE 18 -100W LAMPS TO 50W. OFFICES - CHANGE 14 -100W LAMPS TO 90W. DFRESSING RM - CHANGE 12 - 100W LAMPS TO 90W. STORAGE - CHANGE 2 - 100W LAMPS TO 90W. STORAGE - CHANGE 2 - 100W LAMPS TO 90W. STORAGE - CHANGE 2 - 100W LAMPS TO 90W. STORAGE - CHANGE 2 - 100W LAMPS TO 90W. CUUNGE/ACT ROOM - CHANGE 36 - 150W FLOOD LAMPS TO 120W. CORR./TOILETS - REPLACE 57 -100W INCAN. FIXTURES WITH 32W FLUOR, FIXTURES. |

| NAME                    |                  |      |                 |           |            |           |            |           |                   | Оя           | GA        | F<br>NIZ  |          | DN        | EH            | INF       | ORM        | IAI             |             | TELE         | рно        | NEI        | NO.          | SIG         | AT         | URE          |            |            | ÷                |      |      |       | N/         |
|-------------------------|------------------|------|-----------------|-----------|------------|-----------|------------|-----------|-------------------|--------------|-----------|-----------|----------|-----------|---------------|-----------|------------|-----------------|-------------|--------------|------------|------------|--------------|-------------|------------|--------------|------------|------------|------------------|------|------|-------|------------|
| · · · · · · · · · · · · | fix              | tur  | er              | wi]       | 1          | re        | du         | ice       | e t               | he           | ele       | ect       | ric      | al        | er            | her       | ду         | us              | ed          | for          | li         | ght        | ing          | &           | air        | <u>c</u> cc  | nd:        | iti        | oni              | ng   | •    |       | _          |
|                         | los              | ses  | •               | Re        | ep.        | Lac       | cir        | ŋ         | ir                | ncan         | de        | sce       | nt       | liq       | -<br>Jht      | in        | g w        | <i>i</i> t      | h 1         | ower         | W          | att        | age          | bu          | lb         | and          | l f        | luc        | bres             | scei | nt   |       |            |
|                         | wir              | ndow | IS I            | wit       | _h         | ir        | າຣເ        | 11a       |                   | ed p         | an        | els       |          | vil       | l r           | red       |            | e<br>s          | a b<br>ola  | r h∈         | at         | αa         | in           | and         | ອ່ເ<br>ໜ່  | Inte         | er l       | ssc<br>hea | it y             |      |      |       |            |
|                         | 1ML<br>Pos       | orov | e i<br>ai       | cor<br>ni | nro<br>i n | דרכ<br>ו+ |            | 2         | <u>50.</u><br>100 | lar<br>m     | <u>[]</u> |           | on       | w1)<br>ng | ndc<br>al     | )WS       | nc         | )t<br>Iro       | rep         |              | ed.        | ۰ N<br>۱۱۰ |              | . re        | auc        | e s          | 2019       | ar<br>55-  | , <del>,</del> , |      |      |       |            |
|                         | doc              | ors  | an              | d v       | vi.        | ndo       | DWS        | 5 1       | tha               | at a         | re        | nc        | nt 1     | rep.      | lac           | ced       | , W        | vil             | lr          | educ         | e          | inf        | ilt          | rat         | ior        | n ar         | nd ,       |            |                  |      |      | ĺ     |            |
|                         | hea              | at g | ai              | n :       | in         | tł        | ne         | SI        | um                | ner          | an        | d h       | neat     | : 10      | DSS           | sés       | ir         | ı t             | he          | wint         | er         | •          | Wea          | the         | rst        | crip         | pi         | ng         |                  |      |      |       |            |
| -                       | Bu:<br>The       | ermc | .ng<br>pa       | 50<br>ne  | b,<br>w    | Po<br>ind | ost<br>dov | t (<br>vs | Cha<br>ta         | apel<br>5 re | h<br>pl   | as<br>ace | sev<br>o | ver<br>ld | al<br>sir     | en<br>ngl | erc<br>e r | JY<br>Dan       | con<br>ie w | serv<br>indo | 7at<br>Sws | .10r       | i op<br>vill | por<br>. re | tur<br>duc | niti<br>ce s | les<br>sol | ar         |                  |      |      |       |            |
|                         |                  |      |                 | _         |            |           |            |           |                   |              |           |           |          |           |               |           | -          |                 |             |              |            |            |              |             |            |              |            |            |                  |      |      |       |            |
