# **Energy Conservation Plan**

**Texas Tech University** 

November 2005

#### Texas Tech University Energy Conservation Plan

#### **Executive Summary**

Executive Order RP-49 from the Governor's Office requires each state agency to develop an energy conservation plan and set percentage goals for reducing electricity, gasoline, and natural gas. This plan is to be submitted to the Governor's Office and to the Legislative Budget Board no later than December 1, 2005. The Texas Tech University Energy Conservation Plan consists of two parts, the Resource Efficiency Plan and the Fleet Fuel Management Plan.

Identified in the Resource Efficiency Plan, reporting to the State Energy Conservation Office (SECO) is the two-year energy reduction goal of 3.5%. Tactics identified to achieve this goal include implementing identified energy projects totaling approximately \$2.16 million with an estimated annual energy savings of \$650,000. The funding source identified for these projects is the LoanSTAR Revolving Loan Program managed by the Texas State Energy Conservation Office.

The Fleet Fuel Management Plan, reporting to the State Office of Vehicle Fleet Management (SOVFM) sets a 5% reduction in fleet fuel consumption for fiscal year 2006. Tactics identified to achieve this goal include replacing older vehicles with new, more efficient vehicles and implementing best practices for maintenance and operation.

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#### SUMMARY

Executive Order RP-49 from the Governor's Office requires each state agency develop an energy conservation plan and set percentage goals for reducing electricity, gasoline, and natural gas. This plan is to be submitted to the Governor's Office and to the Legislative Budget Board no later than December 1, 2005. The Texas Tech University Energy Conservation Plan consists of two parts, the Resource Efficiency Plan and the Fleet Fuel Management Plan. The report is divided into the following sections.

- I. Preliminary Utility Audits/Utility Assessment Reports
- II. Implementation Schedule
- III. Finance Strategy
- IV. Utility Awareness Plan
- V. Asset Management Inventory
- VI. Utility history report
- VII. Savings monitoring and Evaluation Plan
- VIII. Project Implementation Update
  - IX. Fleet Fuel Management Plan

#### I. Preliminary Utility Audits/Utility Assessment Reports

The preliminary utility audits include 54 of the University's largest facilities, which represent more than 90% of the total University Educational and General (E&G) campus facilities' square-foot. This audit consists of a general inspection of each building envelope, mechanical rooms, identification of energy saving opportunities, recommendations for cost effective resource efficiency measures, report of energy consumption and expenditures, and physical description of each facility audited.

The utility assessment reports include 10 of the 54 buildings audited. These buildings were selected according to measured and corrected energy consumption/demand ratios whose values exceeded one standard deviation of the 54 buildings arithmetic mean.

#### II. Implementation Schedule

The implementation schedule describes the energy saving measures, the completion date, and a time chart for tracking each measure. The following major measures for implementation are:

Project	Status	Est. Funding	Est. Completion
AHU VFDs and Library Stacks	50% Design	Feb 2006	July 2006
ITC Performance Contract	50% Design	Apr 2006	Aug 2006
AHU Controls Upgrade	Concept	Jun 2006	Nov 2006
Boiler Side stream Heat Recovery	Concept	Sep 2006	Mar 2006

#### III. Finance Strategy

The finance strategy includes the amount of money required to implement the energy saving measures identified in the preliminary utility audits and utility assessment reports.

The funding sources and amounts required for the selected energy saving measures are:

Project	Fund Source	Est Amount
AHU VFDs/Library Stacks	LoanSTAR	\$600,000
ITC Performance Contract	LoanSTAR	\$560,000
AHU Controls Upgrade	LoanSTAR	\$500,000
Boiler Sidestream Heat Recovery	LoanSTAR	\$500,000

#### IV. Utility Awareness Plan

The utility awareness plan includes measures related to enhance the energy saving culture among the university students, faculty and staff. This plan includes currently the following awareness measures:

- Brochures development
- Rescheduling solicitude letters
- TechAnnounce energy tips
- Energy conservation ideas on monthly safety meeting
- Energy committee to develop energy saving ideas

#### V. Asset Management Inventory

The Asset Management Inventory describes all of the 183 campus facilities. The inventory includes the facility name, year built, facility type, gross area, assigned area, and construction type.

#### VI. Utility History Report

The Utility History Report contains the measured expenditures and costs for all campus utilities during past-two-recent years. The utilities measured are electricity, natural gas, water, and purchased thermal energy.

#### VII. Savings Monitoring and Evaluation Plan

The Savings Monitoring and Evaluation Plan includes a numerical and graphical track of the engineering and monetary units associated to the purchased utilities and the implemented energy savings measures. The purchased utilities under track are electricity, natural gas, and water.

#### VIII. Project Implementation Update

This section includes the current status of implemented energy savings measures and a report of their results obtained to the current date. The measures are:

- Lighting retrofit
- Freeze protection
- Independent Air Handling Units (AHU)
- Variable Frequency Drives (VFD) installation
- Recommissioning
- Detailed Utility Audits for ITC and Abilene Campus

#### II. PRELIMINARY LITILITY AUDITS

The Preliminary Utility Audits have been performed in four phases. The buildings audited during the first and second phases were selected among the educational and general buildings considering mainly their gross area. The third phase included some buildings with special utility consumption patterns. These audits were conducted following the audit reports indicated by the Savings Energy Conservation Office (SECO). The audit reports are included in this section.

During the fourth phase, the Utilities section of Texas Tech University solicited the services of TAC Americas to perform a Preliminary Energy Analysis on selected university buildings in the areas of lighting, energy management, and Heating, Ventilating, and Air Conditioning (HVAC). The pilot test, which included an energy simulation model, started with three E&G buildings and showed a preliminary savings value of about 40% of the buildings current utility costs. The buildings considered in this phase were:

- Drane Hall
- International Textile Center

#### Drane Hall

This building, composed mainly of business and clerical offices, was selected as a reference building from the university main campus. The building audit showed annual savings of \$25,578, or about 12% of the building utility cost.

#### International Textile Center

The International Textile Center (ITC) is a textile research center of more than 100,000 square-feet of space and its own heating and cooling plant. Audits of this building resulted in the development of a \$560,000 project with an estimated annual savings of \$93,000. This project is currently in design and funding is expected to be through the LoanSTAR program managed by SECO.

#### EDUCATION AND GENERAL PURPOSE (E&G) BUILDINGS SELECTED FOR DETAILED ENERGY AUDITS

\* Selection based on 2002-2005 average electricity consumption, demand, and cost

BUILDING	TOTAL						
	KWH	KW	COST	ft <sup>2</sup>	KWH/ft <sup>2</sup>	\$/ft <sup>2</sup>	\$/KWH
Food Technology	41183	83	16528	17400	2.367	0.950	0.401
Computer Engineering	1780880	3562	84365	57665	30.883	1.463	0.047
Chemical Engineering	418400	700	22911	18776	22.284	1.220	0.055
Engineering and Technology Labs	576266.67	1061	30673	21657	26.609	1.416	0.053
Fisheries & Wildlife	232600	448	30673	8486	27.410	3.615	0.132
International Textile Center	3216000	6437	177072	109376	29.403	1.619	0.055
				E & G (MEAN)	15.159	0.768	0.059
				E & G (ST DEV)	10.404	0.406	0.019
				E & G (M+1SD)	25.563	1.173	0.079

Values in **bold** are 1 standard deviation above the overall E & G mean

<sup>\*</sup> This is the only utility currently metered per building.

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If further certify text have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dicks			_		T	exas Tech L	Iniversity-Phys	sical Plant	/ 806 742 1696 1/8/2003
		of Energy A							ation and Pho	ne Numbe	er of Auditor Date
	TEXAS TEC	HUNIVERS	ITY						RT		Texas Tech university/Lubbock, Tx
l	Faci	lity Name						Building	(s) name		Building/Campus Address
i											
						as Tech Univ					
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building					TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	t: Hrs/Occup	ants/% GSF					
61392	Days	(c) I	Daylight		(d) E	vening					
1											Central Bidg. Panel
	M-F	12	1300	64%	4	70	3%	0	0	0%	(f) Yes X No
Date (b)		i	l								7
Occupied	SAT	- 6	150	6%	0	0	0%	0	0	0%	EMS .
1970		l									(g) Yes _X No
	SUN	- 6	70	3%	0	0	0%	0	0	0%	=-
			_								
	RENERO	SYUSING	GSYSTE	M S_					_		
Primary	Primary		Space		Space		Domesti	C	Interior		Special Building
Heat	Cooling		Termina	1	Termina	ı	Hot Wate	er	Lighting		Systems & Facilities
Source (h)	Source	(i)	Heat (i	)	Cooling (	k)	Source (	i)	System (r	m)	(n)
Steam	Centrifuga	d Chillers	Fan ar	nd Coil	Fan ar	nd Coil	Heat Exc	hanger	Fluores	scent	
Boiler					l				ł		
			I		I		l		1		
			-								
III. UNIQ	UEBUIL	DINGCH	ARACTE	RISTICS	3	_					
<ol> <li>Year rou</li> </ol>	nd, 24 hour	per day oper	ation		Yes	No X		5 List yea	r and type of r	najor buildi	ing modifications and additions.
	per year ope				Yes X	No			-		
<ol><li>Summer</li></ol>						No				-	<u> </u>
4. Building	has exterior	floodlighting			Yes X	No					
Form PUA 1											

Building Nar	ne(s)	ART					(a) Building	Size(s)(Gross	s Sq. Ft.):	61,392				
ENERGY U	SE AND CO	OST DATA		For Year En	ding	8/31/2005		** Metered	X Best E	stimate X				
		ELECTRICITY		N	ATURAL GA	S		WATER			PURCHASI	ED THERMAL		TOTAL
1	KWH	COST	\$/KWH	MCF	COST	\$/MCF	MGAL	COST	\$/MGAL	STEAM-H	OT WATER	CHILLED	WATER	ENERGY
MONTH		\$			\$			\$	•	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	111,926	\$7,276.43	\$0.07	60.69	\$388.60	\$6.40	141.05	\$376.43	\$2.67	163.71	\$1,812.94	32,158.92	\$4,310.25	\$14,164.65
October	110,776	\$6,894.43	\$0.06	69.84	\$393.64	\$5.64	75.74	\$229.53	\$3.03	273.62	\$3,120.57	27,154.20	\$3,765.73	\$14,403.90
November	111,762	\$6,416.50	\$0.06	101.40	\$751.96	\$7.42	59.94	\$196.63	\$3.28	403.31	\$5,659.10	17,272.19	\$2,827.74	\$15,851.93
December	96,148	\$5,837.68	\$0.06	136.65	\$948.60	\$6.94	57.14	\$206.67	\$3.62	494.52	\$5,826.68	15,183.43	\$2,211.37	\$15,031.00
January	98,942	\$6,069.61	\$0.06	156.32	\$1,006.96	\$6.44	48.87	\$183.91	\$3.76	495.85	\$5,710.89	16,244.92	\$2,158.93	\$15,130.31
February	105,517	\$6,185.31	\$0.06	134.87	\$882.75	\$6.55	29.58	\$117.66	\$3.98	453.72	\$4,965.49	18,222.54	\$2,057.13	\$14,208.34
March	97,956	\$6,084.40	\$0.06	119.56	\$787.49	\$6.59	35.69	\$145.95	\$4.09	405.11	\$5,053.38	18,930.33	\$2,768.30	\$14,839.53
April	133,950	\$8,615.69	\$0.06	102.81	\$772.83	\$7.52	60.21	\$200.46	\$3.33	272.41	\$3,494.37	22,937.73	\$3,322.14	\$16,405.48
May	92,861	\$6,882.32	\$0.07	75.97	\$508.35	\$6.69	113.64	\$350.26	\$3.08	233.90	\$1,463.64	26,247.25	\$5,345.17	\$14,549.73
June	74,618	\$5,740.38	\$0.08	62.37	\$422.26	\$6.77	113.95	\$351.20	\$3.08	170.80	\$66.97	35,603.69	\$7,151.67	\$13,732.48
July	75,111	\$4,904.09	\$0.07	61.04	\$461.94	\$7.57	212.48	\$548.83	\$2.58	177.08	\$1,678.26	41,215.54	\$5,666.94	\$13,260.05
August	71,002	\$5,434.74	\$0.08	185.87	\$1,446.16	\$7.78	381.14	\$846.14	\$2.22	157.29	\$1,838.51	42,169.80	\$7,010.99	\$16,576.53
	D		Avg.	(2)		Avg.	3		Avg.	<b>④</b>		5)		
Annual	1,180,569	\$76,341.58	\$0.07	1,267.4	\$8,771.53	\$6.86	1,329.4	\$3,753.66	\$3.23	3,701.3	\$40,690.79	313,340.5	\$48,596.37	\$178,153.93
Totals														

NNUAL ENERGY CONS	SUMPTION IN BTU'S:					ENERGY	UTILIZATIO	N INDEX (EUI)	
oo) Electricity	******	KWH x 0.0116	=	13,694.60	MMBTU	EUI =	Total Ann	ual BTU's	MMBTU/Sq.Ft./Yr.
pp) Nat. Gas	1,267.40	MCF x 1.03	=	1,305.42	MMBTU	1 .	Building C	Gross Sq. Ft.	
qq1) Steam/Hot Water	3,701.31	MMBTU x 1.0	=	3,701.31	MMBTU	EUI =	(uu)	22,461.41	
qq2) Steam		LBS x 0.001390	=	-	MMBTU		(a)	61,392.00	
rr) Chilled Water	313,340,54	TON HRS x 0.012	=	3,760.09	MMBTU				
ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU	EUI =	(vv)	0.365868728	MMBTU/Sq.Ft./Yr
tt) Other Fuel	-	x	-	-	MMBTU				
_						ENERGY	COST INDE	X (ECI)	
	(	uu) TOTAL ANNUAL BTU'S =		22,461.41	MMBTU	ECI =	Annual E	nergy Costs	\$/Sq Ft /Yr.
					-		Building C	Gross Sq. Ft.	
						ECI =	(nn)	178,153.93	
Do not include water cos	ts (hh).						(a)	61,392.00	
* Electricity is metered by	building.								
he remaining values ar	e metered at the Utilities D	epartment				ECI =	(ww)	2.901907903	\$/Sq Ft /Yr
and estimated by building	s by using its gross square fo	not value				1			

TEXAS TECH UNIVERSITY	ART		61392	
Facility Name	Building Na	me(s)	Building Size	(s) (GSF)
	ce plan. No; Recommended	ASURES aspection of building(s):  X Yes No	ings	
which could result from impleme				
System Changes	% Cost Savings	System Changes	% Cost Savir	ngs
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventila Repair of caulking & wea Maintenance & repair or Heating & Cooling System Operation X. Change in thermostat co Provide locking thermost	atherstripping operating controls Subtotal 0 s ntrol set points	Water Systems Operati Repair all leaks Reduction of wate Reduce hot water Increase chilled w Utility Plant & Distributic Equipment cleaning	or consumption temperature   ater temperatu Subtotal _ on System Ope	ire 0
Reset of air & water tem Unoccupied reset or shu Shut down non-critical ex	peratures t down of system	Adjustment of air/l Combustion monit Adjustment of driv Steam Trap maint Pipe insulation rep Subtota	toring & contro es, fans, moto enance pair	
Lighting Systems Operations  X Reduce illumination leve Maximize use of daylight X Install high efficiency lar Reduce or delete evenin	nps	Other Measures (includi	Subtotal _ Totals _	0 6329.0

Based on auditor evaluation, indicate whether or not the building conditions and/or site characteristics present an opportunity to apply solar heating

# ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT Describe proposed energy conservation measures: Adjust AHU's reset schedule Adjust AHU's economizer operation setpoint Update building utilities operation schedule Estimate of installed cost of above measures: \$36,061.26

5.7

X Yes No

\$6,329.00

4.0

3 0

1.0

2 0

3.0

Time of day schedule optimization

and/or cooling systems, or solar domestic hot water heating systems.

Estimate of annual energy and water cost savings for above measures:

Projected simple payback period for above measures in years:

Economizers

Energy Auditor Certification: 1 hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating how, and building configurations.

		eremy Dicks			_		Te				806 742 1696 12/12/2002
		of Energy A							ation and Pho	ne Numbe	
		HUNIVERS	ITY				ARCHITEC1				Texas Tech university/Lubbock, Tx
1	Faci	lity Name					<b>Building Nar</b>	ne(s)			Building/Campus Address
1											
					Tex	as Tech Univ	ersity				
					Name	and Address	of Owner	"			
I. BASIC	BUILDII	NG DATA									
Building				OPERA	TING SCHE	DULE					BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occu	pants/% GSF		7			
175562	Days	(c) [	Daylight		(d) E	vening		(e)	Night		
1											Central Bidg. Panel
	M-F	12 Hrs	2900	50%	4 Hrs	150	2%	0	0	0%	(f) Yes X No
Date (b)											7 " — —
Occupied	SAT	6 Hrs	300	5%	0	0	0%	0	0	0%	EMS
1970											(g) Yes X No
	SUN	6 Hrs	150	2%	0	0	0%	0	0	0%	
					•						
II. MAJO	RENERO	YUSING	SSYSTE	MS							
Primary	Primary		Space		Space		Domesti	c	<ul> <li>Interior</li> </ul>		Special Building
Heat	Cooling		Termina	il	Termina	ıl	Hot Wat	er	Lighting		Systems & Facilities
Source (h)	Source	(i)	Heat (i	)	Cooling	(k)	Source (	i)	System (r	m)	(n)
Steam	Centrifuga	d Chillers	Fan ar	nd Coil	Fan a	nd Coil	Heat Ex	changer	Fluores	scent	
Boiler			1						ı		
1			1								
			1						1		
			•						•		
III. UNIQ	UEBUIL	DINGCH	ARACTE	RISTICS							
		per day oper	ation		Yes	No X		5. List yea	r and type of r	major build	ing modifications and additions.
2. 9 month	per year ope	ration			Yes _X_	No					
<ol><li>Summer</li></ol>	Program Us	e			Yes X	No					
4 Building	has exterior	floodlighting			Yes X	No					

D. 25 No.		ARCHITECTURI	_				(a) Building	Size(s) (Gro	ee Sa Et \	175562				
Building Nar	me(s) ISE AND COS			For Year En	dina	8/31/2005		** Metered		stimate X				_
ENERGY U		ELECTRICITY	_		ATURAL GA			WATER	<u></u>			ED THERMAL		TOTAL
	KWH		s/kwh	MMBTU	COST	s/MMBTU	MGAL.	COST	\$/MGAL	STEAM	OT WATER		WATER	ENERGY
	KVVH	COST	3/1/4/11	IMINIBIO	COST	\$/MIND I O	MOAL.	0031	SANIGAL	MMBTU	COST	TON HRS	COST	COSTS*
MONTH		5						*.						(nn)
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	0	(kk)	(11)	(mm)	
September	201,824	\$13,121	\$0.07	173.61	\$1,111.57	\$6.40	403.46	\$1,076.75	\$2.67	468.29	\$5,185.81	91,964.48	\$12,325.98	\$32,820.89
October	199.750	\$12,432	\$0.06	199.78	\$1,125.98	\$5.64	216.64	\$656.56	\$3.03	782.68	\$8,926.25	77,652.55	\$10,768.81	\$33,909.56
November	201,528	\$11,570	\$0.06	290.04	\$2,150.95	\$7.42	171.46	\$562.45	\$3.28	1,153.64	\$16,187.59	49,393.10	\$8,086.46	\$38,557.59
December	173,373	\$10,526	\$0.06	390.88	\$2,713.42	\$6.94	163.45	\$591.18	\$3.62	1,414.54	\$16,666.94	43,419.87	\$6,323.83	\$36,821.81
January	178,412	\$10,945	\$0.06	447.13	\$2,880.36	\$6.44	139.79	\$526.07	\$3.76	1,418.36	\$16,335.74	46,455.40	\$6,173.86	\$36,860.69
February	190,266	\$11,153	\$0.06	385.79	\$2,525.07	\$6.55	84.61	\$336.57	\$3.98	1,297.85	\$14,203.55	52,110.79	\$5,882.76	\$34,101.21
March	176,633	\$10,971	\$0.06	342.00	\$2,252.59	\$6.59	102.09	\$417.47	\$4.09	1,158.79	\$14,454.94	54,134.86	\$7,916.49	\$36,012.82
April	241,537	\$15,536	\$0.06	294.08	\$2,210.63	\$7.52	172.22	\$573.41	\$3.33	779.21	\$9,995.47	65,594.77	\$9,500.29	\$37,815.51
May	167,446	\$12,410	\$0.07	217.31	\$1,454.10	\$6.69	325.05	\$1,001.90	\$3.08	669.06	\$4,186.67	75,058.95	\$15,285.51	\$34,338.29
June	134,550	\$10,351	\$0.08	178.42	\$1,207.86	\$6.77	325.94	\$1,004.59	\$3.08	488.55	\$191.56	101,815.47	\$20,451.56	\$33,206.54
July	135,439	\$8.843	\$0.07	174.61	\$1,321.35	\$7.57	607.78	\$1,569.90	\$2.58	506.52	\$4,800.57	117,863.62	\$16,205.67	\$32,740.48
August	128,030	\$9,800	\$0.08	142.03	\$1,105.05	\$7.78	1,090.22	\$2,420.33	\$2.22	449.92	\$5,258.97	_120,592.51	\$20,049.25	\$38,633.47
1	D		Avg.	<b>2</b>		Avg.	3		Avg.	4)		(5)		
Annual	2,128,788	\$137,658	\$0.07	3,235.68	\$22,058.93	\$6.86	3,802.72	\$10,737.18	\$3.23	10,587.42	\$116,394.07	896,056.35	\$138,970.47	\$425,818.87
Totals				1			L		L					

ANNUAL ENERGY CONSU	IMPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
(oo) Electricity	2,128,787.61	KWH x 0.0116	=	24,693.94		EUI =	Total Annu		MMBTU/Sq.Ft./Yr.
(pp) Nat. Gas	3,235.68	MMBTU x 1.0	=	3,235.68	MMBTU		Building Gr	oss Sq. Ft.	
(qq1) Steam/Hot Water	10,587.42	MMBTU x 1 0	=	10,587.42	MMBTU	EUI =	(uu)	49,269.71	
(qq2) Steam		LBS x 0.001390	=		MMBTU		(a)	175,562.00	
(m) Chilled Water	896,056.35	TON HRS x 0.012	w	10,752.68	MMBTU	ľ			
(ss) Propane or Butane	-	GAL x 0.095475	=		MMBTU	EUI =	(vv)	0.280639953	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	-	×	=	-	MMBTU				
					_	ENERGY	COST INDEX	(ECI)	
	(1	u) TOTAL ANNUAL BTU'S =		49,269.71	MMBTU	ECI =	Annual Ent	ergy Costs	\$/Sq.Ft./Yr.
					_	1	Building Gr	oss Sq. Ft.	
						ECI =	(nn)	425,818.87	
*Do not include water costs	(hh).						(a)	175,562.00	
** Electricity is metered by	building.					1			
The remaining values ar	e metered at the Utilities Dep	partment				ECI =	(ww)	2.4254615	\$/Sq.Ft./Yr.
	by using its gross square foot vi					i			
Form PUA 2	, , , , , , , , , , , , , , , , , , , ,								

EXAS TECH UNIVERSITY	ARCHITEC	TURE	175562	
acility Name	Building Na	me(s)	Building Size(s) (G	SF)
	NDED ENER			
AND WATER CONSE				
rovide the following recommendations based	on an on-site ii	rspection of building(s)	:	
. Scheduled preventive maintenance plan.		V V N-		
		_X_YesNo	evines	
Provide a general estimate, expressed as which could result from implementing the			aviligs	
vstem Changes % Cost 5		System Changes	% Cost Savings	_
entilation System Operations	Javillys	Water Systems Oper		
X Reduced ventilation		Repair all leaks		
Variable ventilation			ater consumption	
Unoccupied area ventilation shut	down		ter temperature	
Repair of caulking & weatherstrip			water temperature	
Maintenance & repair or operating			Subtotal 0	)
Subtot				_
		1		
eating & Cooling System Operations		Utility Plant & Distrib	ution System Oper.	
Change in thermostat control set	points	Equipment clea	ining	
Provide locking thermostat covers	}	Adjustment of a	air/fuel ration	
Reset of air & water temperatures	:	Combustion mo	onitoring & control	
Unoccupied reset or shut down of	system	Adjustment of o	frives, fans, motors, etc	<b>).</b>
Shut down non-critical exhaust sy		Steam Trap ma		
Subt	otal 852	Pipe insulation		
		Subt	otal SubtotalC	
ighting Systems Operations		Other Measures (inc	luding water use)	
X Reduce illumination levels			- '	
Maximize use of daylight				
Install high efficiency lamps				
Reduce or delete evening cleaning	a hours			
Subto			Subtotal 0	3
		₹	Totals 2006	61

Subtotal Totals

20061.0

## FNERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

5.4

Describe proposed energy conservation measures: Adjust AHU's economizer operation setpoint Update building utilities operation schedule \$107,736,54 2.0 Estimate of installed cost of above measures:

Adjust AHU's reset schedule

3.0 Estimate of annual energy and water cost savings for above measures:

40 Projected simple payback period for above measures in years: \$20,061.00

Retrofit (efficiency/illumination level) existing lighting system

Form PUA 4

10

Energy Auditor Certification: Thereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	J	Jeremy Dickson Texas Tech University-Physical Pl						ical Plant /			
	Name	of Energy A	uditor					Organiza	ation and Pho	ne Number	
		H UNIVERS					AGRICULTU	IRAL SCIEN	ICES		Texas Tech university/Lubbock, Tx
	Facil	ity Name					Building Nan	ne(s)			Building/Campus Address
l											
i					Texa	s Tech Univ	rersity				
					Name	and Address	of Owner				
I. BASIC	BUILDII	NG DATA									
Building					TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup	ants/% GSF					
43902	Days	(c) E	Daylight		(d) E	vening		(e)	Night		<b>⊒</b>
				, , , , , , , , , , , , , , , , , , , ,							Central Bldg, Panel
	M-F	12 Hrs	980	61%	4 Hrs	32	2%	0	0	0%	(f) Yes X No
Date (b)											
Occupied	SAT	6 Hrs	80	5%	0	0	0%	0	0	0%	EMS
1942							i				(g) Yes X No
	SUN	6 Hrs	32	2%		0	0%	0	0	0%	
						_					
		SYUSINO		MS							·
Primary	Primary		Space		Space		Domesti		Interior		Special Building
Heat	Cooling		Termina		Termina		Hot Wate		Lighting		Systems & Facilities
Source (h)			Heat (j		Cooling (		Source (		System (		(n)
Steam	Centrifuga	al Chillers	Fan a	nd Coil	Fan ar	nd Corl	Heat Ex	changer	Fluore	scent	
Boiler							1				
			<u> </u>		L		L		L		
		DING CH		RISTICS							No. of the contract of the con
		per day open	ation		Yes	No X		<ol><li>List yea</li></ol>	r and type of	major build	fing modifications and additions.
	per year ope				Yes X						
	r Program Us				Yes X						
4. Building	has exterior	floodlighting			Yes X	No					···
1											

· ·														
Building Nar	ne(s)	AGRICULTU	RAL SCIENC	CES		_	(a) Building	Size(s) (Gro		43902				
ENERGY U	SE AND COST	DATA		For Year En	ding:	8/31/2005		** Metered _	X Best	Estimate>	<u> </u>			TOTAL
	ELEC	TRICITY		NAT	URAL GAS		WATER				PURCHASED THERMAL			
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WA	TER	ENERGY
MONTH	"	s			\$			\$	1	MMBTU	COST	TON HRS	COST	COSTS*
1	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(li)	(mm)	(nn)
September	50,880	\$3,308	\$0.07	43.41	\$277.97	\$6.40	100.89	\$269.26	\$2.67	117.10	\$1,296.79	22,997.15	\$3,082.30	\$8,234.07
October	47,760	\$2,972	\$0.06	49.96	\$281.57	\$5.64	54.18	\$164.18	\$3.03	195.72	\$2,232.15	19,418.22	\$2,692.91	\$8,343.28
November	44,160	\$2,535	\$0.06	72.53	\$537.88	\$7.42	42.88	\$140.65	\$3.28	288.49	\$4,047.96	12,351.51	\$2,022.14	\$9,283.95
December	46.560	\$2.827	\$0.06	97.75	\$678.53	\$6.94	40.87	\$147.83	\$3.62	353.73	\$4,167.83	10,857.81	\$1,581.37	\$9,402.48
January	49.680	\$3.048	\$0.06	111.81	\$720.28	\$6.44	34.96	\$131.55	\$3.76	354.68	\$4,085.01	11,616.89	\$1,543.87	\$9,528.33
February	46,080	\$2,701	\$0.06	96.47	\$631.43	\$6.55	21.16	\$84.16	\$3.98	324.55	\$3,551.82	13,031.11	\$1,471.07	\$8,439.67
March	46,320	\$2,877	\$0.06	85.52	\$563.29	\$6.59	25.53	\$104.40	\$4.09	289.77	\$3,614.68	13,537.26	\$1,979.64	\$9,139.11
April	50.400	\$3.242	\$0.06	73.54	\$552.80	\$7.52	43.07	\$143.39	\$3.33	194.85	\$2,499.52	16,402.99	\$2,375.70	\$8,813.15
May	43.200	\$3,202	\$0.07	54.34	\$363.62	\$6.69	81.29	\$250.54	\$3.08	167.31	\$1,046.94	18,769.65	\$3,822.38	\$8,685.21
June	42,720	\$3,286	\$0.08	44.62	\$302.04	\$6.77	81.51	\$251.21	\$3.08	122.17	\$47.90	25,460.54	\$5,114.23	\$9,001.86
July	44,400	\$2,899	\$0.07	43.66	\$330.42	\$7.57	151.98	\$392.58	\$2.58	126.66	\$1,200.46	29,473.62	\$4,052.48	\$8,874.88
August	40,080	\$3,068	\$0.08	35.66	\$277.44	\$7.78	272.63	\$605.24	\$2.22	112.51	\$1,315.09	30,156.03	\$5,013.63	\$10,279.27
	D		Avg.	2)		Avg.	3)		Avg.	<b>1</b>		5)		l
Annual	552,240	\$35,965	\$0.07	809.27	\$5,517.28	\$6.86	950.93	\$2,685.00	\$3.23	2,647.55	\$29,106.14	224,072.78	\$34,751.72	\$108,025.25
Totals				1	1		l	l						

NNUAL ENERGY CONSU	IMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)	
oo) Electricity	552240	KWH x 0.0116	=	6405.984	ммвти	EUI =	Total Annual BTU's	MMBTU/Sq.Ft./Yr.
pp) Nat. Gas	809.2738	MMBTU x 1.0	=	809.2738	MMBTU		Building Gross Sq. Ft.	
qq1) Steam/Hot Water	2647.54827	MMBTU x 1.0	===	2647.5483	MMBTU	EUI =	(uu) 12551.67946	
qq2) Steam	0	LBS x 0.001390	=	0	MMBTU		(a) 43902	
rr) Chilled Water	224072.782	TON HRS x 0.012	=	2688.8734		1		
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv) 0.285902224	MMBTU/Sq.Ft./Yr.
tt) Other Fuel	0	×	=	0	MMBTU			
						ENERGY	COST INDEX (ECI)	
	(uu) TO	AL ANNUAL BTU'S =		12551.679	MMBTU	ECI =	Annual Energy Costs	\$/Sq Ft./Yr.
						1	Building Gross Sq. Ft.	
						ECI =	(nn) 108025.2455	_
Do not include water costs	(hh).					1	(a) 43902	
* Electricity is metered by I	ouilding.							
The remaining values ar	e metered at the Utilities Departm	ent				ECI =	(ww) 2.460599641	\$/Sq.Ft./Yr.
	by using its gross square foot value.							

001	- 1 1	RA I	NI A	РV	1A/ A	TE	: D	Λ Ι	ח וא	EN	EP	G V	AIII	דור

PUA3

TEXAS TECH UNIVERSITY		URAL SCIENCES	43902
Facility Name	Building Na	ime(s)	Building Size(s) (GSF)
RECON	MENDED ENER	GY	
AND WATER COM	NSERVATION ME	ASURES	
Provide the following recommendations ba	sed on an on-site in	nspection of building(s):	·
<ol> <li>Scheduled preventive maintenance pla</li> </ol>	ın.		
In Existence X Yes No;		X Yes No	
<ol><li>Provide a general estimate, expressed</li></ol>			ivings
which could result from implementing			
	ost Savings	System Changes	% Cost Savings
Ventilation System Operations		Water Systems Opera	itions
Reduced ventilation	*	Repair all leaks	
_X_ Variable ventilation			ter consumption
Unoccupied area ventilation s			er temperature .
Repair of caulking & weathers		Increase chilled	water temperature
Maintenance & repair or opera			Subtotal 0
Su	btotal 12350		
Heating & Cooling System Operations		Utility Plant & Distribu	
Change in thermostat control		Equipment clear	
Provide locking thermostat co		Adjustment of ai	
X Reset of air & water temperate			nitoring & control
Unoccupied reset or shut dow			rives, fans, motors, etc.
Shut down non-critical exhaus		Steam Trap mai	
	Subtotal 216	Pipe insulation r	
		Subto	tal Subtotal 0
		015	
Lighting Systems Operations		Other Measures (inclu	iding water use)
X Reduce illumination levels		<u> </u>	
Maximize use of daylight		<u> </u>	
X Install high efficiency lamps		<del> </del>	
Reduce or delete evening cle		<del>-</del>	Subtotal 0
Į Su	ibtotal 4302	4	Totals 16868.0
			10000.0

TEXAS TE	CH UNIVERSITY	AGRICULTURAL SCIENCE		
nstitution	Name	Building Name	Building Size (GSF)	į
	ENERGY AND WATER	CONSERVATION MEASURE R	ETROFIT RECOMMENDATIONS	-
	ENERGI AND WATER	SONGER THE MEADURE N	and the state of t	
1.0	Basic Building Data 1.1 Annual Ene	ergy Use 0.2859022	BTU/Sq.Ft/Yr.	
	1.2 Annual Ene	ergy Cost 2.4605996	\$/Sq.Ft./Yr.	
	1.3 Describe physical condition of building envel	ope: Regular condition		
	1.4 Describe physical condition of building energ	gy and water-using systems: Go	ood condition	
2.0	Based on 1.1 - 1.4 above, indicate the need and p Briefly outline recommended retrofit options: Lighting retrofit	potential for energy and water conservation m		
	Reset schedule			
	Economizer			- 1
3.0	Based on auditor evaluation, indicate whether or and/or cooling systems, or solar domestic hot wat		teristics present an opportunity to apply solar heating  X Yes No	
	ENERGY AND WAT	ER CONSERVATION MEASUR	E RETROFIT ASSESSMENT	
1 0	Describe proposed energy conservation measure Adjust AHU's reset schedule	Retrofit (efficiency/illuminații	on level) existing lighting system	
	Adjust AHU's economizer operation setpoint			
2.0	Install VFDs on AHUs Estimate of installed cost of above measures:	\$53.313.10		
2.0	Estimate of installed cost of above measures:	φοσ,στο.10		
3.0	Estimate of annual energy and water cost saving	s for above measures: \$	16,868.00	
4.0	Projected simple payback period for above meas	ures in years: 3.2		

Energy Auditor Certification: I hereby certify that I. JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operaling hower, and building configurations.