| DESCRIP                 | <u>сі</u><br>ті0 |      | ידם<br>דדי      |           |            | CA.       |            | L         |                   | NOR          | <br>с то  |           |          |           | ידידי<br>ארבי |           |            | ,               | <u> </u>    |              | <b></b> ]  |            |              | 11          | 1          |              | ΔΙ         | . <u> </u> |                  | LL   | I    |       | Di         |
| YIELO                   |                  | ı    |                 | • •       | I          | ,         |            |           |                   | ł            | ,         |           |          |           |               | ,         |            | 1               |             | 1.           |            |            |              |             | ŧ          | 1 1          |            | ,          | ,                |      | 1    |       | r          |
| 123                     | 4                | 6 6  | 7               | 8         | 9          | 10        | 11         | 12        | 13                | 14 15        | 16        | 17        | 18 1     | 9 20      | 21            | 22        | 23 2       | 4 2             | 526         | 27 28        | 29         | 30         | 1 32         | 33          | 43         | 5 36         | 37         | 38 3       | 9 40             | 41   | 42 4 | 3 44  | 45         |
| CODE                    | CHAI             | REQ  |                 | SER       |            |           |            | ž         | TVPE              | N            | UM        | BEF       | 1        | s         | UFF           | ١x        |            | NU              | MBE         | R 2          | SL         | JFFI       | ×            | NU          | мве        | ER           |            | SUF        | FIX              |      | NL   | JMBE  | R          |
| TRANS                   | U C C            | D    | <u>ocu</u><br>T | ME        | NT         | NU        | IMB<br>T   | ER        |                   | <u> </u>     | UIL       | DIN       | G/F/     |           | ITY           | <u></u>   |            | BUI             | LDIN        | IG/FA        |            | ITY        | _            | BUI         | DI         | NG/F         |            | LITY       | (                | 1    | BUI  | LDIN  | <u>IG/</u> |
| XIFIA                   |                  |      |                 | L         | L_J        |           |            |           |                   | P10          | 10        | 5         | 6-1-     | <u>a</u>  | <u> </u>      | L         | 91         | <u></u>         | Օլ 6        | 0,6          | ;          |            |              | 11          |            | 1            | 11         |            | مıP              | lo I | s t  | -     | C          |
| 11213                   | 4                | 5 0  | +               | •         | 9          | 10        |            | 12        | 13                | 14 1         | 210       | 11/       |          | 9 20      | 121           | 22        | 23         | 24 2            | 5 20        | 2/2          | 129        | 130        | 3 13.        | (]33        | 3413       | 5 30         | 3/         | 38 3       | 39 40            | 1    | •2]• | -3 44 | <u> </u>   |
|                         | t<br>t           |      | +               | NU        | мв         | ER        |            | <u>í</u>  | 7                 |              |           | le er     |          |           |               |           |            |                 |             |              |            | Ind        | -            |             | 2412       | -            | 11         | 2012       | 20140            |      | 0    | 12/44 | T.         |
|                         | ANG              | REO  | T               | SE        | RIA        | ۲L '      |            | ~         | ä                 |              |           |           |          | ٦.        |               |           |            | Ţ               |             |              | 1          | от⊦        | IER          |             | o C1.      | τάτι         | ON         |            |                  |      |      |       |            |
|                         | 18               | D    | OCL             | IME       | NT         | NI        | JME        | BEF       | 2                 | в            | ŨIL       | DIN       | G/F      | ACII      | .17)          | Y         |            | <u>use</u><br>D |             | -            | n se       | e Ar       | 420          | -17         | anu        | UAF          | am         | 120-       | -0; 1            |      | 0001 |       | ger        |
|                         |                  |      |                 |           |            |           |            |           |                   |              |           |           |          |           |               |           | F          |                 | - 4         |              |            |            | 470          | • •         |            | <u>n ^ a</u> | /          | 4 7 6      | E                |      |      |       |            |

|                     |                       | FORWARD FOR AP                  | PROVAL                                                   |            |              |
|---------------------|-----------------------|---------------------------------|----------------------------------------------------------|------------|--------------|
| то                  | RECOMMENDED<br>ACTION | ENVIRONMENTAL IMPACT            | ESTIMATED COST                                           | WORK TO BE | FROM         |
|                     | APPROVAL              | ENVIRONMENTAL<br>CONSIDERATIONS | FUNDED \$<br>WC K\$<br>WC L\$                            | IN-HOUSE   | FACILITIES E |
| APPROVING AUTHORITY |                       |                                 | WCS<br>UNFUNDED <u>\$ 2,492</u><br>TOTAL <u>\$ 57,33</u> |            | DAT          |

|                  |    |     |           |     |     |     |     |     |            |     |      |                       | APPRON  | AL A | CTION                           |       |        |
|------------------|----|-----|-----------|-----|-----|-----|-----|-----|------------|-----|------|-----------------------|---------|------|---------------------------------|-------|--------|
|                  |    | W   |           | DOC | :UN | 1EN | T   | NUN | <b>ABE</b> | R   |      |                       | D       | ATE  |                                 | ۰FO   | RWAF   |
|                  | NS | Ň   | RE        | ٥   |     | SEF | RIA | L   | T.         | ų   | -    | ACTION TAKEN          | мо      |      | ] [                             | DES   | IGN    |
|                  | UE | 5   | 10        |     | 1   | NUN | 188 | ER  | L.         |     |      | -                     |         |      |                                 | мо    | DA     |
| 12               | 3  | 4   | 5         | 6   | 7   | 8 9 | ) 1 | 01  | 1 1:       | 2 1 | 3 14 |                       | 15 16   | 17 1 | B                               | 19 20 | 21 22  |
|                  |    |     | 1         |     |     |     |     |     |            |     |      | A - APPROVED          |         |      | SIGNATURE OF APPROVAL AUTHORITY | l     |        |
| X <sub>I</sub> F | 1C | C   |           |     | 1   | 1   | 1   |     |            |     |      | D DISAPPROVED         |         |      |                                 | 1     | 1      |
| DA               | 1  | FOR | M<br>3 78 | 4   | 128 | 3   | 1   | EDI | тю         | N   | 0F 1 | FEB 78 WILL BE USED L | UNTIL E | хна  | USTED.                          | PINK  | TE (OR |

....