	Jeremy Dickson				Te	xas Tech U	niversity-Phys	ical Plant /	806 742 1696 4/10/2004		
	Name of Energy Auditor							Organiz	ation and Pho	ne Numbe	
·		H UNIVERS				AGRICULT	URAL PLANT	SCIENCES	1		Texas Tech university/Lubbock, Tx
	Faci	lity Name					Building Nar	ne(s)			Building/Campus Address
						as Tech Univ					
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building					TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup		·				
26725	Days	(c) [	Daylight		(d) E	vening		(e)	Night		4
1 1		j							1	Central Bidg. Panel	
	M-F	12 Hrs	280	60%	4 Hrs	9	2%	0	0	0%	(f) Yes <u>X</u> No
Date (b)				Ē.			l				
Occupied	SAT	6 Hrs	23	. 5%	0	0	0%	0	0	0%	EMS
1961			1								(g) Yes X No
	SUN	6 Hrs	9	2%	0	0	0%	0	0	0%	
			SSYSTE				,				I
Primary	Primary		Space		Space			Domestic Interior			Special Building
Heat	Cooling		Termina		Termina		Hot Wat		Lighting		Systems & Facilities
Source (h)			Heat (j		Cooling		Source (		System (		(n)
Steam	Centrifuga	al Chillers	Fan a	nd Coil	Fan a	nd Coil	Heat Ex	changer	Fluore	scent	
Boiler	i		1		ļ						
1			i		1						
	L				L						<u> </u>
			ARACTE	RISTICS							
		per day oper	ation		Yes	No X		<ol><li>List yea</li></ol>	ir and type of	major build	ing modifications and additions.
2. 9 month						No					
	Program U				Yes X						
<ol><li>Building</li></ol>	has exterior	floodlighting			Yes X	No					
ı											

Building Nar	ne(s)	AGRICULTU	RAL PLANT	SCIENCES			(a) Building	Size(s) (Gro	ss Sq. Ft.)	26725				
ENERGY U	SE AND COS	T DATA		For Year En	ding:	8/31/2005		** Metered _	X Best	Estimate2	<u> </u>			
	ELEC	CTRICITY		NAT	URAL GAS			WATER		PURCHASED THERMAL				TOTAL
1 .	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WA	TER	ENERGY
MONTH		s			\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
1	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	64,000	\$4,161	\$0.07	26.43	\$169.21	\$6.40	61.42	\$163.91	\$2.67	71.29	\$789.41	13,999.33	\$1,876.33	\$7,159.55
October	58,400	\$3,635	\$0.06	30.41	\$171.40	\$5.64	32.98	\$99.94	\$3.03	119.14	\$1,358.80	11,820.69	\$1,639.29	\$6,904.12
November	52,320	\$3,004	\$0.06	44.15	\$327.43	\$7.42	26.10	\$85.62	\$3.28	175.61	\$2,464.16	7,518.89	\$1,230.96	\$7,111.98
December	53,120	\$3,225	\$0.06	59.50	\$413.05	\$6.94	24.88	\$89.99	\$3.62	215.33	\$2,537.13	6,609.61	\$962.65	\$7,228.03
January	59,840	\$3,671	\$0.06	68.06	\$438.46	\$6.44	21.28	\$80.08	\$3.76	215.91	\$2,486.72	7,071.69	\$939.82	\$7,615.96
February	55,200	\$3,236	\$0.06	58.73	\$384.38	\$6.55	12.88	\$51.23	\$3.98	197.57	\$2,162.14	7,932.59	\$895.50	\$6,729.05
March	56,480	\$3,508	\$0.06	52.06	\$342.90	\$6.59	15.54	\$63.55	\$4.09	176.40	\$2,200.41	8,240.70	\$1,205.09	\$7,320.13
April	64,640	\$4,158	\$0.06	44.77	\$336.51	\$7.52	26.22	\$87.29	\$3.33	118.62	\$1,521.56	9,985.19	\$1,446.19	\$7,549.21
May	52,640	\$3,901	\$0.07	33.08	\$221.35	\$6.69	49.48	\$152.51	\$3.08	101.85	\$637.32	11,425.88	\$2,326.84	\$7,239.39
June	52,480	\$4,037	\$0.08	27.16	\$183.87	\$6.77	49.62	\$152.92	\$3.08	74.37	\$29.16	15,498.90	\$3,113.25	\$7,516.52
July	53,920	\$3,521	\$0.07	26.58	\$201.14	\$7.57	92.52	\$238.98	\$2.58	77.11	\$730.77	17,941.84	\$2,466.92	\$7,158.32
August	48,640	\$3,723	\$0.08	15.82	\$123.08	\$7.78	165.96	\$368.44	\$2.22	68.49	\$800.55	18,357.25	\$3,052.01	\$8,067.16
	$\triangleright$		Avg.	<b>2</b>		Avg.	3		Avg.	<b>(</b>		(5)		
Annual	671,680	\$43,779	\$0.07	486.75	\$3,312.80	\$6.86	578.87	\$1,634.47	\$3.23	1,611.67	\$17,718.14	136,402.56	\$21,154.84	\$87,599.41
Totals	l	1												

NNUAL ENERGY CONS	JMPTION IN BTU'S:					ENERGY	UTILIZATION IN	DEX (EUI)	
o) Electricity	671680	KWH x 0.0116	-	7791.488	MMBTU	EUI =	Total Annual I	BTU's	MMBTU/Sq.Ft./Yr.
p) Nat. Gas	486.751757	MMBTU x 1.0	= =	486.75176	MMBTU	1	Building Gros	s Sq. Ft.	
q1) Steam/Hot Water	1611.67436	MMBTU x 1.0	=	1611.6744	MMBTU	EUI =	(uu)	11526.74481	
g2) Steam	0	LBS x 0.001390	Ξ.	0	MMBTU	1	(a)	26725	
r) Chilled Water	136402.558	TON HRS x 0.012	=	1636.8307	MMBTU	1			
s) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.431309441	MMBTU/Sq.Ft./Yr.
) Other Fuel	0	×	=	0	MMBTU	1			
						ENERGY	COST INDEX (	ECI)	
,	(1	uu) TOTAL ANNUAL BTU'S =		11526.745	MMBTU	ECI =	Annual Energ Building Gros		\$/Sq.Ft./Yr.
						ECI =	(nn)	87599.41015	
Oo not include water costs	(hh).						(a)	26725	
Electricity is metered by	building.					ļ			
he remaining values ar	e metered at the Utilities D	epartment				ECI =	(ww)	3.277807676	\$/Sq.Ft./Yr
nd estimated by buildings	by using its gross square foot	value				1			

0051	1 BALL NI A	DV W/	TED AND	ENEDGY	AHDIT

DILLAG

TEXAS TECH UNIVERSITY		URAL PLANT SCIENCE	S 26725
Facility Name	Building Na		Building Size(s) (GSF)
raciity Name	bulluling iva-	me(s)	building Size(s) (GSF)
AND WATER CONSE Provide the following recommendations based		ASURES	
Scheduled preventive maintenance plan.     In Existence X Yes No; R.     Provide a general estimate, expressed as a which could result from implementing the f	range, of annu		ings
System Changes % Cost S	avings	System Changes	% Cost Savings
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventilation shut o Repair of caulking & weatherstripp Maintenance & repair or operating Subtot Heating & Cooling System Operations Change in thermostat control set p Provide locking thermostat covers X Reset of air & water temperatures Unoccupied reset or shut down of Shut down non-critical exhaust systems Subto	controls al 0  coints  system stems	Water Systems Operati Repair all leaks Reduction of wate Reduce hot water Increase chilled w  Utility Plant & Distributi Equipment cleani Adjustment of air' Combustion moni Adjustment of air' Steam Trap maini Pipe insulation re	or consumption temperature   tater temperature Subtotal 0
Lighting Systems Operations Reduce illumination levels Maximize use of daylight Install high efficiency lamps Reduce or delete evening cleaning Subtots		Subtota Other Measures (includ	

TEXAS TI	CH UNIVERSITY			AGRICULTURAL PLA	26725		
Institution	Name			Building Name		Building Size (GSF)	='
	ENERG	Y AND W	VATER CONSERV	ATION MEASUR	RE RETROFIT RE	COMMENDATIONS	
1.0	Basic Building Data		Annual Energy Use Annual Energy Cost	0.4313094 3.2778077		BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.	
	1.3 Describe physical c	ondition of bu	uilding envelope:	Good condition			- -
	1.4 Describe physical of	ondition of bu	uilding energy and water-u	sing systems:	Good condition		
2.0	Based on 1.1 - 1.4 above Briefly outline recommer		need and potential for en ptions:		-	ementation.	
	Reset schedule Economizer						• • •
3.0			whether or not the building		haracteristics present anX Yes	opportunity to apply solar heating No	-
	EN	ERGY AN	ND WATER CONS	ERVATION MEAS	SURE RETROFIT	ASSESSMENT	
1.0	Describe proposed ener Adjust AHU's reset sche Adjust AHU's economize	dule					- -
2.0	Estimate of installed cos	t of above me	easures: \$208.33				-
3.0	Estimate of annual energy	gy and water	cost savings for above me	asures:	\$175.00		
4.0	Projected simple paybac	k period for a	above measures in years:	1.2			
Carre DI I							

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	Jeremy Dickson						Te	xas Tech Ur	niversity-Phys	806 742 1696 4/14/2003	
		of Energy A						Organiza	ation and Pho		
	TEXAS TEC						AGRICULTU	JRAL PAVIL	ION		Texas Tech university/Lubbock, Tx
	Facil	ity Name					Building Nar	ne(s)			Building/Campus Address
1											
						as Tech Univ					
					Name	and Address	of Owner				
	BUILDII	NG DATA									
	Building OPERATING SCHEDULE										BASIC HVAC CONTROL DATA
Size (a)											
7263	Days	(c) [	Daylight		(d) E	vening		(e)	Night		
1 1					1				1		Central Bidg. Panel
	M - F 12 Hrs 100 83% 4 Hrs 2 2							0	0	0%	(f) Yes <u>X</u> No
Date (b)				Ī							
Occupied	SAT 6 Hrs 6 5% 0 0 0% 0						0%	0	0%	EMS	
1924									(g) Yes X No		
	SUN	0 Hrs	0	0%	0	0_	0%	0	0	_0%	<u> </u>
	RENERO	SYUSING	SYSTE	MS							<u> </u>
Primary	Primary		Space		Space		Domesti		Interior		Special Building
Heat	Cooling		Termina	1	Termina		Hot Wat	er	Lighting		Systems & Facilities
Source (h)	Source	(1)	Heat (		Cooling (		Source (		System (		(n)
Steam	Centrifuga	I Chillers	Fan ar	nd Coil	Fan ar	d Coil	Heat Ex	changer	Fluore	scent	
Boiler '			1				1				
1			l								
			i				l		L		
III. UNIQ	UEBUIL	DING CH	ARACTE	RISTICS							
1. Year rou	nd, 24 hour	per day oper	ation		Yes	No X		5. List yea	r and type of	major build	ling modifications and additions.
2. 9 month	per year ope	eration			Yes _X_	No					
<ol><li>Summer</li></ol>	Program Us	e			Yes X	No					
4. Building	has exterior	floodlighting			Yes X						
1	During tea overton incomprising										

Building Nam	ne(s)	AGRICULTU	IRAL PAVILK	ON			(a) Building	Size(s) (Gr	oss Sa. Ft.)	7263				
	SE AND COST			For Year En	ding:	8/31/2005	(-/	** Metered		Estimate	x			
	ELEC	TRICITY		NAT	URAL GAS		WATER			PURCHASED THERMAL				TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$			\$		l .	s		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	47,520	\$3,089	\$0.07	7.18	\$45.99	\$6.40	16.69	\$44.55	\$2.67	19.37	\$214.54	3,804.57	\$509.93	\$3,904.31
October	47,200	\$2,938	\$0.06	8.26	\$46.58	\$5.64	8.96	\$27.16	\$3.03	32.38	\$369.28	3,212.49	\$445.51	\$3,826.15
November	44,160	\$2,535	\$0.06	12.00	\$88.98	\$7.42	7.09	\$23.27	\$3.28	47.73	\$669.68	2,043.39	\$334.54_	\$3,651.79
December	43,840	\$2,662	\$0.06	16.17	\$112.25	\$6.94	6.76	\$24.46	\$3.62	58.52	\$689.51	1,796.28	\$261.62	\$3,749.60
January	46,080	\$2,827	\$0.06	18.50	\$119.16	\$6.44	5.78	\$21.76	\$3.76	58.68	\$675.81	1,921.86	\$255.41	\$3,898.92
February	40,960	\$2,401	\$0.06	15.96	\$104.46	\$6.55	3.50	\$13.92	\$3.98	53.69	\$587.60	2,155.82	\$243.37	\$3,350.40
March	40,320	\$2,504	\$0.06	14.15	\$93.19	\$6.59	4.22	\$17.27	\$4.09	47.94	\$598.00	2,239.56	\$327.51	\$3,540.39
April	45,600	\$2,933	\$0.06	12.17	\$91.45	\$7.52	7.12	\$23.72	\$3.33	32.24	\$413.51	2,713.66	\$393.03	\$3,854.71
May	35,840	\$2,656	\$0.07	8.99	\$60.16	\$6.69	13.45	\$41.45	\$3.08	27.68	\$173.20	3,105.19	\$632.36	\$3,563.42
June	35,680	\$2,745	\$0.08	7.38	\$49.97	\$6.77	13.48	\$41.56	\$3.08	20.21	\$7.92	4,212.11	\$846.08	\$3,690.42
July	40,960	\$2,674	\$0.07	7.22	\$54.66	\$7.57	25.14	\$64.95	\$2.58	20.95	\$198.60	4,876.02	\$670.43	\$3,662.98
August	36,640	\$2,805	\$0.08	39.94	\$310.76	\$7.78	45.10	\$100.13	\$2.22	18.61	\$217.56	4,988.91	\$829.44	\$4,262.45
	Ο.			(a)		Avg.	3)		Avg.	(4)		(5)		
Annual	504,800	\$32,769	\$0.07	167.93	\$1,177.62	\$6.86	157.32	\$444.20	\$3.23	438.00	\$4,815.22	37,069.85	\$5,749.21	\$44,955.54
Totals										L		L	L	

ANNUAL ENERGY CONS	SUMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)	
oo) Electricity	504800	KWH x 0.0116	-	5855.68	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft/Yr.
pp) Nat. Gas	167.925326	MMBTU x 1.0	=	167.92533	MMBTU	1	Building Gross Sq. Ft.	
qq1) Steam/Hot Water	438.001529	MMBTU x 1.0	=	438.00153	MMBTU	EUI =	(uu) 6906.445071	
qq2) Steam	0	LBS x 0.001390	=	0	MMBTU	1	(a) 7263	
rr) Chilled Water	37069.8514	TON HRS x 0.012	=	444.83822	MMBTU			
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv) 0.950908037	MMBTU/Sq.Ft/Yr.
(tt) Other Fuel	0	x	=	0	MMBTU			
						ENERGY	COST INDEX (ECI)	
	(	uu) TOTAL ANNUAL BTU'S =		6906.4451	MMBTU	ECI =	Annual Energy Costs	\$/Sq.Ft./Yr.
							Building Gross Sq. Ft.	
						ECI =	(nn) 44955.54047	
'Do not include water cos	is (hh).						(a) 7263	
** Electricity is metered by	building.							
The remaining values a	re metered at the Utilities D	epartment				EC1 =	(ww) 6.189665493	\$/Sq.Ft./Yr.
and estimated by building:	s by using its gross square fool	t value.				1		
Form PUA 2								

DDEI	I BA I NI A	DV 14/ A	T E D A N D	ENERGY	AHDIT

PUA3

RECOMMENDED ENERGY AND WATER CONSERVATION MEASURES  Provide the following recommendations based on an on-site inspection of building(s):  1. Scheduled preventive maintenance plan. In Existence X Yes No, Recommended X Yes No 2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings  Ventilation System Operations Repair all leaks Reduced ventilation Reduced ventilation Repair all leaks Repair all leaks Reduced to twater temperature Repair of caulking & weatherstripping Increase chilled water temperature Maintenance & repair or operating controls Sublotal 0	TEXAS TECH UNIVERSITY AGRICU	LTURAL PAVILION 7263
RECOMMENDED ENERGY AND WATER CONSERVATION MEASURES  Provide the following recommendations based on an on-site inspection of building(s):  1. Scheduled preventive maintenance plan. In Existence X Yes No; Recommended X Yes No 2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings  Ventilation System Operations Reduced ventilation Reduced ventilation Reduced to not water temperature Repair of caulking & weatherstripping Increase chilled water temperature  Repair of caulking & weatherstripping Maintenance & repair or operating controls Subtotal 0  Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers Adjustment of air/fuel ration  X. Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90 Pipe insulation repair	Facility Name Building	Name(s) Building Size(s) (GSF)
AND WATER CONSERVATION MEASURES  Provide the following recommendations based on an on-site inspection of building(s):  1. Scheduled preventive maintenance plan. In Existence X Yes No; Recommended X Yes No 2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings  Ventilation System Operations  Reduced ventilation Reduced ventilation Reduced to not water temperature Repair of caulking & weatherstripping Increase chilled water temperature  Maintenance & repair or operating controls Subtotal 0  Heating & Cooling System Operations  Change in thermostat control set points Provide locking thermostat covers Adjustment of air/fuel ration  X. Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90 Pipe insulation repair	,	
Provide the following recommendations based on an on-site inspection of building(s):  1. Scheduled preventive maintenance plan. In Existence X Yes No; Recommended X Yes No  2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings  Ventilation System Operations  Reduced ventilation Reduced ventilation Nariable ventilation Ariable ventilation Reduced ventilation Repair of caulking & weatherstripping Increase chilled water temperature  Repair of aulking & weatherstripping Increase chilled water temperature  Heating & Cooling System Operations  Change in thermostat control set points  Provide locking thermostat covers  X Reset of air & water temperatures  Unoccupied reset or shut down of system Shut down non-critical exhaust systems  Subtotal 9  Pipe insulation repair  Pipe insulation repair	RECOMMENDED EN	RGY
1. Scheduled preventive maintenance plan. In Existence X Yes No, Recommended X Yes No 2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings  Ventilation System Operations  Reduced ventilation  Variable ventilation  Unoccupied area ventilation shut down Repair of caulking & weatherstripping Maintenance & repair or operating controls  Subtotal 0  Heating & Cooling System Operations  Change in thermostat control set points Provide locking thermostat covers  X. Reset of air & water temperature Unoccupied reset or shut down of system Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90  Pipe insulation repair	AND WATER CONSERVATION I	MEASURES
In Existence X Yes No Recommended X Yes No 2 Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings Ventilation System Operations Reduced ventilation Reduced ventilation Repair of caulking & weatherstripping Maintenance & repair or operating controls Subtotal 0  Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers Adjustment of air/fuel ration X Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90 Pipe insulation repair	Provide the following recommendations based on an on-site	inspection of building(s):
2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings  Ventilation System Operations Reduced ventilation   Water Systems Operations   Repair all leaks   Reduction of water consumption   Reduce hot water temperature   Increase chilled water temperature   Increase chilled water temperature   Subtotal   0    Heating & Cooling System Operations   Utility Plant & Distribution System Operations   Change in thermostat control set points   Provide locking thermostat covers   Adjustment of air/fuel ration   Adjustment of dir/fuel ration   Combustion monitoring & control   Adjustment of dir/fuel ration   Subtotal   9   Pipe insulation repair	Scheduled preventive maintenance plan.	
which could result from implementing the following conservation measures.  System Changes % Cost Savings  Ventilation System Operations  Reduced ventilation  Variable ventilation  Unoccupied area ventilation shut down Repair of caulking & weatherstripping  Maintenance & repair or operating controls  Subtotal  O  Water Systems Operations  Reduction of water consumption  Reduction of water consumption  Reduction of water consumption  Reduce hot water temperature    Increase chilled water temperature  Subtotal  O  Utility Plant & Distribution System Oper.  Equipment cleaning  Adjustment of airffuel ration  Combustion monitoring & control  Adjustment of drives, fans, motors, etc.  Shut down non-critical exhaust systems  Subtotal  90  Pipe insulation repair		
System Changes   % Cost Savings   % Co	<ol><li>Provide a general estimate, expressed as a range, of ar</li></ol>	nnual energy and water savings
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventilation shut down Repair of aculking & weatherstripping Maintenance & repair or operating controls Subtotal  Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers X. Reset of air & water temperature Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal    Water Systems Operations   Reduce hot water temperature     Increase chilled water temperature     Subtotal 0     Utility Plant & Distribution System Oper.   Equipment cleaning     Adjustment of air/fuel ration     Combustion monitoring & control     Adjustment of dir/fuel ration     Combustion monitoring & control     Adjustment of dir/fuel ration     Combustion monitoring & control     Adjustment of dir/fuel ration     Combustion monitoring & control     Pipe insulation repair	which could result from implementing the following con-	
Reduced ventilation Variable ventilation Unoccupied area ventilation shut down Repair of aulking & weatherstripping Maintenance & repair or operating controls Subtotal 0  Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers X. Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90  Reduction of water consumption Reduce hot water temperature   Increase chilled water temperature   Subtotal 0  Utility Plant & Distribution System Oper. Equipment cleaning Adjustment of air/fuel ration Combustion monitoring & control Adjustment of drives, fans, motors, etc. Steam Trap maintenance	System Changes % Cost Savings	System Changes % Cost Savings
Variable ventilation Unoccupied area ventilation shut down Repair of caulking & weatherstripping Maintenance & repair or operating controls Subtotal 0  Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers  X. Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90  Reduction of water consumption Reduce hot water temperature Increase chilled water temperature  Utility Plant & Distribution System Oper. Equipment cleaning Adjustment of air/fuel ration Combustion monitoring & control Adjustment of air/fuel ration Pipe insulation repair	Ventilation System Operations	
Unoccupied area ventilation shut down Repair of caulking & weatherstripping Maintenance & repair or operating controls Subtotal 0  Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers X. Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90  Reduce hot water temperature Increase chilled water temperature Utility Plant & Distribution System Oper. Equipment cleaning Adjustment of air/fuel ration Combustion monitoring & control Adjustment of dir/fuel ration Seem Trap maintenance Pipe insulation repair		
Repair of caulking & weatherstripping Maintenance & repair or operating controls Subtotal 0  Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers X. Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90  Pipe insulation repair	Variable ventilation	Reduction of water consumption
Maintenance & repair or operating controls Subtotal 0  Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers  X. Reset of air & water temperatures Uncccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90  Willity Plant & Distribution System Oper. Equipment cleaning Adjustment of air/fuel ration Combustion monitoring & control Adjustment of air/fuel ration Steam Trap maintenance Pipe insulation repair	Unoccupied area ventilation shut down	
Subtotal 0   Utility Plant & Distribution System Oper.	Repair of caulking & weatherstripping	Increase chilled water temperature
Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers A Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90 Utility Plant & Distribution System Cquipment cleaning Equipment cleaning Combustion monitoring & control Adjustment of drives, fans, motors, etc. Steam Trap maintenance	Maintenance & repair or operating controls	Subtotal 0
Change in thermostat control set points Provide locking thermostat covers Adjustment of all-fivel ration  X. Reset of air & water temperatures Combustion monitoring & control Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90 Pipe insulation repair	Subtotal0	
Change in thermostat control set points Provide locking thermostat covers Adjustment of all-fivel ration  X. Reset of air & water temperatures Combustion monitoring & control Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90 Pipe insulation repair		
Provide locking thermostat covers  X Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90 Pipe insulation repair	Heating & Cooling System Operations	Utility Plant & Distribution System Oper.
X Reset of air & water temperatures Combustion monitoring & control Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 90 Pipe insulation repair		
Unoccupied reset or shut down of system Adjustment of drives, fans, motors, etc.  Shut down non-critical exhaust systems Sueam Trap maintenance Subtotal 90 Pipe insulation repair		
Shut down non-critical exhaust systems Steam Trap maintenance Subtotal 90 Pipe insulation repair	X Reset of air & water temperatures	
Subtotal 90 Pipe insulation repair		
Subtotal Subtotal 0	Subtotal 90	
		Subtotal Subtotal 0
	Lighting Systems Operations	
X Reduce illumination levels *** Noisy chiller area.		
Maximize use of daylight Ear protection highly recommended.		Ear protection higly recommended.
X Install high efficiency lamps		
Reduce or delete evening cleaning hours		
Subtotal 709 Subtotal 0	Subtotal 709	
Totals		Totals

TEXAS TE	CH UNIVERSITY			AGRICULTURAL PAV	7263		
Institution	Name			Building Name		Building Size (GSF)	
	ENERG	YAND	WATER CONSER	VATION MEASUR	E RETROFIT F	RECOMMENDATIONS	
1.0	Basic Building Data	1.1 1.2	Annual Energy Use Annual Energy Cost	0.950908 6.1896655		BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.	
	1.3 Describe physical of	ondition of		Regular condition			
	1.4 Describe physical of	ondition o	f building energy and water-	using systems:	Good condition		
2,0	Based on 1.1 - 1.4 above Briefly outline recommer Lighting retrofit Adjust AHU's reset sche	ded retrof	the need and potential for e	energy and water conservat	tion measure retrofit im	plementation.	
	Adjust AHU's economize		n setpoint				
3.0			ate whether or not the building symmetric hot water heating sy		naracteristics present a	n opportunity to apply solar heating No	
	EN	ERGY	AND WATER CONS	SERVATION MEAS	SURE RETROF	IT ASSESSMENT	
1.0	Describe proposed ener Adjust AHU's reset sche	dule		Retrofit (efficiency/illur	mination level) existing	lighting system	
	Adjust AHU's economize	r operatio	n setpoint				
2.0	Estimate of installed cos	t of above	measures: \$4,449.93	2			
3.0	Estimate of annual energy	gy and wa	ter cost savings for above m	neasures:	\$799.00		
4.0	Projected simple paybac	k period fo	or above measures in years	5.6			
Form PUA	14						

Energy Auditor Certification. I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If further certify that this audit reflects the current energy prices, operating hours, and buildings colligius/arions.

	Jeremy Dickson						Te	806 742 1696	4/10/2004			
	Name	of Energy A	uditor		-			Organiz	ation and Pho	ne Numbe	r of Auditor	Date
	TEXAS TEC	H UNIVERSI	TY			AGRICULT	URAL ED & C	OMMUNIC	ATIONS		Texas Tech univer	sity/Lubbock, Tx
	Faci	lity Name					<b>Building Nar</b>	ne(s)			Building/Campus A	ddress
						as Tech Uni						
					Name	and Address	of Owner					
	BASIC BUILDING DATA										,	
	Building OPERATING SCHEDULE Size (a) Time Period: Hrs/Occupants/% GSF										BASIC HVAC CONTROL	DATA
Size (a)							:					
6594	594 Days (c) Daylight					vening		(e)	Night			
											Central Bldg. Panel	
	M-F	12 Hrs	720	64%	4 Hrs	23	2%	0	0	0%	(f) YesXNo	
Date (b)	i				1				1			
Occupied	SAT	6 Hrs	56	5%	5% 0 0 0% 0 0 0%				EMS			
1951					Į		1 1		1		(g) Yes X No	
	SUN	6 Hrs	23	2%	0	0	0%	0	0	0%	L	
		SYUSING		MS								
Primary	Primary		Space		Space		Domesti		Interior		Special Building	
Heat	Cooling		Termina		Termina		Hot Wate		Lighting		Systems & Facilities	
Source (h)	Source		Heat (j)		Cooling (		Source (		System (r		(n)	
Steam	Centrifuga	I Chillers	Fan ar	nd Coil	Fan ar	nd Coil	Heat Ex	changer	Fluores	scent		
Boiler							1		1			
1									1			
		DING CH		RISTICS								
		per day opera	ntion		Yes	No X		<ol><li>List yea</li></ol>	r and type of a	major build	ing modifications and additions.	
	per year ope					No						
	Program Us				Yes _X_	No						
4. Building	has exterior	floodlighting			Yes X	No						
L												
Form PUA 1												

,														
Building Nar	me(s)	AGRICULTU	RAL ED & C	OMMUNICAT	TIONS		(a) Building	Size(s) (Gro	oss Sq. Ft.)	6594				
ENERGY U	ISE AND COS	T DATA		For Year En	ding:	8/31/2005		** Metered_	X Best	Estimate	<u></u>			
	ELEC	CTRICITY		NAT	TURAL GAS WATER				PURCHASED THERMAL				TOTAL	
i	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH	1	\$			\$			s	1	MMBTU	COST	TON HRS	COST	COSTS*
L	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	26,240	\$1,706	\$0.07	24.92	\$159.58	\$6.40	57.92	\$154.58	\$2.67	67.23	\$744.48	13,202.59	\$1,769.54	\$4,534.07
October	21,120	\$1,314	\$0.06	28.68	\$161.65	\$5.64	31.10	\$94.26	\$3.03	112.36	\$1,281.47	11,147.94	\$1,545.99	\$4,397.82
November	23,200	\$1,332	\$0.06	41.64	\$308.79	\$7.42	24.61	\$80.75	\$3.28	165.62	\$2,323.92	7,090.96	\$1,160.91	\$5,206.33
December	22,080	\$1,341	\$0.06	56.12	\$389.54	\$6.94	23.46	\$84.87	\$3.62	203.07	\$2,392.74	6,233.44	\$907.86	\$5,115.61
January	21,440	\$1,315	\$0.06	64.19	\$413.51	\$6.44	20.07	\$75.52	\$3.76	203.62	\$2,345.19	6,669.22	\$886.33	\$5,035.79
February	23,040	\$1,351	\$0.06	55.38	\$362.50	\$6.55	12.15	\$48.32	\$3.98	186.32	\$2,039.09	7,481.12	\$844.54	\$4,645.04
March	21,600	\$1,342	\$0.06	49.10	\$323.39	\$6.59	14.66	\$59.93	\$4.09	166.36	\$2,075.18	7,771.70	\$1,136.51	\$4,936.66
April	24,160	\$1,554	\$0.06	42.22	\$317.36	\$7.52	24.72	\$82.32	\$3.33	111.86	\$1,434.97	9,416.90	\$1,363.88	\$4,752.50
May	20,800	\$1,542	\$0.07	31.20	\$208.75	\$6.69	46.67	\$143.83	\$3.08	96.05	\$601.05	10,775.60	\$2,194.42	\$4,689.62
June	19,360	\$1,489	\$0.08	25.61	\$173.40	\$6.77	46.79	\$144.22	\$3.08	70.14	\$27.50	14,616.81	\$2,936.06	\$4,770.56
July	18,720	\$1,222	\$0.07	25.07	\$189.70	\$7.57	87.25	\$225.38	\$2.58	72.72	\$689.18	16,920.72	\$2,326.52	\$4,653.02
August	20,480	\$1,568	\$0.08	29.96	\$233.14	\$7.78	156.51	\$347.47	\$2.22	64.59	\$754.99	17,312.48	\$2,878.31	\$5,781.51
	p		Avg.	2		Avg.	3		Avg.	<b>(4)</b>		5)		
Annual	262,240	\$17,075	\$0.07	474.09	\$3,241.31	\$6.86	545.93	\$1,541.45	\$3.23	1,519.95	\$16,709.74	128,639.48	\$19,950.85	\$58,518.54
Totals	L			<u></u>				1		L		l		

ANNUAL ENERGY CONS	UMPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
(oo) Electricity	262240	KWH x 0.0116	-	3041.984	MMBTU	EUI =	Total Annu	ial BTU's	MMBTU/Sq.Ft./Yr.
pp) Nat. Gas	474.094574	MMBTU x 1.0	=	474.09457	MMBTU		Building G	ross Sq. Ft.	
qq1) Steam/Hot Water	1519.94913	MMBTU x 1.0	=	1519.9491	MMBTU	EUI =	(uu)	6579.701449	
qq2) Steam	0	LBS x 0.001390	20	0	MMBTU	1	(a)	6594	
rr) Chilled Water	128639.479	TON HRS x 0.012	=	1543.6737	MMBTU	1			
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.997831582	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	0	x	=	0	MMBTU				
					_	ENERGY	COST INDEX	(ECI)	
		(uu) TOTAL ANNUAL BTU'S =		6579.7014	MMBTU	ECI =	Annual En	ergy Costs	\$/Sq.Ft./Yr.
						1	Building G	ross Sq. Ft.	
						ECI =	(nn)	58518.5365	
'Do not include water costs	(hh).					1	(a)	6594	
" Electricity is metered by	building.								
The remaining values ar	e metered at the Utilities I	Department				ECI =	(ww)	8.874512663	\$/Sq.Ft./Yr.
and estimated by buildings	by using its gross square for	t value.							
Form PUA 2									

TEXAS TECH UNIVERSITY	AGRICULTU	JRAL ED & COMMUNICA 6594
Facility Name	<b>Building Nar</b>	me(s) Building Size(s) (GSF)
	MENDED ENERG	
AND WATER CONS		
Provide the following recommendations base  1. Scheduled preventive maintenance plan		spection of building(s):
In Existence X Yes No:		X Yes No
Provide a general estimate, expressed a		
which could result from implementing th		
System Changes % Cos	st Savings	System Changes % Cost Savings
Ventilation System Operations		Water Systems Operations
Reduced ventilation		Repair all leaks
X Variable ventilation		Reduction of water consumption
Unoccupied area ventilation shows		Reduce hot water temperature
Repair of caulking & weatherstri		Increase chilled water temperature
Maintenance & repair or operati		Subtotal 0
Subt	total 2970	
Heating & Cooling System Operations		Utility Plant & Distribution System Oper.
Change in thermostat control se	at nointe	Equipment cleaning
Provide locking thermostat cover		Adjustment of air/fuel ration
X Reset of air & water temperature		Combustion monitoring & control
Unoccupied reset or shut down		Adjustment of drives, fans, motors, etc.
Shut down non-critical exhaust		Steam Trap maintenance
Sul	btotal 117	Pipe insulation repair
		Subtotal Subtotal 0
Lighting Systems Operations		Other Measures (including water use)
X Reduce illumination levels		<u> </u>
Maximize use of daylight		
X Install high efficiency lamps		<del></del>
Reduce or delete evening clean Subt		— Subtotal 0
Subt	Ulai <u>040</u>	Totals 3733.0
		10tais
i		

	CHUNIVERSITY			AGRICULTURAL ED	& COMMUNICATIONS	6594	
Institution	Name			Building Name		Building Size (GSF)	
	ENERGY	AND	WATER CONSER	VATION MEASU	RE RETROFIT REC	COMMENDATIONS	
1.0	Basic Building Data	1.1	Annual Energy Use	0.9978316		BTU/Sq.Ft./Yr.	
		1.2	Annual Energy Cost	8.8745127		\$/Sq.Ft./Yr.	
	1.3 Describe physical co	ndition o	f building envelope:	Regular condition			
	1.4 Describe physical co	ndition o	f building energy and water-	using systems:	Good condition		
2.0	Based on 1.1 - 1.4 above, Briefly outline recommend Lighting retrofit	indicate ed retrof	it optione:		ation measure retrofit implem		
	VFD installation on AHUs						
	Reset schedule	••••					
	Economizer						
3.0	Based on auditor evaluation	n, indica	ate whether or not the buildi	ng conditions and/or site of	haracteristics present an opp	portunity to apply solar heating	
	and/or cooling systems, or	solar do	mestic hot water heating sy	stems.	X Yes I		
	ENE	RGY	AND WATER CONS	SERVATION MEA	SURE RETROFIT A	SSESSMENT	
1.0	Describe proposed energy Install VFDs on AHU's fan		ration measures:	Retrofit (efficiency/illu	mination level) existing lighti	ng system	
	Adjust AHU's reset schedu						
	Adjust AHU's economizer						
2.0	Estimate of installed cost of	of above	measures: \$14,499.2	3			
3.0	Estimate of annual energy	and wat	er cost savings for above m	easures:	\$3,733.00		
4.0	Projected simple payback	period fo	r above measures in years	3.9_			
Form PUA	4						

Energy Auditor Certification: I hereby certify that I. JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating horse, and building configurations.

		leremy Dicks			_		Texas Tech University-Physical Plant / 806 742 1696 4/28/2003						
		e of Energy A							ation and Pho	ne Numbe			
	TEXAS TEC	CH UNIVERS	ITY			ADMINSTR	ATIVE SUPP	ORT CENTE	ER		Texas Tech university/Lubbock, Tx		
	Faci	lity Name		_			<b>Building Nar</b>	ne(s)			Building/Campus Address		
					Texa	as Tech Univ	rersity						
					Name	and Address	of Owner						
BASIC BUILDING DATA													
	Building OPERATING SCHEDULE										BASIC HVAC CONTROL DATA		
Size (a)				Time Period	: Hrs/Occup	ants/% GSF							
32909	Days	(c) [	Daylight		(d) E	vening		(e)	Night				
		ł		1							Central Bidg. Panel		
	M-F	12 Hrs 60 64% 4 Hrs 0 0% 0 0 0%								(f) Yes X No			
Date (b)				1									
Occupied	SAT	6 Hrs	_0	0%	0	0 0 0% 0 0 0%				EMS			
1998			l	1							(g) Yes X No		
	SUN	6 Hrs	0	0%	0	0	0%	0	0	0%	<u> </u>		
		GYUSINO									1		
Primary	Primary		Space		Space		Domesti		Interior		Special Building		
Heat	Cooling		Termina		Termina		Hot Wat		Lighting		Systems & Facilities		
Source (h)	Source		Heat (		Cooling (		Source (		System (		(n)		
Steam	Centrifugi	el Chillers	Fana	nd Coil	Fan ar	id Coil	Heat Ex	changer	Fluore:	scent			
Boiler							1						
							1						
			L				<u> </u>		L		<del></del>		
				RISTICS									
	1. Year round, 24 hour per day operation Yes X No 5. List year and type of major building modifications and additions.												
	per year op					No _X_							
	Program U					No _X_							
4. Building	has exterior	floodlighting			Yes _X_	No							
1													

Building Name(s) ADMINSTRATIVE SUPPORT CENTER (a) Building Size(s) (Gross Sq. Ft.) 32909														
ENERGY USE AND COST DATA For Year Ending:					8/31/2005				32909 Estimate	y				
	ELECTRICITY NATURAL GA				0.01.2000	WATER .			PURCHASED THERMAL			TOTAL		
	KWH	COST \$/KWH		MCF	MCF COST \$/MCF		MGAL	COST S/MGAL				CHILLED WA	TER	ENERGY
MONTH		\$			\$			\$	1	MMBTU	COST	TON HRS	COST	COSTS*
0	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	· (ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	81,600	\$5,305	\$0.07			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$5,304.89
October	52,640	\$3,276	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$3,276,19
November	47,840	\$2,747	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$2,746.60
December	49,120	\$2,982	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$2,982.34
January	60,640	\$3,720	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$3,719.96
February	48,480	\$2,842	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$2,841.86
March	54,400	\$3,379	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$3,378.98
April	64,480	\$4,147	\$0.06			· N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$4,147.36
May	67,360	\$4,992	\$0.07			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$4,992.33
June	74,080	\$5,699	\$0.08			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$5,699.02
July	93,600	\$6,111	\$0.07			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$6,111.28
August	82,080	\$6,283	\$0.08			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$6,282.71
	$\rho$ $$		Avg.	<b>2</b>		Avg.	3)		Avg.	4)		5)		ψ0,E3E.77
Annual	776,320	\$51,484	\$0.07	0.00	\$0.00	N/A	0.00	\$0.00	N/A	0.00	\$0.00	0.00	\$0.00	\$51,483.52
Totals				İ						1	*****		00.00	001,100.52

ANNUAL ENERGY CONSU	MPTION IN RTU'S					TENEDOV	LITHITATION	I INDEM COLOR		
						ENERGY	UNLIZATION	I INDEX (EUI)		
(oo) Electricity	776320	KWH x 0.0116	=	9005.312	MMBTU	EUI =	Total Annu	af RTU's	MMBTU/Sq.Ft./Yr.	
(pp) Nat. Gas	0	MCF x 1.03	-	0	MMBTU		Building Gr		minib ro/sq.rc/11.	
(qq1) Steam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU	EUI =	(uu)	9005.312		
(qq2) Steam	0	LBS x 0.001390	-	0	MMBTU		(a)	32909		
(rr) Chilled Water	0	TON HRS x 0.012	=	0	MMBTU		(-)	0.000		
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.273642833	MMBTU/Sq.Ft/Yr.	
(tt) Other Fuel	0	x	-	0	MMBTU				man or oqui to i i.	
							ENERGY COST INDEX (ECI)			
(uu) TOTAL ANNUAL BTU'S = 9005.312 MMBTU							Annual Eng	ergy Costs	\$/Sq.Ft./Yr.	
							Building Gr	oss Sq. Ft.		
	ECI =	(nn)	51483.51847							
*Do not include water costs (hh).							(a)	32909		
** Electricity is metered by building.										
The remaining values are metered at the Utilities Department						ECI =	(ww)	1.564420629	\$/Sq.Ft/Yr.	
and estimated by buildings by using its gross square foot value.							1,	1.00-1120020	woq.rt.rtt.	
orm PUA 2										

TEXAS TECH UNIVERSITY	ADMINS	TRATIVE	SUPPORT CE	NTE 32909		
Facility Name	Building	Name(s)	Building Size	Building Size(s) (GSF)		
RECO	OMMENDED EN	RGY	_			
AND WATER C	ONSERVATION I	<b>MEASUR</b>	RES			
Provide the following recommendations	based on an on-site	inspecti	ion of building(s	s):		
<ol> <li>Scheduled preventive maintenance;</li> </ol>			•			
In Existence X Yes No	; Recommende	<u> </u>	Yes No	)		
<ol><li>Provide a general estimate, expresse</li></ol>	ed as a range, of ar	nual ene	ergy and water s	savings		
which could result from implementing	g the following con:	ervation	measures.	•		
	Cost Savings		m Changes	% Cost Savi	ngs	
Ventilation System Operations		Wate	r Systems Ope	rations		
Reduced ventilation			Repair all leaks	s		
Variable ventilation			Reduction of w	ater consumption	1	
Unoccupied area ventilation		Reduce hot water temperature				
Repair of caulking & weather	erstripping		Increase chille	d water temperate	ure	
Maintenance & repair or ope	erating controls			Subtotal	0	
	Subtotal 0	_				
Heating & Cooling System Operations		Utility	Plant & Distrib	ution System Op	er.	
Change in thermostat contro	ol set points		Equipment clea			
Provide locking thermostat of the provide locking thermostat of the provide locking	covers		Adjustment of a	air/fuel ration		
Reset of air & water tempera	atures		Combustion me	onitoring & contro	ol	
Unoccupied reset or shut do	own of system		Adjustment of	drives, fans, moto	rs, etc.	
Shut down non-critical exha	ust systems		Steam Trap ma	aintenance		
	Subtotal 0		Pipe insulation	repair		
			Subt	total Subtotal	0	

Subtotal 0

Other Measures (including water use)

Subtotal

Totals

0

0.0

Ear protection highy recommended.