|                 |      |                              |                  |                        | -         |                           |          |                   |           |       |                        |            | i_    | .v.)       |                 | -1                   |
|-----------------|------|------------------------------|------------------|------------------------|-----------|---------------------------|----------|-------------------|-----------|-------|------------------------|------------|-------|------------|-----------------|----------------------|
| √G W<br>120-6   | OR   | K REQUE                      | ST — X<br>agency | (FA, X·F<br>is the Off | B,<br>ice | XFC<br>of the Chief of En | pineers. |                   |           |       | ,                      | ¢ .        | ,     |            |                 |                      |
|                 |      |                              |                  |                        |           |                           |          |                   |           | BU    | ILDING/                | ACI        | LITY  |            |                 |                      |
|                 |      |                              |                  | SHO                    | ראכ       | T JOB DESCRIPTI           | ON       |                   |           | N     | UMBER                  |            | SUFF  | =IX        | E               |                      |
| 38 39           | 40   | 41 42 43 4                   | 4 45 46          | 47 48 4                | 95        | 0 51 52 53 54 55          | 56 57 58 | 59 60 61 62 63 64 | 65        | 66 67 | 68 69 70               | 71         | 72 73 | 74 7       | 5 76            | 77 78 79 8           |
|                 | D    | o e t                        | .a.h             | 1 <b>.</b>             | 、 1       |                           |          |                   |           |       |                        | .          |       | .          |                 | 1 1 1                |
| <u> </u><br>ודע | -    | BUILDI                       | NG/FA            | CILITY                 |           | BUILDING/FA               | ILITY    | BUILDING/FAC      | 11<br>111 | TY    | BUILI                  |            | J/FAC |            | Y               | <u>I</u> <u>I</u> I  |
| SUFF            | IX   | NUMB                         | ER               | SUFFIX                 | :         | NUMBER                    | SUFFIX   | NUMBER            | su        | IFFIX | NUM                    | IBER       | l tr  | SUF        | FIX             | BLANK                |
| 38 39           | 40   | 41 42 43 4                   | 45 46            | 47 48 49               | 9 5       | 0 51 52 53 54 55          | 56 57 58 | 59 60 61 62 63 64 | 65        | 66 67 | 68 69 70               | 71         | 72 73 | 74 7       | 5 76            | 77 78 79 8           |
|                 |      |                              |                  |                        |           |                           |          |                   |           |       |                        |            |       | .          | .               |                      |
|                 |      |                              |                  |                        |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      |                              | DESC             | HIBE WE                | 141       | WILL HAPPENT              | WORK     |                   |           | 0     |                        |            |       |            |                 |                      |
|                 |      |                              |                  | The                    | bı        | uilding woul              | ld cont  | tinue to wast     | e         | ener  | gy unr                 | iece       | essa  | rił        | у,              |                      |
| ar              |      |                              | ]                | and                    | $\infty$  | ccupants wou              | ld cor   | ntinue to com     | pla       | ain   | about                  | poc        | or s  | pac        | e               |                      |
| .ng             |      |                              |                  | cond                   | lit       | tioning. Th               | iese co  | omplaints was     | te        | tim   | e and                  | res        | sour  | ces        | •               |                      |
|                 |      |                              |                  | The                    | bu        | ulding woul               | d save   | e approximate     | ТÀ        | 548   | milli                  | on         | BTU   | 's         |                 |                      |
| ar<br>ssar      | -, , |                              |                  | per                    | уe        | dr.                       |          |                   |           |       | •                      |            |       |            |                 |                      |
| beat            | Y    |                              | 1                |                        |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
| luor            | es   | cent                         |                  |                        |           |                           |          |                   |           |       |                        |            |       | · ,        |                 |                      |
| itio            | ni   | ng.                          |                  |                        |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      |                              |                  |                        |           | PERS                      | ON TO C  | ALL FOR ADDITIO   | NAI       | LINFO | ORMATIC                | <u>N</u>   |       | <u>.'-</u> |                 |                      |
|                 |      |                              | NAME             |                        |           |                           |          | ORGANIZATION      |           |       |                        |            |       | <b> </b> T | ELEP            | HONE NO.             |
|                 |      |                              |                  |                        |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      |                              |                  |                        | 7         | <b></b>                   | APPROV   | VED FOR DESIGN    |           |       |                        | s          | OUR   | CE O       | FFU             | NDS                  |
| BE              | FR   | ом                           |                  |                        | 1         |                           |          |                   |           |       |                        |            | :     |            |                 |                      |
| ED              |      |                              |                  |                        |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      |                              |                  |                        |           |                           |          |                   |           |       |                        |            | ••    |            |                 |                      |
| HELP            |      | FACILITIE                    | SENG             | INEER                  | 1 ·       |                           |          |                   |           |       |                        |            | DIRE  |            |                 |                      |
| ACT             |      |                              |                  |                        |           | Į                         |          |                   |           |       |                        |            |       |            | REIM            | 8.                   |
|                 |      | D                            | ATE              | •                      |           | SI                        | GNATUR   | IE                | -         | DAT   | ε                      | <u> </u>   |       |            |                 |                      |
|                 |      |                              |                  |                        |           |                           |          |                   |           |       |                        |            |       |            | •               | ·····                |
|                 |      |                              |                  |                        | 4         | REMARKS                   |          | -                 |           |       |                        | ·          |       |            |                 | •.                   |
|                 |      |                              |                  | 1 TO                   | ł         |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      | ·FORM                        | ARDEL            |                        | ł         | l ·                       |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      | MO                           |                  |                        |           |                           |          |                   |           |       |                        |            | -     |            |                 |                      |
|                 |      | 19 20 21                     | 2223             | 24 25 26               | 1         | 1                         |          |                   |           |       |                        |            |       |            |                 |                      |
| HORIT           | ΓY   | ·                            |                  |                        | 1         |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      |                              |                  |                        | ľ.        |                           |          |                   |           |       |                        |            |       |            |                 |                      |
| ۰.              |      | WHITE (<br>PINK              | ORIGI            | NAL) - P.<br>- F<br>0  | 80<br>08  | JECT FILE COPY            | UNCH AF  | TER COMPLETION    | G         | REEN  | I – FOR<br>COM<br>APPF | WAF<br>PLE | ID TO | OF "       | PUN<br>FOR<br>K | CH AFTER<br>WARD FOF |
|                 |      | nie ostał                    | <u></u>          |                        |           | •                         |          |                   |           |       | • • • •                |            |       |            |                 |                      |
|                 |      | ayyan karan Mayan Ariya<br>A | ia c             |                        |           | •                         |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      |                              |                  |                        |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      |                              |                  |                        |           | •                         |          |                   |           |       |                        |            |       |            |                 | ••                   |
| •               |      | a s c                        |                  | _                      |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      |                              | 1                | <u>, )</u>             |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 | ٠,   | . '                          | IN               | U/                     |           |                           |          |                   |           |       |                        |            |       |            |                 | ·                    |
|                 |      |                              | $\sim$           | 10                     |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |
|                 |      | ,<br>V                       |                  | /                      |           |                           |          |                   |           |       |                        |            |       |            |                 |                      |

## LIFE CYCLE COST ANALYSIS SUMMARY STUDY: FTLVGRUP ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID 1.001 INSTALLATION & LOCATION: FT LEAVENWORTH REGION NO. 7 PROJECT NO. & TITLE: DACA41-86-C-0061 FT LEAVENWORTH ESOS