\*\*\* Noisy chiller area.

Form PUA 3

Lighting Systems Operations

Reduce illumination levels

Maximize use of daylight

Install high efficiency lamps
Reduce or delete evening cleaning hours

XAS TE	CH UNIVERSITY		ADMINSTRATIVE SUPPORT CENTER	32909	
stitution			Building Name	Building Size (GSF)	-
	ENERGY AN	D WATER CONSER	VATION MEASURE RETROFIT	RECOMMENDATIONS	
1.0	Basic Building Data 1.		0.2736428	BTU/Sq.Ft./Yr.	
	1.3	2 Annual Energy Cost	1.5644206	\$/Sq.Ft./Yr.	
	1.3 Describe physical condition	of building envelope:	Good condition		=
	1.4 Describe physical condition	of building energy and water	using systems: Good condition		-
2.0	Briefly outline recommended ref		energy and water conservation measure retrofit		-
3.0	Based on auditor evaluation, inc and/or cooling systems, or solar		ing conditions and/or site characteristics presen ystems. X Yes		-
	ENERG	AND WATER CON	SERVATION MEASURE RETRO	FIT ASSESSMENT	
1.0	Describe proposed energy cons	ervation measures:			-
2.0	Estimate of installed cost of abo	ve measures: \$0.00			-
3.0	Estimate of annual energy and	water cost savings for above r	neasures: \$0.00		
4.0	Projected simple payback perio	d for above measures in year	s: #DIV/0		

Energy Auditor Certification: 1 hereby certify that I. Jenemy Dickson. (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. Hurther certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	J	eremy Dickso	on				Te	xas Tech Ur	iversity-Phys	ical Plant /	806 742 1696 12/17/2002
	Name	of Energy A	uditor					Organiza	ition and Pho	ne Numbe	
	TEXAS	TECH UNIVE	RSITY			_	ADI	MINISTRATI	NC		Texas Tech university/Lubbock, Tx
		Facility Nam	e				Bu	uilding Name	(s)		Building/Campus Address
1											
						s Tech Univ					
					Name a	and Address	of Owner				
I. BASIC	BUILDI	NG DATA									
Building				OPERA	TING SCHED	ULE					BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup	ants/% GSF					
113975	Days	(c) E	Daylight		(d) E	vening		(e)	Night		
							1				Central Bidg. Panel
1	M-F	11 Hrs	575	63%	0 Hrs	0	0%	0 Hrs	0	0%	(f) Yes <u>X</u> No
Date (b)											
Occupied	SAT	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	EMS
1925											(g) Yes X No
	SUN	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	
II. MAJO	RENER	SYUSINO	SYSTE	MS							
Primary	Primary		Space		Space		Domesti	ic	Interior		Special Building
Heat	Cooling		Termina	ıl	Terminal	i	Hot Wat	er	Lighting	1	Systems & Facilities
Source (h)	Source	(i)	Heat (i	}	Cooling (	k)	Source (	(I)	System (	m)	(n)
Steam	Centrifuga	al Chillers	Fan a	nd Coil	Fan a	nd Coil	Heat ex	changer	Fluore	scent	
Boiler					1			-	ļ		
55.101									1		
			1		l				i		
III JINIO	HE BILL	DINGCH	APACTE	RISTICS							
		per day oper		KIGITO		No		5 List yea	and type of	major build	ting modifications and additions
	per year op					No_X				,	•
	Program U:				Yes						
		se floodlighting				No _X_ No					
- building	nas extento	nooungrung			160 _A_						

D		ADMINISTRA	TION				(1) Dellate	C:(-)(O	- C- FW	113975				
Building Na							(a) Building	Size(s)(Gros						
ENERGY L	ISE AND COST			For Year En		8/31/2005		** Metered _	X Best E	Estimate>				
1	ELEC	TRICITY		NAT	URAL GAS			WATER			URCHASED T	HERMAL		TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WATE	R	ENERGY
MONTH		\$			\$			s .		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	_(nn)
September	137,760	\$8,955.90	\$0.07	173.48	\$1,110.73	\$6.40	403.15	\$1,075.93	\$2.67	467.93	\$5,181.86	\$91,894.29	\$12,316.57	\$28,640.98
October	131,520	\$8,185.50	\$0.06	199.63	\$1,125.12	\$5.64	216.48	\$656.06	\$3.03	782.08	\$8,919.44	\$77,593.28	\$10,760.59	\$29,646.70
November	121,680	\$6,985.91	\$0.06	289.82	\$2,149.30	\$7.42	171.33	\$562.02	\$3.28	1,152.76	\$16,175.24	\$49,355.40	\$8,080.28	\$33,952.75
December	131,760	\$7,999.87	\$0.06	390.59	\$2,711.35	\$6.94	163.32	\$590.73	\$3.62	1,413.46	\$16,654.22	\$43,386.73	\$6,319.00	\$34,275.16
January	133,920	\$8,215.32	\$0.06	446.79	\$2,878.16	\$6.44	139.69	\$525.66	\$3.76	1,417.28	\$16,323.27	\$46,419.94	\$6,169.15	\$34,111.57
February	118,560	\$6,949.91	\$0.06	385.49	\$2,523.15	\$6.55	84.55	\$336.31	\$3.98	1,296.86	\$14,192.70	\$52,071.02	\$5,878.27	\$29,880.33
March	123,360	\$7,662.33	\$0.06	341.74	\$2,250.87	\$6.59	102.02	\$417.16	\$4.09	1,157.91	\$14,443.91	\$54,093.54	\$7,910.45	\$32,684.71
April	136,800	\$8,798.99	\$0.06	293.86	\$2,208.95	\$7.52	172.09	\$572.98	\$3.33	778.61	\$9,987.84	\$65,544.70	\$9,493.04	\$31,061.79
May	123,600	\$9,160.50	\$0.07	217.14	\$1,452.99	\$6.69	324.81	\$1,001.14	\$3.08	668.55	\$4,183.47	\$75,001.66	\$15,273.85	\$31,071.94
June	127,680	\$9,822.50	\$0.08	178.28	\$1,206.94	\$6.77	325.69	\$1,003.82	\$3.08	488.18	\$191.41	\$101,737.75	\$20,435.95	\$32,660.62
July	132,240	\$8,634.15	\$0.07	174.47	\$1,320.34	\$7.57	607.31	\$1,568.70	\$2.58	506.13	\$4,796.90	\$117,773.66	\$16,193.30	\$32,513.40
August	128,880	\$9,864.96	\$0.08	159.50	\$1,240.93	\$7.78	1,089.39	\$2,418.49	\$2.22	449.58	\$5,254.96	\$120,500.46	\$20,033.95	\$38,813.28
	0 -		Avg.	(a)		Avg.	<b>3</b>		Avg.	<b>(4)</b>		O		
Annual	1547760	\$101,235.82	\$0.07	3,250.78	\$22,178.81	\$6.86	3,799.82	\$10,728.98	\$3.23	10,579.34	\$116,305.23	895,372.42	\$138,864.40	\$389,313.25
Totals	1	l		1	l		1	ı		Į.	1			I

647760 0.78313 579.338 0 0372.421 0	KWH x 0.0116 MMBTU x 1.0 MMBTU x 1.0 LBS x 0.001390 TON HRS x 0.012 GAL x 0.095475	= = = = = = = = = = = = = = = = = = = =	10744,469	MMBTU MMBTU MMBTU	EUI = EUI = EUI =	Total Annual Building Gros (uu) (a) (vv)		MMBTU/Sq.Fl./Yr.
579.338 0 372.421	MMBTU x 1.0 LBS x 0.001390 TON HRS x 0.012 GAL x 0.095475	= = = = = = = = = = = = = = = = = = = =	10579.338 0 10744.469 0	MMBTU MMBTU MMBTU MMBTU		(uu) (a)	42528.60621 113975	MMBTU/Sq.Fl./Yr
0 372.421 0	LBS x 0,001390 TON HRS x 0,012 GAL x 0,095475	= = = = = = = = = = = = = = = = = = = =	0 10744.469 0	MMBTU MMBTU MMBTU		(a)	113975	MMBTU/Sq.Ft./Yr
0	TON HRS x 0.012 GAL x 0.095475	= =	10744,469	MMBTU MMBTU	EUI =			MMBTU/Sq.Fl./Yr
0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.373139778	MMBTU/Sq.Ft./Yr
		=			EUI =	(vv)	0.373139778	MMBTU/Sq.Ft./Yr
0	_ x	=	0	MARKET	1			
				THE POPULATION OF THE POPULATI	1			
					ENERGY (	COST INDEX (	ECI)	
(uu) TOTAI	L ANNUAL BTU'S =		42528.606	MMBTU	ECI =	Annual Energ	gy Costs	\$/Sq.Ft./Yr.
					1	Building Gros	ss Sq. Ft.	
					ECI =	(nn)	389313.2463	
						(a)	113975	
ig,								
ered at the Utilities Department						(ww)	3.415777551	\$/Sq Ft./Yr.
ing its gross square foot value.					1			
e	ered at the Utilities Department	ered at the Utilities Department	ered at the Utilities Department	ered at the Utilities Department	ered at the Utilities Department	g. red at the Utilities Department	ECI = (nn) (a) g. red at the Utilities Department (ww)	ECI = (nn) 389313.2463 (a) 113975 g. red at the Utilities Department (ww) 3.415777551

TEXAS	TECH UNIVERSITY	ADMINIST	RATIC	IN .		113975	
Facility	Name	Building Na	me(s)			Building Size(s	(GSF)
		ECOMMENDED ENER					
	AND WATE	R CONSERVATION ME	EASU	RES			
	the following recommendat		nspect	ion of buil	ding(s):	,	
	eduled preventive maintena						
	xistence X Yes						
	vide a general estimate, exp					ngs	
whi	ich could result from implem		rvatio	n measure	S.		
	Changes	% Cost Savings		em Chang		% Cost Saving	s
Ventilat	ion System Operations		Wat	er System	s Operation	ons	
	Reduced ventilation			Repair a			
Х	Variable ventilation		<u> </u>			r consumption	
	Unoccupied area venti	ation shut down	<u> </u>			temperature	
	Repair of caulking & w	eatherstripping	<u></u>	Increase	chilled w	ater temperature	
	Maintenance & repair of	or operating controls	ì			Subtotal	0
		Subtotal 613	-				
Heating	& Cooling System Operation	ns	Utilit	y Plant & I	Distributio	n System Oper.	
_X	Change in thermostat	control set points	<u></u>	Equipme	nt cleanir	ng	
	Provide locking thermo	stat covers	<u></u>	Adjustme	ent of air/f	uel ration	
X	Reset of air & water ter	mperatures		Combust	tion monit	oring & control	
	Unoccupied reset or sh	ut down of system	_	Adjustme	ent of driv	es, fans, motors,	etc.
	Shut down non-critical	exhaust systems		Steam T	rap maint	enance	
		Subtotal 779		Pipe insu	ulation rep	air	
			1		Subtota	Subtotal	0

Subtotal 11216

Other Measures (including water use)

Subtotal Totals

12608.0

Form PUA 3

Lighting Systems Operations

Reduce illumination levels
Maximize use of daylight
Install high efficiency lamps
Reduce or delete evening cleaning hours

EXAS TE	CH UNIVERSITY	ADMINISTRATION	113975
stitution	Name	Building Name	Building Size (GSF)
	ENERGY AND WATER CONSER	RVATION MEASURE RE	TROFIT RECOMMENDATIONS
1.0	Basic Building Data 1.1 Annual Energy Use 1.2 Annual Energy Cost	0.3731398 3.4157776	BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.
	1.3 Describe physical condition of building envelope:	Good condition	
	1.4 Describe physical condition of building energy and water-	using systems: Good	condition
2.0	Based on 1.1 - 1.4 above, indicate the need and potential for e Briefly outline recommended retrofit options: Reset schedules	energy and water conservation measu	re retrofit implementation.
	Time of day schedule optimization  Economizers		
3.0	High efficiency lighting  Based on auditor evaluation, indicate whether or not the buildi  and/or cooling systems, or solar domestic hot water heating sy		cs present an opportunity to apply solar heating YesX No
	ENERGY AND WATER CON	SERVATION MEASURE	RETROFIT ASSESSMENT
1.0	Adjust AHU's economizer operation setpoint	Retrofit (efficiency/illumination le s on AHUS	vel) existing lighting system
2.0	Update building utilities operation schedule  Estimate of installed cost of above measures: \$72.894.	73	
3.0	Estimate of annual energy and water cost savings for above m		
4.0	Projected simple payback period for above measures in years	5.8	

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy nices, coperating horses, and building configurations.

_	J	eremy Dicks	on		Texas Tech University-Physical Plant / Organization and Phone Numbe						806 742 1696 4/28/2003					
	Name	of Energy A	uditor							one Numbe	r of Auditor Date					
	TEXAS TEC	H UNIVERS	ITY				ATHLETIC T	RAINING C	ENTER		Texas Tech university/Lubbock, Tx					
I	Faci	ity Name					<b>Building Nan</b>	ne(s)			Building/Campus Address					
ł																
						s Tech Univ										
	B				Name	and Address	of Owner									
Building	BUILDII	NG DATA		ODEDA	TING SCHED						BASIC HVAC CONTROL DATA					
Size (a)					: Hrs/Occup						BASIC HVAC CONTROL DATA					
97388	Davs	(=) (	Daylight	Time Period		vening		(0)	Night							
37300	Days	(6)	Jayiigiit	_	10/ 5	vering		(6)	rengrit		Central Bidg, Panel					
1	M-F	12 Hrs	120	64%	4	4	2%	0	0	0%	(f) Yes X No					
Date (b)	- M1 - 1	12 1115	120	0476			2.40		-	0,6	- (/) 163 <u>-                                   </u>					
Occupied	SAT	6 Hrs	9	5%	0	0	0%	0	0 0%		EMS					
1986							1				(g) Yes X No					
	SUN	4 hrs	4	2%	0	0	0%	0		0%	W					
II. MAJO	RENERO	SYUSING	SYSTE	MS												
Primary	Primary		Space		Space		Domestic	С	Interior		Special Building					
Heat	Cooling		Termina		Terminal		Hot Wate		Lighting		Systems & Facilities					
Source (h)	Source		Heat (j		Cooling (		Source (		System (		(n)					
Steam	Centrifuga	I Chillers	Fan ar	nd Coil	Fan an	d Coil	Heat Ex	changer	Fluore:	scent						
Boiler																
	l				1				i							
	l		<u> </u>		L		L		l		<u> </u>					
III. UNIQ		01110.00		DIATIO												
				KISTICS		No X		C Lintung	cood boo of	mains build	ing modifications and additions.					
1. Tear rou     2. 9 month		per day oper	auon			No		o. List yea	r and type of t	major bullo	ing modifications and additions.					
	Program Us				Yes X											
4. Building					Yes X											
- Dullung	- CALCULA	grining														

i														
Building Nam		ATHLETIC T	RAINING CE	NTER			(a) Building	Size(s) (Gn		97388				
ENERGY US	SE AND COST	DATA		For Year En	ding:	8/31/2005		** Metered	X Best	Estimate	X			
	ELEC	CTRICITY		NAT	URAL GAS			WATER		Р	URCHASED T	HERMAL		. TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$			\$		1	s		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(8)	(mm)	(nn)
September	36,280	\$2,055.10	\$0.06	96.31	\$616.61	\$6.40	223.81	\$597.30	\$2.67	259.77	\$2,876.68	51,014.67	\$6,837.49	\$12,983.18
October	35,515	\$2,051.57	\$0.06	110.82	\$624.61	\$5.64	120.18	\$364.21	\$3.03	434.17	\$4,951.58	43,075.53	\$5,973.69	\$13,965.65
November	35,574	\$1,982.85	\$0.06	160.89	\$1,193.18	\$7.42	95.11	\$312.00	\$3.28	639.95	\$8,979.60	27,399.41	\$4,485.73	\$16,953.36
December	35,163	\$1,883.76	\$0.05	216.83	\$1,505.19	\$6.94	90.67	\$327.94	\$3.62	784.68	\$9,245.51	24,085.93	\$3,507.96	\$16,470.36
January	42,924	\$2,196.85	\$0.05	248.03	\$1,597.80	\$6.44	77.55	\$291.82	\$3.76	786.80	\$9,061.79	25,769.81	\$3,424.77	\$16,573.03
February	35,633	\$1,928.76	\$0.05	214.01	\$1,400.71	\$6.55	46.94	\$186.70	\$3.98	719.95	\$7,879.01	28,906.97	\$3,263.29	\$14,658.48
March	34,575	\$1,927	\$0.06	189.72	\$1,249.56	\$6.59	56.63	\$231.58	\$4.09	642.81	\$8,018.47	30,029.76	\$4,391.45	\$15,817.71
April	37,221	\$1,997	\$0.05	163.13	\$1,226.29	\$7.52	95.54	\$318.08	\$3.33	432.24	\$5,544.70	36,386.82	\$5,270.02	\$14,355.81
May	28,459	\$1,698	\$0.06	120.54	\$806.62	\$6.69	180.31	\$555.78	\$3.08	371.14	\$2,322.43	41,636.80	\$8,479.20	\$13,862.43
June	31,517	\$1,845	\$0.06	98.97	\$670.02	\$6.77	180.80	\$557.27	\$3.08	271.01	\$106.26	56,479.22	\$11,344.92	\$14,523.91
July	34,457	\$2,712	\$0.08	96.86	\$732.98	\$7.57	337.15	\$870.86	\$2.58	280.98	\$2,662.98	65,381.47	\$8,989.63	\$15,968.44
August	28,401	\$800	\$0.03	88.54	\$688.90	\$7.78	604.77	\$1,342.61	\$2.22	249.58	\$2,917.27	66,895.25	\$11,121.75	\$16,870.63
	$\rho$		Avg.	2		Avg.	3		Avg.	<b>(</b>		5)		
Annual	415,719	\$23,078	\$0.06	1,804.66	\$12,312.46	\$6.86	2,109.45	\$5,956.14	\$3.23	5,873.07	\$64,566.28	497,061.64	\$77,089.90	\$183,002.99
Totals		L		L	L		L	L		L		L	L	L

ANNUAL ENERGY CONST	UMPTION IN BTU'S:					ENERGY	UTILIZATION	NDEX (EUI)	
(oo) Electricity	415719	KWH x 0.0116	=	4822.3404	MMBTU	EUI =	Total Annual	BTU's	MMBTU/Sq.Ft/Yr.
(pp) Nat. Gas	1804.65642	MMBTU x 1.0	-	1804.6564	MMBTU		Building Gro	ss Sq. Ft.	
(qq1) Steam/Hot Water	5873.068	MMBTU x 1.0	=	5873.068	MMBTU	EUI =	(uu)	18464.8045	
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU		(a)	97388	
(rr) Chilled Water	497061.64	TON HRS x 0.012	= -	5964.7397	MMBTU				
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI ≈	(vv)	0.189600408	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	0	×	=	0	MMBTU				
						ENERGY	COST INDEX	(ECI)	
		(uu) TOTAL ANNUAL BTU'S =		18464.804	MMBTU	ECI =	Annual Ener	gy Costs	\$/Sq.Ft./Yr.
							Building Gro	ss Sq. Ft.	
						ECI =	(nn)	183002.9883	
*Do not include water costs	(hh).					1	(a)	97388	
** Electricity is metered by t	building.					1			
The remaining values are	e metered at the Utilities	Department		ECI =	(ww)	1.879112296	\$/Sq.Ft./Yr.		
and estimated by buildings	by using its gross square for	oot value.		1			_		
Form PUA 2									

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PHAS

TEXAS TECH UNIVERSITY	ATHLETIC 1	TRAINING CENTER	97388
Facility Name	Building Na	me(s)	Building Size(s) (GSF)
	COMMENDED ENER		
	CONSERVATION ME		
Provide the following recommendation:		spection of building(s):	
Scheduled preventive maintenance			
In Existence X YesN		_X_ Yes No	
<ol><li>Provide a general estimate, expres</li></ol>			ngs
which could result from implement			
	% Cost Savings	System Changes	% Cost Savings
Ventilation System Operations Reduced ventilation		Water Systems Operation	ons
Variable ventilation		Repair all leaks Reduction of water	
Unoccupied area ventilation		Reduction of water	
Repair of caulking & weath		Increase chilled wa	
Maintenance & repair or o		increase crimed w	Subtotal 0
I Wanterlance & repair or o	Subtotal 0		Sublotal
		1	
Heating & Cooling System Operations		Utility Plant & Distributio	n System Oper.
Change in thermostat con	trol set points	Equipment cleaning	
Provide locking thermosta	t covers	Adjustment of air/f	uel ration
Reset of air & water temper	eratures	Combustion monit	oring & control
Unoccupied reset or shut	down of system	Adjustment of driv	es, fans, motors, etc.
Shut down non-critical exh	aust systems	Steam Trap mainte	enance
	Subtotal 0	Pipe insulation rep	air
	<u></u>	Subtota	Subtotal 0
Lighting Systems Operations		Other Measures (includi	ng water use)
Reduce illumination levels	ı	*** Noisy chiller area.	
Maximize use of daylight		Ear protection highy reco	mmended.
Install high efficiency lamp			
Reduce or delete evening			0
ĺ	Subtotal0		Subtotal 0 Totals 0.0
1		Ì	Totals 0.0
		1	i i

	CH UNIVERSITY		ATHLETIC TRAINING CENTER	97388
nstitution	Name		Building Name	Building Size (GSF)
	ENERGY	AND WATER CONSE	RVATION MEASURE RETR	OFIT RECOMMENDATIONS
1.0	Basic Building Data	1.1 Annual Energy Use	0.1896004	BTU/Sq.Ft./Yr.
		1.2 Annual Energy Cost	1.8791123	\$/\$q.Ft./Yr.
	1.3 Describe physical co	ndition of building envelope:	Good condition	
	1.4 Describe physical co	ndition of building energy and wat	er-using systems: Good cor	ndition
2.0	Based on 1.1 - 1.4 above, Briefly outline recommend	lad ratrofit antions:	or energy and water conservation measure	
3.0		on, indicate whether or not the buil		s present an opportunity to apply solar heating Yes No
	ENE	RGY AND WATER CON	NSERVATION MEASURE RE	ETROFIT ASSESSMENT
1.0	Describe proposed energy	conservation measures:		
2.0	Estimate of installed cost	of above measures: \$0.00		
2.0	Estimate of installed cost of	or above measures: \$0.00	U	
3.0	Estimate of annual energy	and water cost savings for above	measures: \$0.00	,
4.0	Projected simple payback	period for above measures in year	ars: #DIV/0!	

Energy Auditor Certification: I hareby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dicks					Te			806 742 1696 11/24/2005							
	Name	e of Energy A	uditor					Organiz	ation and Pho	ne Numbe							
	TEXAS TEC	H UNIVERS	TY				BIOLOGY				Texas Tech university/Lubbock, Tx						
	Faci	ity Name					<b>Building Nar</b>	ne(s)			Building/Campus Address						
1																	
	_					as Tech Univ											
					Name	and Address	of Owner										
	BUILDI	NG DATA															
Building					TING SCHEE						BASIC HVAC CONTROL DATA						
Size (a)				Time Period													
156219	Days	(c) E	Daylight		(d) E	vening		(e)	Night								
1		!		1		İ			·		Central Bidg. Panel						
	M-F	12 Hrs	3124	60%	4 Hrs	104	2%	0	0	0%	(f) Yes <u>X</u> No						
Date (b)									1								
Occupied	SAT	6 Hrs	260	5%	0	0	0%	. 0	0	0%	EMS						
1969		1				1					(g) Yes <u>X</u> No						
	SUN	6 Hrs	104	2%_	0	0	0%	0	0	0%	<u> </u>						
			SYSTE														
Primary	Primary		Space		Space		Domesti		Interior		Special Building						
Heat	Cooling		Termina		Termina		Hot Wate		Lighting		Systems & Facilities						
Source (h)	Source		Heat (j		Cooling		Source (		System (		(n)						
Steam	Centrifuga	al Chillers	Fan a	nd Coil	Fan a	nd Coil	Heat Ex	changer	Fluore	scent							
Boiler																	
1					1												
	L.,		L		L				<u> </u>		<u> </u>						
III. UNIQ				RISTICS													
		per day open	ation		Yes	No _X_					ing modifications and additions.						
	per year ope				Yes _X_			Recommiss	sioning - FY00	)							
	Program Us				Yes _X_	No											
4. Building	has exterior	floodlighting			Yes _X_	No											
1																	

Building Na	me(s)	BIOLOGY					(a) Building	Size(s) (Gr	nee Sn. Ft \	156219				
	ISE AND COS			For Year En	ding	8/31/2005	(a) Danoing	** Metered _			x			
	E	LECTRICITY			IATURAL GA	S		WATER			PURCHAS	ED THERMAL		TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-	OT WATER	CHILLE	WATER	ENERGY
MONTH		\$			\$		l	s		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September		\$19,238.01	\$0.07	154.48	\$989.10	\$6.40	359.01	\$958.12	\$2.67	416.69	\$4,614.45	81,832.06	\$10,967.93	\$36,767.62
October	266,640	\$16,595.05	\$0.06	177.77	\$1,001.92	\$5.64	192.77	\$584.22	\$3.03	696.45	\$7,942.78	69,096.98	\$9,582.33	\$35,706.30
November	258,960	\$14,867.44	\$0.06	258.08	\$1,913.96	\$7.42	152.57	\$500.48	\$3.28	1,026.54	\$14,404.08	43,951.08	\$7,195.51	\$38,881.47
December	259,920	\$15,781.16	\$0.06	347.82	\$2,414.46	\$6.94	145.44	\$526.05	\$3.62	1,258.69	\$14,830.62	38,635.97	\$5,627.08	\$39,179.36
January	290,640	\$17,829.31	_\$0.06	397.87	\$2,563.01	\$6.44	124.39	\$468.10	\$3.76	1,262.09	\$14,535.91	41,337.06	\$5,493.64	\$40,889.98
February	257,040	\$15,067.51	\$0.06	343.28	\$2,246.87	\$6.55	75.29	\$299.48	\$3.98	1,154.86	\$12,638.63	46,369.35	\$5,234.61	\$35,487.10
March	259,440	\$16,114.74	\$0.06	304.32	\$2,004.40	\$6.59	90.85	\$371.48	\$4.09	1,031.12	\$12,862.33	48,170.41	\$7,044.27	\$38,397.23
April	313,200	\$20,145.06	\$0.06	261.68	\$1,967.07	\$7.52	153.25	\$510.24	\$3.33	693.36	\$8,894.19	58,367.69	\$8,453.57	\$39,970.13
May	265,920	\$19,708.43	\$0.07	193.36	\$1,293.89	\$6.69	289.24	\$891.51	\$3.08	595.34	\$3,725.39	66,789.13	\$13,601.39	\$39,220.61
June	277,440	\$21,343.62	\$0.08	158.76	\$1,074.78	\$6.77	290.02	\$893.90	\$3.08	434.73	\$170.46	90,597.68	\$18,198.26	\$41,681.02
July	300,240	\$19,603.12	\$0.07	155.37	\$1,175.76	\$7.57	540.81	\$1,396.93	\$2.58	450.71	\$4,271.65	104,877.69	\$14,420.17	\$40,867.64
August	264,240	\$20,225.92	\$0.08	82.82	\$644.37	\$7.78	970.10	\$2,153.67	\$2.22	400.35	\$4,679.55	_107,305.91	\$17,840.27	\$45,543.78
	ρ			2)		Avg.	3		Avg.	4)	-	5)		
Annual	3,309,600	\$216,519.00	\$0.07	2,836	\$19,290	\$6.86	3,384	\$9,554	\$3.23	9,421	\$103,570	797,331	\$123,659	\$472,592
Totals											_			

ANNUAL ENERGY CONST	UMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)	
(oo) Electricity	3309600	KWH x 0.0116	=	38391.36	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft/Yr.
(pp) Nat. Gas	2836	MMBTU x 1.0	=	2836	MMBTU	1	Building Gross Sq. Ft.	
(qq1) Steam/Hot Water	9421	MMBTU x 1.0	=	9421	MMBTU	EU! =	(uu) 60216.332	
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU		(a) 156219	
(rr) Chilled Water	797331	TON HRS x 0.012	=	9567.972	MMBTU	1		
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv) 0.385461	MMBTU/Sq.Ft/Yr.
(tt) Other Fuel	. 0	x	=	0	MMBTU			
				*	_	ENERGY	COST INDEX (ECI)	
	(uu) To	OTAL ANNUAL BTU'S =		60216.332	MMBTU	ECI =	Annual Energy Costs	\$/Sq.Ft./Yr.
							Building Gross Sq. Ft.	
						ECI =	(nn) 472592	
*Do not include water costs	(hh).					1	(a) 156219	
** Electricity is metered by I	building.					1 .		
The remaining values an	e metered at the Utilities Departn	nent				ECI =	(ww) 3.025188997	\$/Sq.Ft./Yr.
and estimated by buildings	by using its gross square foot value.							
Form PUA 2								

D	0		1 R	<i>n</i> ı	N	٨	D	v	w	۸	. 1	: 6	•	^	N	п	=	N	0	٠,	,	٨	_	٠,	-

PLIAS

TEXAS TECH UNIVERSITY	BIOLOGY			156219	
Facility Name	Building Na	me(s)		Building Siz	te(s) (GSF)
	MENDED ENER				
AND WATER COM					1
Provide the following recommendations ba		nspect	ion of building(s):		
Scheduled preventive maintenance pla					1
In Existence X Yes No;	Recommended				[
Provide a general estimate, expressed				ngs	1
which could result from implementing t				24.0	
	ost Savings		em Changes	% Cost Sav	rings
Ventilation System Operations  Reduced ventilation		wate	er Systems Operation Repair all leaks	ns	
Variable ventilation			Reduction of water		_
Unoccupied area ventilation si	nut down		Reduce hot water		
Repair of caulking & weathers		<u>                                     </u>	Increase chilled wa		
Maintenance & repair or opera			increase crimed wi	Subtotal	n l
	btotal 0	ì		Gubiolai	
34.		1			
Heating & Cooling System Operations		Utility	Plant & Distributio	n System Or	oer.
X Change in thermostat control	set points		Equipment cleaning		
Provide locking thermostat co			Adjustment of air/f	uel ration	
X Reset of air & water temperatu	ıres		Combustion monit	oring & contr	ol
Unoccupied reset or shut dow	n of system		Adjustment of drive	es, fans, mot	ors, etc.
Shut down non-critical exhaus	t systems	_	Steam Trap mainte	enance	
s	ubtotal 945		Pipe insulation rep	air	
			Subtota	Subtotal	0
		1			
Lighting Systems Operations		Othe	r Measures (includi	ng water use	•)
X Reduce illumination levels					1
Maximize use of daylight					i
X Install high efficiency lamps					i
Reduce or delete evening clea				0	_ ]
Sul	btotal15376	4		Subtotal Totals	16331.0
		1		IOIAIS	16321.0
		1			

TEXAS TI	CH UNIVERSITY			BIOLOGY		156219	
nstitution	Name.		<del>_</del>	Building Name		Building Size (GSF)	-
	ENERG	YAND	WATER CONSER	VATION MEASU	JRE RETROFIT F	RECOMMENDATIONS	
1.0	Basic Building Data	1.1	Annual Energy Use	0.385461		BTU/Sq.Ft./Yr.	
		1.2	Annual Energy Cost	3.025189		\$/Sq.Ft./Yr.	
	1.3 Describe physical c	ondition of	building envelope:	Fair			-
	1.4 Describe physical c	ondition of	building energy and water-	using systems:	Good condition		-
2.0	Briefly outline recommer Lighting retrofit		the need and potential for e		vation measure retrofit im		-
	Reset schedule	*!as!#!					-
	Time of day schedule op Economizer	timization					-
3.0		tion, indica	te whether or not the buildir	ng conditions and/or site	characteristics present a	opportunity to apply solar heating	-
	and/or cooling systems,	or solar do	mestic hot water heating sy	stems.	X Yes	No	
-	EN	ERGY	AND WATER CONS	SERVATION ME	ASURE RETROFI	T ASSESSMENT	
1.0	Describe proposed ener Adjust AHU's reset sche	dule		Retrofit (efficiency/il	lumination level) existing	ighting system	-
	Adjust AHU's economize						_
	Update building utilities						
2.0	Estimate of installed cos	t of above	measures: \$91,440.2	3			-
3.0	Estimate of annual energ	gy and wat	er cost savings for above m	easures:	\$16,321.00		-
4.0	Projected simple paybac	k period fo	or above measures in years	5.6	3		_

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or instituonal buildings. I surface certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dicks					Te	xas Tech U	niversity-Phys	sical Plant /	/ 806 742 1696 12/17/2002
		of Energy A							ation and Pho	one Numbe	er of Auditor Date
		H UNIVERS	ΠY				CIVIL ENGI	NEERING			Texas Tech university/Lubback, Tx
	Facil	lity Name					<b>Building Nar</b>	ne(s)			Building/Campus Address
						is Tech Univ				_	
					Name :	and Address	of Owner				
	BUILDII	NG DATA									
Building					TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup						
91094	Days	(c) [	Daylight		(d) E	vening		(e)	Night		
!					1						Central Bidg. Panel
	M-F	12 Hrs	1670	55%	4 Hrs	61	2%	0	0	0%	(f) Yes <u>X</u> No
Date (b)											
Occupied	SAT	6 Hrs	152	5%	0	0	0%	0	0	0%	EMS ·
1951									1		(g) Yes <u>X</u> No
-	SUN	6 Hrs	61	2%	0	0	0%	0	0	0%	
			SYSTE	M S					<del></del>		
Primary Heat	Primary		Space		Space		Domestic		Interior		Special Building
	Cooling		Termina		Terminal		Hot Wate		Lighting		Systems & Facilities
Source (h)	Source		Heat (j)		Cooling (		Source (		System (		(n)
Steam Boiler	Centrifuga	l Chillers	Fan ar	id Coil	Fan an	d Coil	Heat Ex	changer	Fluore	scent	
Boiler											
<b>├</b> ──-			Щ		L		L				<u> </u>
III UNIQ	ue naire	01110 011		0.07.00							
		per day oper		KISTICS		No X		F 123			
	no, za nour p per year ope		auon					<ol><li>List yea</li></ol>	and type of	major build	ing modifications and additions.
	Program Us				Yes _X_	No					
Building											
- building	nas extentor	noongnung			Yes X	NO					
Form PUA 1											

la														
Building Nar		CIVIL ENGIN	IEERING					Size(s) (Gro		91094				
ENERGY U	SE AND COS			For Year En	ding	8/31/2005		** Metered	X Best	Estimate	Χ			
1		TRICITY		NAT	TURAL GAS			WATER		P	URCHASED TI	HERMAL		TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$		ł	\$		l	<b>S</b>	l	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	L_(ii) _	(kk)	(11)	(mm)	(nn)
September	97680	6350.26065	\$0.07	90.08	\$576.76	\$6.40	209.34	\$558.69	\$2.67	242.98	\$2,690.77	47,717.69	\$6,395.59	\$16,572.08
October	85440	5317.58579	\$0.06	103.66	\$584.24	\$5.64	112.41	\$340.67	\$3.03	406.11	\$4,631.57	40,291.64	\$5,587.62	\$16,461.69
November	81840	4698.60716	\$0.06	150.49	\$1,116.06	\$7.42	88.96	\$291.84	\$3.28	598.59	\$8,399.27	25,628.64	\$4,195.83	\$18,701.60
December	88080	5347.81726	\$0.06	202.82	\$1,407.91	\$6.94	84.81	\$306.75	\$3.62	733.96	\$8,647.99	22,529.30	\$3,281.25	\$18,991.71
January	93120	5712.44621	\$0.06	232.00	\$1,494.54	\$6.44	72.54	\$272.96	\$3.76	735.95	\$8,476.14	24,104.35	\$3,203.44	\$19,159.52
February	82800	4853.67986	\$0.06	200.17	\$1,310.19	\$6.55	43.90	\$174.63	\$3.98	673.42	\$7,369.81	27,038.77	\$3,052.39	\$16,760.70
March	58320	3622.46281	\$0.06	177.46	\$1,168.80	\$6.59	52.97	\$216.62	\$4.09	601.26	\$7,500.25	28,089.00	\$4,107.64	\$16,615.76
April	120720	7764.72479	\$0.06	152.59	\$1,147.03	\$7.52	89.36	\$297.53	\$3.33	404.31	\$5,186.36	34,035.21	\$4,929.43	\$19,325.07
May	78240	5798.68851	\$0.07	112.75	\$754.49	\$6.69	168.66	\$519.86	\$3.08	347.16	\$2,172.34	38,945.90	\$7,931.21	\$17,176.58
June	72240	5557.46619	\$0.08	92.58	\$626.72	\$6.77	169.12	\$521.25	\$3.08	253.50	\$99.40	52,829.07	\$10,611.72	\$17,416.55
July	82320	5374.79622	\$0.07	90.60	\$685.61	\$7.57	315.36	\$814.58	\$2.58	262.82	\$2,490.87	61,155.99	\$8,408.65	\$17,774.51
August	72000	5511.14852	\$0.08	52.43	\$407.91	\$7.78	565.68	\$1,255.84	\$2.22	233.45	\$2,728.73	62,571.93	\$10,402.97	\$20,306.59
	$\circ$		Avg.	(2)		Avg.	3		Avg.	<b>(4)</b>		5)		
Annual	1,012,800	\$65,910	\$0.07	1,658	\$11,280	\$6.86	1,973	\$5,571	\$3.23	5,494	\$60,393	464,937	\$72,108	\$215,262
Totals		L		l			L							