FISCAL YEAR 1987 DISCRETE PORTION NAME: GROUP9 ANALYSIS DATE: 07-10-87 ECONOMIC LIFE 25 YEARS PREPARED BY: CRB

| 1. | INVESTMENT<br>A. CONSTRUCTION COST<br>B. SIOH<br>C. DESIGN COST<br>D. ENERGY CREDIT CALC (1A+1B+1C)X.9<br>E. SALVAGE VALUE COST<br>F. TOTAL INVESTMENT (1D-1E) | \$<br>\$<br>\$<br>\$<br>\$ | 49849.<br>4985.<br>2492.<br>51594.<br>0.<br>51594. |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------|
|    | F. TOTAL INVESTMENT (1D-1E)                                                                                                                                    | \$                         | 51594.                                             |

2. ENERGY SAVINGS (+) / COST (-) ANALYSIS DATE ANNUAL SAVINGS, UNIT COST & DISCOUNTED SAVINGS

|    | FUEL                                                                   |                                                                                                                                                                                                                         | UNIT COST<br>\$/MBTU(1)            | SAVINGS<br>MBTU/YR(2)          | A<br>S                     | NNUAL \$<br>AVINGS(3)           | DIS<br>FA | COUNT<br>CTOR(4)                          | D<br>S | ISCOUNTED<br>AVINGS(5)             |
|----|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------|----------------------------|---------------------------------|-----------|-------------------------------------------|--------|------------------------------------|
|    | A. ELECT<br>B. DIST<br>C. RESID<br>D. NAT G<br>E. COAL                 | \$\$\$\$                                                                                                                                                                                                                | 15.50<br>.00<br>.00<br>3.15<br>.00 | 326.<br>0.<br>0.<br>222.<br>0. | \$<br>\$<br>\$<br>\$<br>\$ | 5045.<br>0.<br>0.<br>699.<br>0. |           | 11.05<br>16.73<br>17.67<br>19.36<br>13.47 |        | 55750.<br>0.<br>0.<br>13526.<br>0. |
|    | F. TOTAL                                                               |                                                                                                                                                                                                                         |                                    | 547.                           | \$                         | 5744.                           |           |                                           | \$     | 69276.                             |
| 3. | NON ENERGY                                                             | NON ENERGY SAVINGS(+) / COST(-)                                                                                                                                                                                         |                                    |                                |                            |                                 |           |                                           |        |                                    |
|    | A. ANNUAL RECURRING (+/-)                                              |                                                                                                                                                                                                                         |                                    |                                |                            |                                 |           |                                           | \$     | 0.                                 |
|    | (1) DISCOU<br>(2) DISCOU                                               | UN.                                                                                                                                                                                                                     | TED SAVING/                        | COST (3A X 3A                  | <b>A</b> 1)                | 11.05                           |           |                                           | \$     | 0.                                 |
|    | C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+) /COST(-) (3A2+3BD4)          |                                                                                                                                                                                                                         |                                    |                                |                            |                                 |           | BD4)                                      | \$     | 0.                                 |
|    | D. PROJECT I<br>(1) 25% MA<br>A IF 3D<br>B IF 3D<br>C IF 3D<br>D IF 3D | PROJECT NON ENERGY QUALIFICATION TEST<br>(1) 25% MAX NON ENERGY CALC (2F5 X .33) \$ 22<br>A IF 3D1 IS = OR > 3C GO TO ITEM 4<br>B IF 3D1 IS < 3C CALC SIR = (2F5+3D1)/1F)=<br>C IF 3D1B IS < 1 PROJECT DOES NOT QUALIFY |                                    |                                |                            |                                 | 22861.    |                                           |        |                                    |
| 4. | FIRST YEAR D                                                           | O                                                                                                                                                                                                                       | LAR SAVING                         | S 2F3+3A+(3B1                  | D/(YE                      | ARS ECONO                       | DMIC L    | IFE))                                     | \$     | 5744.                              |
| 5. | TOTAL NET DI                                                           | ISC                                                                                                                                                                                                                     | OUNTED SAV                         | /INGS (2F5+3C)                 | )                          |                                 |           |                                           | \$     | 69276.                             |
| 6. | DISCOUNTED<br>(IF < 1 PROJEC                                           | S#<br>CT                                                                                                                                                                                                                | VINGS RATIO                        | )<br>(UALIFY)                  | (8                         | SIR)=(5 / 1F)                   | =         | 1.34                                      |        |                                    |