ANNU	IAL ENERGY CONSU	IMPTION IN BTU'S:					ENERGY	UTILIZATION	I INDEX (EUI)	
(00)	Electricity	1012800	KWH x 0.0116	=	11748.48	MMBTU	EUI =	Total Annu	al BTU's	MMBTU/Sq.Ft./Yr.
(pp)	Nat. Gas	1658	MMBTU x 1.0	=	1658	MMBTU	1	Building G	ross Sq. Ft.	
(qq1)	Steam/Hot Water	5494	MMBTU x 1.0	=	5494	MMBTU	EUI =	(uu)	24479.724	
(qq2)	Steam	0	LBS x 0.001390	=	0	MMBTU	1	(a)	91094	
(rr)	Chilled Water	464937	TON HRS x 0.012	22	5579.244	MMBTU	1			
(ss)	Propane or Butane	0	GAL x 0.095475	-	0	MMBTU	EUI =	(vv)	0.268730366	MMBTU/Sq.Ft./Yr.
(tt)	Other Fuel	0	x	=	0	MMBTU	1			
			<del></del>			_	ENERGY	COST INDEX	(ECI)	
			(uu) TOTAL ANNUAL BTU'S =		24479.724	MMBTU	ECI =	Annual En	ergy Costs	\$/Sq.Ft/Yr.
						_	1	Building G	ross Sq. Ft.	
							ECI =	(nn)	215262	
*Do n	ot include water costs	(hh).						(a)	91094	
	ctricity is metered by b									
The r	emaining values are	metered at the Utilities	s Department				ECI =	(ww)	2.363075504	\$/Sq.Ft./Yr.
and e	stimated by buildings I	y using its gross square	foot value.				1			

PRELIMINARY	ALERANDENE	RGY AUDIT	PUA3
TEXAS TECH UNIVERSITY	CIVIL E	NGINEERING	91094
Facility Name	Building	Name(s)	Building Size(s) (GSF)
	RECOMMENDED EN	ERGY	
AND W	ATER CONSERVATION	MEASURES	
Provide the following recomme	endations based on an on-si	te inspection of building	s):
1. Scheduled preventive mail		, ,	,
In Existence X Yes	No; Recommende	ed X Yes N	0
<ol><li>Provide a general estimate</li></ol>	e, expressed as a range, of a	annual energy and water	
which could result from im	plementing the following co	nservation measures.	
System Changes	% Cost Savings	System Changes	% Cost Savings
Ventilation System Operations		Water Systems Ope	erations
Reduced ventilati	on	Repair all leal	ts
Variable ventilation	in	Reduction of v	vater consumption
	ventilation shut down		ater temperature
	& weatherstripping		ed water temperature
			O Living Contraction Co.

Unoccupied area ventilation shut down Repair of caulking & weatherstripping	Reduce hot water temperature Increase chilled water temperature
Maintenance & repair or operating controls Subtotal 0	Subtotal 0
Heating & Cooling System Operations  X Change in thermostat control set points Provide locking thermostat covers  X Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 431	Utility Plant & Distribution System Oper.  Equipment cleaning Adjustment of air/fuel ration Combustion monitoring & control Adjustment of drives, fans, motors, etc. Steam Trap maintenance Pipe insulation repair Subtotal Subtotal 0
Lighting Systems Operations  X Reduce illumination levels  Maximize use of daylight  X Install high efficiency lamps  Reduce or delete evening cleaning hours  Subtotal 8919	Other Measures (including water use)  Subtotal 0

9350.0

5.7

Projected simple payback period for above measures in years:

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating howers, and building configurations.

		Jeremy Dicks			_		т	exas Tech l	Iniversity-Phy	sical Plant	1/806 742 1696 11/24/2005
		e of Energy A						Organia	ation and Pho	one Numbe	er of Auditor Date
	TEXAS 1	<b>FECH UNIVE</b>	RSITY					CHEMISTE	RY		Texas Tech university/Lubbock. Tx
1		Facility Nam	ie				Be	uilding Nam	e(s)		Building/Campus Address
								-	.,		
					Te	cas Tech Univ	versity				
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building				OPERA	TING SCHE	DULE					BASIC HVAC CONTROL DATA
Size (a)				Time Perio	d: Hrs/Occu	pants/% GSF					
192980	Days	(c) I	Daylight		(d)	Evening		(e:	Night		
											Central Bidg, Panel
	M-F	12 Hrs	3350	52%	4 Hrs	150	2%	0	0	0%	(f) Yes X No
Date (b)				l					1		
Occupied	SAT	12 Hrs	300	5%	0	0	0%	0	0	0%	EMS
1929		l	l		1						(g) Yes X No
	SUN	12 Hrs	150	2%	0	0	0%	0	0	0%	
											<u> </u>
			SSYSTE	MS							
Primary	Primary		Space		Space		Domesti	c	Interior		Special Building
Heat	Cooling		Termina	ž.	Termina	aí	Hot Wate	er	Lighting	l .	Systems & Facilities
Source (h)	Source		Heat (j)	)	Cooling	(k)	Source (	r)	System (	m)	(n)
Steam	Centrifuga	d Chillers	Fan ar	nd Coil	Fan a	nd Coil	Heat Exc	changer	Fluore	scent	
Boiler					1		1				
			1		ļ						
					<u> </u>						
III. UNIQ				RISTICS							
		per day opera	ation		Yes	No_X					ing modifications and additions
	per year ope				Yes_X	No		Recommiss	ioning - FY00	)	
	Program Us				Yes_X	No					
4. Building	has exterior	floodlighting			Yes_X	No					
L											
Form PUA 1											

	e(s)	CHEMISTRY					(a) Building Si			192980				
NERGY US	SE AND COS			For Year Er		8/31/2005		" Metered	X Best I	stimate_X				
		ELECTRICITY			NATURAL GA			WATER				ED THERMAL		TOTA
	KWH	COST	\$/KWH	MMBTU	COST	SMMBTU	MGAL	COST	SIMGAL		HOT WATER		WATER	ENER
MONTH		3		1	8		i	8	Į.	MMBTU	COST	TON HRS	COST	COST
	(68)	(65)	(00)	(dd)	(ee)	(0)	(gg)	(hh)	(6)	- 40	(86)	- 60	(mm)	(nn)
Septembe	396,000	\$25,744.30	\$0.07	190.83	\$1,221.88	\$6.40	443.49	\$1,183.58	\$2.67	514,75	\$5,700 31	101,088 54	\$13,548,88	47398
October	342,000	\$21,285,28	\$0.06	219.60	\$1,237.89	\$5.64	238 14	\$721.70	\$3.03	860,33	\$9,811,85	85,356,68	\$11,837.21	44693.
Vovember	306,000	\$17,568.11	\$0.05	318.81	\$2,384.35	\$7.42	188.47	\$618.25	\$3.28	1,258 10	\$17,793.81	54,293.52	\$8,888,74	47233
December	300,960	\$18,272.92	\$0.05	429.67	\$2,982.62	\$6.94	179.66	\$649.83	\$3.62	1,554.88	\$18,320.52	47,727.68	\$6,951.23	47177
erusry	354,480	\$21,745.57	\$0.08	491.49	\$3,166.13	\$6.44	153.66	\$578.26	\$3.76	1,559.08	\$17,958.46	51,064.37	\$6,786 39	50232
ebruary	322,320	\$18,894.18	\$0.06	424.08	\$2,775.59	\$6.55	93.01	\$369.96	\$3.98	1,428.62	\$15,612.72	57,280.85	\$6,466.40	44118
Aarch	331,440	\$20,586.92	\$0.06	375.94	\$2,476,07	\$6.59	112 22	\$458.89	\$4,09	1,273,76	\$15,889.06	59,505.73	\$8,701.91	48112
lprii .	392,640	\$25,254.65	\$0.06	323.28	\$2,429.96	\$7.52	189.31	\$630.30	\$3.33	858 51	\$10,987.14	72,102.51	\$10,442.84	49744
ABY .	354,720	\$26,289.76	\$0,07	238,87	\$1,598.36	\$8 69	357.30	\$1,101.30	\$3.08	735.44	\$4,602.04	82,505.76	\$16,802.03	50393.4
une	383,280	\$29,485.96	\$0.08	198.12	\$1,327.59	\$6,77	358 27	\$1,104.25	\$3.08	537.02	\$210,57	111,916,86	\$22,480 62	54609.
vy .	426,960	\$27,876.86	\$0.07	191.93	\$1,452.44	\$7.57	668.07	\$1,725 65	\$2.58	556.77	\$5,276.85	129.557.20	\$17,813,48	54145 2
lugust	387,600	\$29,668.35	\$0.08	89.77	\$698,42	\$7.78	1,198,38	\$2,650,46	\$2.22	494,58	\$5,780,73	132,558,63	\$22,038.39	60846.3
			Avg.	200		Avg.	(3)		Ava.	0	1	( )		
launn	4,298,400	\$282,672,86	\$0.07	3,490,35	\$23,731,19		4 180.00	\$11,802,44	\$3.23	11.637.83	\$127 941.85	984 956 62	\$152,758 12	598908
otats				1							4.21.01.00	001,000 01	V104,100 14	320000
oo) Electric pp) Net G qq1) Steem	city ias vHot Water	4.298,400.00 3,490.35 11,637.83			KWH x 0 011 MMBTU x 1.1 MMBTU x 1.1	0	:	49,881.44 3,490,35 11,637.83	MMBTU MMBTU	ENERGY U	TitiZATION IN Total Annual B Building Gross (w)	TU's Sq. Ft. 78,529 12	MMBT.	VSq.£t.M
oo) Electric pp) Net G qq1) Steem qq2) Steem	city ias vHot Water	4.298,400.00 3,490.35 11,637.63 1,237,430.00			MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013	0		3,490.35 11,637.83 1,720.03	MMBTU MMBTU MMBTU	EUI =	Total Annual B Building Gross	TU's Sq. Ft.	ммет.	NSq.£t M
pp) Electric pp) Net. G qq1) Steem qq2) Steem r) Chilled	city ias vHot Water Water	4.298,400.00 3,490.35 11,637,63 1,237,430.00 984,956.62			MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013 TON HRS x 1	0 0 190 0.012		3,490.35 11,637.83 1,720.03 11,819.48	MMBTU MMBTU MMBTU MMBTU	EUI =	Total Annual B Building Gross (uu) (a)	TU's Sq. Ft. 78,529 12 192,980 00		
pp) Plectric pp) Net. G qq1) Steem qq2) Steem rr) Chilled ss) Propen	city ias vHot Water Water is or Butane	4.298,400.00 3,490.35 11,637,63 1,237,430.00 984,956.62			MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013	0 0 190 0.012	= = = '	3,490,35 11,637,83 1,720.03 11,819,48	MMBTU MMBTU MMBTU MMBTU MMBTU	EUI =	Total Annual B Building Gross (LU)	TU's Sq. Ft. 78,529 12		VSq.£t.M
po) Electric p) Net. G (qq1) Steem qq2) Steem r) Chilled	city ias vHot Water Water is or Butane	4.298,400.00 3,490.35 11,637,63 1,237,430.00 984,956.62			MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013 TON HRS x 1	0 0 190 0.012		3,490,35 11,637,83 1,720.03 11,819,48	MMBTU MMBTU MMBTU MMBTU	EUI =	Total Annual B Building Gross (tu) (e)	TU's Sq. Ft. 78,529 12 192,980 00 0.406925798		
po) Electric pp) Net. G (qq1) Steem qq2) Steem r) Chilled (s) Propen	city ias vHot Water Water is or Butane	4.298,400.00 3,490.35 11,637,63 1,237,430.00 984,956.62		(uu) TOTAL	MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013 TON HRS x 1	0 0 0 0 0 0 0 0 0 175	= = = '	3,490,35 11,637,83 1,720.03 11,819,48	MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU	EUI = EUI = EUI = ENERGY C	Total Annual B Building Gross (cu) (e) (vv) OST INDEX (E Annual Energy Building Gross	TU's Sq. Ft. 78,529 12 192,980 00 0.408928798 (CI) Costs Sq. Ft.		VSQ FI M
co) Electric co) Net. G cq1) Steem cq2) Steem r) Chilled cs) Propen () Other Fu	city iss vHot Water Water is or Butane uel	4.298.400.00 3.490.35 11,637.63 1.237,430.00 984.956.62		(w) TOTAL	MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013 TON HRS x 1 GAL x 0.0954	0 0 0 0 0 0 0 0 0 175	= = = '	3,490,35 11,637,83 1,720,03 11,819,48	MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU	EUI = EUI = ENERGY C	Total Annual B Building Gross (cu) (iii) (iv) OST INDEX (E Annual Energy Building Gross (nn)	TU's Sq. Ft. 78,529 12 192,980 00 0,408928798 CCI) Costs Sq. Ft. 598,906,46	MMSTU	VSq FI M
(o) Electric (p) Net. G (q1) Steem (q2) Steem (r) Chilled (s) Propan () Other Fig.	city ias vHot Water Water is or Butane uel	4.298,400,00 3,490,35 11,637,83 1,237,430,00 984,956,62		(w) TOTAL	MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013 TON HRS x 1 GAL x 0.0954	0 0 0 0 0 0 0 0 0 175	= = = '	3,490,35 11,637,83 1,720,03 11,819,48	MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU	EUI = EUI = EUI = ENERGY C	Total Annual B Building Gross (cu) (e) (vv) OST INDEX (E Annual Energy Building Gross	TU's Sq. Ft. 78,529 12 192,980 00 0.408928798 (CI) Costs Sq. Ft.	MMSTU	VSq Fl N
p) Electric p) Net. G (q1) Steem (q2) Steem (r) Chilled s) Propan (r) Other F	city sas s/Hot Water Water se or Butane uel  fe water costs : s metered by b	4.298.400.00 3.490.35 11.637.63 1.237.430.00 984.956.62			MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013 TON HRS x 1 GAL x 0.0854 X ANNUAL BT	0 0 0 0 0 0 0 0 0 175	= = = '	3,490,35 11,637,83 1,720,03 11,819,48	MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU	EUI = EUI = EUI = ENERGY C	Total Annual B Building Gross (cu) (iii) (iv) OST INDEX (E Annual Energy Building Gross (nn)	TU's Sq. Ft. 78,529 12 192,980 00 0,408928798 CCI) Costs Sq. Ft. 598,906,46	MMSTU	VSq FI M
o) Electric p) Net. G q1) Steem q2) Steem ) Chilled ) Chilled ) Other F.  To not includ Bectricity is te remaining	city ias whot Water Water is or Sutane uel is water costs : s metered by b ing values an	4.298,400,00 3,490,35 11,637,83 1,237,430,00 984,956,62	ne Utilities C	Department	MMBTU x 1.1 MMBTU x 1.1 LBS x 0.0013 TON HRS x 1 GAL x 0.0854 X ANNUAL BT	0 0 0 0 0 0 0 0 0 175	= = = '	3,490,35 11,637,83 1,720,03 11,819,48	MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU MMBTU	EUI = EUI = EUI = ENERGY C	Total Annual B Building Gross (cu) (iii) (iv) OST INDEX (E Annual Energy Building Gross (nn)	TU's Sq. Ft. 78,529 12 192,980 00 0,408928798 CCI) Costs Sq. Ft. 598,906,46	MMSTU	//Sq F1 M

TEXAS TECH UNIVERSITY	CHEMISTR	RY	192980
Facility Name	Building Na	ame(s)	Building Size(s) (GSF)
	RECOMMENDED ENER		
	ER CONSERVATION ME		
Provide the following recommendate	tions based on an on-site ir	spection of building(s):	
<ol> <li>Scheduled preventive maintena</li> </ol>			
In ExistenceXYes		XYesNo	
<ol><li>Provide a general estimate, exp</li></ol>			rings
which could result from implem			
System Changes	% Cost Savings	System Changes	% Cost Savings
Ventilation System Operations		Water Systems Operat	ions
Reduced ventilation		Repair all leaks	
Variable ventilation		Reduction of water	
Unoccupied area venti		Reduce hot water	
Repair of caulking & w		Increase chilled v	
Maintenance & repair			Subtotal 0
	Subtotal 0		
Heating & Cooling System Operation		Utility Plant & Distributi	
X Change in thermostat		Equipment cleani	
Provide locking thermo		Adjustment of air	
X Reset of air & water te		Combustion moni	
Unoccupied reset or sl			ves, fans, motors, etc.
Shut down non-critical		Steam Trap main	
	Subtotal 1198	Pipe insulation re	' 1
		Subtota	al Subtotal 0
L			
Lighting Systems Operations		Other Measures (include	ling water use)
X Reduce illumination le		_	
Maximize use of daylig			
X Install high efficiency la		<del> </del>	
Reduce or delete even		<u> </u>	
	Subtotal19093	4	Subtotal 0
			Totals 20291.0
		1	

19280 19280 Building Site (GSF)  RECOMMENDATIONS  BTUISE,FLYY.  \$154,FLYY.
8TU/\$q.Ft./Yr.
plementation
n opportunity to apply soler heating No
IT ASSESSMENT

\$20,291.00

5.6

3.0 Estimate of annual energy and water cost savings for above measures:

4.0 Projected simple payback period for above measures in years:

Energy Auditor Certification: Thereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or instituted buildings. If further certify that I have no financial referest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	Jeremy Dickson Texas Tech University-Physical Name of Energy Auditor Organization and Phone N									sical Plant	/ 806 742 1696 11/24/2005
									zation and Ph	one Numbe	er of Auditor Date
$\vdash$		CH UNIVERS	ITY	_			CHEMICAL		ING		Texas Tech university/Lubbock, Tx
1	Fac	lity Name					Building Na	me(s)		_	Building/Campus Address
											• ,
						as Tech Unit		_			
					Name	and Address	of Owner				
Building	ROILDI	NG DATA									
		_			TING SCHEE						BASIC HVAC CONTROL DATA
Size (a) 18776	Time Period: Hrs/Occupants/% GSF										
10//6	Days	(c)	Daylight		(d) Evening (e) Night						
	M-F						l				Central Bidg. Panel
Date (b)	IVI - F	12 Hrs	160	59%	4 Hrs	5	2%	0	0	0%	(f) Yes X No
Occupied	SAT	6 Hrs			1		1				· ·
1961	SAI	6 Firs	14	5%	0	0	0%	0	0	0%	EMS
1 "90"	SUN	6 Hrs	5	2%							(g) Yes X No
	3014	Lonis	L	2%	0	0	0%	0	0	0%	1
II MAJO	RENERO	YUSING	CVCTE	M C							
Primary	Primary		Space	W 3	Space		Domestic				
Heat	Cooling		Termina		Terminal		Hot Wate		Interior		Special Building
Source (h)			Heat (j.		Cooling (				Lighting		Systems & Facilities
Steam	Centrifuga		Fan ar		Fan an		Source (		_System (		(n)
Boiler	- Continue	o Grancia	1 all al	iu coii	ranan	u Coli	Heat Ex	cnanger	Fluore	scent	
1					1				1		
									ł		
									L		
III. UNIQ	UEBUIL	DINGCH	ARACTE	RISTICS							
1. Year rou	nd. 24 hour i	per day opera	tion			No _X_		6 linton			10
	per year ope					No		o. List yea	and type of t	major DUNO	ing modifications and additions.
	Program Us				Yes X	No					
4. Building	has exterior	floodlighting				No					
		, ,				-					
Form PUA 1											

														1
Building Nam	ie(s)	CHEMICAL E	NGINEERIN	IG			(a) Building			18776				
ENERGY US	SE AND COST	DATA		For Year End	ding:	8/31/2005		** Metered _	X Best	Estimate				
	FLEC	TRICITY		NAT	URAL GAS			WATER		P	URCHASED TI			TOTAL
Į	KWH	COST	S/KWH	MMBTU	COST	S/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WA		ENERGY
монтн		\$	4,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		s	1		\$	l	MMBTU	COST	TON HRS	COST	COSTS*
MONTH	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	GD	(kk)	(8)	(mm)	(nn)
September	36,640	\$2,382.00	\$0.07	18.57	\$118.88	\$6.40	43.15	\$115.16	\$2.67	50.08	\$554.61	9,835.42	\$1,318.24	\$4,488.89
October	34,080	\$2,121.06	\$0.06	21.37	\$120.42	\$5.64	23.17	\$70.22	\$3.03	83.71	\$954.64	8,304.78	\$1,151.70	\$4,418.05
November	32,960	\$1,892.30	\$0.06	31.02	\$230.04	\$7.42	18.34	\$60.15	\$3,28	123.38	\$1,731.23	5,282.49	\$864.83	\$4,778.56
December	33,760	\$2,049.75	\$0.06	41.80	\$290.19	\$6.94	17.48	\$63.23	\$3.62	151.28	\$1,782.50	4,643.67	\$676.32	\$4,861.99
January	38,400	\$2,355.65	\$0.06	47.82	\$308.05	\$6.44	14.95	\$56.26	\$3.76	151.69	\$1,747.07	4,968.31	\$660.28	\$5,127.32
	32,800	\$1,922.71	\$0.06	41.26	\$270.05	\$6.55	9.05	\$36.00	\$3.98	138.80	\$1,519.04	5,573,14	\$629.15	\$4,376.95
February			\$0.06	36.58	\$240.91	\$6.59	10.92	\$44.65	\$4.09	123.93	\$1,545,93	5.789.61	\$846.65	\$4,735.34
March	33,120	\$2,057.20		31,45	\$236.42	\$7.52	18.42	\$61.33	\$3.33	83.33	\$1,068.99	7.015.23	\$1.016.04	\$4,914.42
April	39,360	\$2,531.64	\$0.06			\$6.69	34.76	\$107.15	\$3.08	71.55	\$447.76	8.027.40	\$1,634,75	\$4,740,54
May	32,320	\$2,395.37	\$0.07	23.24	\$155.51			\$107.13	\$3.08	52.25	\$20.49	10.888.96	\$2,187.25	\$4,869.21
June	31,520	\$2,424.85	\$0.08	19.08	\$129.18	\$6.77	34.86				\$513.41	12,605.27	\$1,733,16	\$4,801.82
July	34,400	\$2,246.03	\$0.07	18.67	\$141.32	\$7.57	65.00	\$167.90	\$2.58	54.17			\$2.144.23	\$5,391.91
August	30,400	\$2,326.93	\$0.08	12.78	\$99.47	\$7.78	116.60	\$258.85	\$2.22	48.12	\$562.44	12,897.12	\$2,144.23	\$5,391.91
	D		Avg.	<b>2</b>		Avg.	3		Avg.	(4)		(5)		
Annual	409,760	\$26,705	\$0.07	343.64	\$2,340.45	\$6.86	406.69	\$1,148.32	\$3.23	1,132.30	\$12,448.11	95,831.41	\$14,862.61	\$57,504.98
Totals	1	l		] '				ŀ						

NNUAL ENERGY CONS	JMPTION IN BTU'S					ENERGY	UTILIZATIO	N INDEX (EUI)	
oo) Electricity	409760	KWH x 0.0116	=		ммвти	EUI =	Total Ann		MMBTU/Sq.Ft/Yr.
p) Nat. Gas	343.644367	MMBTU x 1.0	=		MMBTU			Gross Sq. Ft.	
q1) Steam/Hot Water	1132.303	MMBTU x 1.0	-	1132.303	MMBTU	EUI =	(uu)	7379.140288	
(q2) Steam	0	LBS x 0.001390	2	0	MMBTU		(a)	18776	
r) Chilled Water	95831.4099	TON HRS x 0.012	=	1149.976	MMBTU				
s) Propane or Butane	0	GAL x 0.095475	77	. 0	MMBTU	EUI =	(vv)	0.393009176	MMBTU/Sq.Ft./Yr.
t) Other Fuel	0	×	=	0	MMBTU				
•						ENERGY	COST INDE	X (ECI)	
	(uc	) TOTAL ANNUAL BTU'S =		7379.140	3_MMBTU	ECI =		nergy Costs Bross Sq. Ft.	\$/Sq.Ft./Yr.
						EC1 =	(nn)	57504.97887	
Do not include water cost	s (hh).						(a)	18776	
* Electricity is metered by						For -		3.062685283	\$/Sq.Ft./Yr.
he remaining values a	re metered at the Utilities Dep	partment				ECI =	(ww)	3.062685263	aroq.rt.m.
nd estimated by buildings	by using its gross square foot v	alue.				1			

 	 D V 1/4 A	T - D	 ENED	~ v	ALIDIT

PUA3

TEXAS TECH UNIVERSITY	CHEMICAL	ENGINEERING	18776
Facility Name	Building Na	ame(s)	Building Size(s) (GSF)
RECOM AND WATER CON Provide the following recommendations bas 1. Scheduled preventive maintenance piar In ExistenceXYesNo; 2. Provide g general estimate, expressed in which could result from implementing the provider of the provi	MENDED ENER ISERVATION MI sed on an on-site i n. Recommended as a range, of ann he following conse ist Savings	GY EASURES spection of building(s):  X. Yes No ual energy and water sav rivation measures. System Changes Water Systems Operati Repair ail leaks Reduction of wate Reducte hot water	rings % Cost Savings ons er consumption
Maintenance & repair or opera	ting controls ototal 288		Subtotal 0
Heating & Cooling System Operations Change in thermostat control of Provide locking thermostat cox X Reset of air & water temperatu Unoccupied reset or shut down Shut down non-critical exhaus	vers ires n of system	Utility Plant & Distributi Equipment cleani Adjustment of air/ Combustion moni Adjustment of dri Steam Trap main Pipe insulation re Subtota	ng fuel ration itoring & control ves, fans, motors, etc. tenance pair
Lighting Systems Operations  X Reduce illumination levels  Maximize use of daylight  X Install high efficiency lamps  Reduce or delete evening clea	ning hours btotal1841	Other Measures (includence) *** Noisy chiller area. Ear protection higly rec	-

	IMINARY WATER AND ENER				PUA4
EXAS T	ECH UNIVERSITY		L ENGINEERING	18776	
stitution	Name	Building N	ame	Building Size (GSF)	
	ENERGY AND WATER	CONSERVATION	MEASURE RETROFIT	RECOMMENDATIONS	
1.0	Basic Building Data 1.1 Annual Ene	ergy Use 0.393009	2	BTU/Sq.Ft./Yr.	
	1.2 Annual Ene	ergy Cost 3.062685	3	\$/Sq.Ft./Yr.	
	1.3 Describe physical condition of building envel	lope: Good con	dition		
	1.4 Describe physical condition of building energ	gy and water-using systems	Regular condition		
- 2.0	Based on 1.1 - 1.4 above, indicate the need and parely outline recommended retrofit options:				
	Lighting retrofit				
	VFD installation on AHU#1				
	Reset schedule				
	Economizer				
3.0	Based on auditor evaluation, indicate whether or and/or cooling systems, or solar domestic hot wa		and/or site characteristics present X Yes	an opportunity to apply solar neating	
	and/or cooling systems, or solar domestic not wa	ter neating systems.		110	
	ENERGY AND WAT	ER CONSERVATION	N MEASURE RETROF	IT ASSESSMENT	
1.0	Describe proposed energy conservation measure Install VFD on AHU#1's fan motors	es: Retrofit (e	fficiency/illumination level) existing	g lighting system	
	Adjust AHU's reset schedule				
	Adjust AHU's economizer operation setpoint	\$16.173.51			
2.0	Estimate of installed cost of above measures:	\$10,173.31			
3.0	Estimate of annual energy and water cost saving	s for above measures:	\$2,244.00		
4.0	Projected simple payback period for above meas	ures in years:	7.2		

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that they en financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building outfligurations.

	J	eremy Dicks	on				Te	xas Tech U	niversity-Phys	sical Plant /	/ 806 742 1696	11/24/2005
	Name	of Energy A	uditor	•				Organiz	ation and Pho	one Numbe	er of Auditor	Date
	TEXAS TEC	HUNIVERS	TY			CHARLES	MAEDGEN TI	HEATRE			Texas Tech univers	ity/Lubbock, Tx
	Faci	lity Name		-			Building Nan	ne(s)			Building/Campus A	ddress
					Tex	as Tech Univ	versity					
					Name	and Address	of Owner					
I. BASIC	BUILDI	NG DATA										
Building					TING SCHEE						BASIC HVAC CONTROL (	DATA
Size (a)				Time Period	riod: Hrs/Occupants/% GSF							
32958	Days	(c) E	aylight		(d) Evening (e) Night				Night			
					1						Central Bidg, Panel	
	M-F	12 Hrs	100	53%	0	0	0%	0	0	0%	(f) Yes X No	1
Date (b)												1
Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS	
1964										İ	(g) Yes X No	i
	SUŃ	0 Hrs	0	0%	0	0_	0%	0	0	0%		
		SYUSING										
Primary	Primary		Space		Space		Domesti		Interior		Special Building	
Heat	Cooling		Termina		Termina		Hot Wate		Lighting		Systems & Facilities	
Source (h)	Source		Heat (		Cooling.		Source (		System (		(n)	
Steam	Centrifuga	t Chillers	Fana	nd Coil	Fan ai	nd Coil	Heat Ex	changer	Fluore	scent		
Boiler	1				1				i			
1	1				1		1					
			L		L		L		L			
	NIQUE BUILDING CHARACTERISTICS											
	Year round, 24 hour per day operation Yes No X  5. List year and type of major building modifications and additions.											
	per year ope					No						
3. Summer Program Use Yes X No												
4. Building	has exterior	floodlighting			Yes X	No						
1												i

Building Nam	Building Name(s) CHARLES MAEDGEN THEATRE (a) Building Size(s) (Gross Sq. Ft.) 32958													
ENERGY US	SE AND COST	DATA		For Year En	ding:	8/31/2005		** Metered	X Best	Estimate	X			
	ELEC	CTRICITY		NAT	URAL GAS			WATER		P	URCHASED TI	HERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	TWATER	CHILLED WA	TER	ENERGY
MONTH		\$	l		\$	l		\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	60,960	\$3,963	\$0.07	32.59	\$208.67	\$6.40	75.74	\$202.14	\$2.67	87.91	\$973.53	17,264.36	\$2,313.94	\$7,661.34
October	62,760	\$3,906	\$0.06	37.50	\$211.38	\$5.64	40.67	\$123.25	\$3.03	146.93	\$1,675.71	14,577.60	\$2,021.61	\$7,937.99
November	63,240	\$3,631	\$0.06	54.45	\$403.79	\$7.42	32.19	\$105.59	\$3.28	216.57	\$3,038.87	9,272.49	\$1,518.06	\$8,697.06
December	58,560	\$3,555	\$0.06	73.38	\$509.39	\$6.94	30.68	\$110.98	\$3.62	265.55	\$3,128.86	8,151.15	\$1,187.16	\$8,491.89
January	61,800	\$3,791	\$0.06	83.94	\$540.73	\$6.44	26.24	\$98.76	\$3.76	266.27	\$3,066.69	8,721.01	\$1,159.01	\$8,656.30
February	60,960	\$3,573	\$0.06	72.42	\$474.03	\$6.55	15.88	\$63.18	\$3.98	243.64	\$2,666.41	9,782.68	\$1,104.36	\$7,881.42
March	56,520	\$3,511	\$0.06	64.20	\$422.88	\$6.59	19.17	\$78.37	\$4.09	217.54	\$2,713.61	10,162.66	\$1,486.15	\$8,211.66
April	76,200	\$4,901	\$0.06	55.21	\$415.00	\$7.52	32.33	\$107.65	\$3.33	146.28	\$1,876.43	12,314.01	\$1,783.48	\$9,083.75
May	56,280	\$4,171	\$0.07	40.79	\$272.98	\$6.69	61.02	\$188.09	\$3.08	125.60	\$785.96	14,090.71	\$2,869.53	\$8,287.69
June	55,320	\$4,256	\$0.08	33.49	\$226.75	\$6.77	61.19	\$188.59	\$3.08	91.72	\$35.96	19,113.67	\$3,839.34	\$8,546.44
July	58,440	\$3,816	\$0.07	32.78	\$248.05	\$7.57	114,10	\$294.72	\$2.58	95.09	\$901.20	22,126.37	\$3,042.27	\$8,301.88
August	52,680	\$4,032	\$0.08	19.51	\$151.83	\$7.78	204.67	\$454.37	\$2.22	84.46	\$987.26	22,638.66	\$3,763.82	\$9,389.60
	$\rho$		Avg.	<b>2</b>		Avg.	3		Avg.	<b>(</b> )		(5)		
Annual	723,720	\$47,107	\$0.07	600.28	\$4,085.47	\$6.86	713.88	\$2,015.67	\$3.23	1,987.56	\$21,850.49	168,215.36	\$26,088.73	\$101,147.01
Totals	L	L		l						L		L		L

NNUAL ENERGY CONSL	JMPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
oo) Electricity	723720	KWH x 0.0116	=	8395.152	MMBTU	EUI =	Total Annu	ai BTU's	MMBTU/Sq.Ft/Yr.
pp) Nat. Gas	600.280877	MMBTU x 1.0	22	600.28088	MMBTU	l	Building Gr	oss Sq. Ft.	
qq1) Steam/Hot Water	1987.56084	MMBTU x 1.0	=	1987.5608	MMBTU	EUI =	(uu)	13001.57804	
qq2) Steam	0	LBS x 0.001390	=	0	MMBTU	1	(a)	32958	
rr) Chilled Water	168215.36	TON HRS x 0.012	=	2018.5843	MMBTU	1			
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.394489291	MMBTU/Sq.Ft/Yr.
tt) Other Fuel	0	x	=	0	MMBTU	l			
		_				ENERGY	COST INDEX	(ECI)	
	(uu) TOT	AL ANNUAL BTU'S =		13001.578	MMBTU	ECI =	Annual End	ergy Costs	\$/Sq.Ft,/Yr.
						1	Building Gr	oss Sq. Ft.	
						ECI =	(nn)	101147.0056	
Do not include water costs	(hh).					1	(a)	32958	
* Electricity is metered by t	oulding.					1			
The remaining values are	e metered at the Utilities Departme	nt				ECI =	(ww)	3.068966733	\$/Sq.Ft./Yr.
nd estimated by buildings	by using its gross square foot value.					1			
orm PUA 2									

TEXAS TECH UNIVERSITY	CHARLES	MAEDGEN THEATRE	32958
Facility Name	Building Na	me(s)	Building Size(s) (GSF)
Provide the following recommendations b  1. Scheduled preventive maintenance pin Existence X Yes No;  2. Provide a general estimate, expresse which could result from implementing.  System Changes % Contiliation System Operations Reduced ventilation  X Variable ventilation  Unoccupied area ventilation  Repair of caulking & weather Maintenance & repair or ope	an. Recommended d as a range, of annu the following consei cost Savings shut down stripping	ASURES aspection of building(s):  X Yes No ual energy and water savi	% Cost Savings
Heating & Cooling System Operations Change in thermostat contro Provide locking thermostat c X Reset of air & water tempera Unoccupied reset or shut do Shut down non-critical exhau	overs tures wn of system	Utility Plant & Distributio Equipment cleanir Adjustment of air/f Combustion monit Adjustment of driv Steam Trap maint Pipe insulation reg	ng uel ration oring & control es, fans, motors, etc. enance pair
Lighting Systems Operations Reduce illumination levels Maximize use of daylight Install high efficiency lamps Reduce or delete evening cl	eaning hours ubtotal 0	Other Measures (including the Noisy chiller area.  Ear protection higly recommendation in the Noisy chiller area.	,

EXAS TE	CH UNIVERSITY			CHARI	ES MAEDGEN THEATRE	E 329	58	^
nstitution	Name		_	Buildin	g Name	Bui	ding Size (GSF)	
	ENERG	YAND	WATER CO	ONSERVATION	MEASURE RET	ROFIT RECOMMENDAT	IONS	-
1.0	Basic Building Data	1.1	Annual Energ	y Use 0.3944	1893	BTU/Sq.Ft./Yr.		
		1.2	Annual Energ	y Cost 3.0689	9667	\$/Sq.Ft./Yr.		
	1.3 Describe physical of	ondition of	building envelop	e: Good o	condition			
	1.4 Describe physical of	ondition of	building energy a	and water-using syste	ms: Good co	ondition		
2.0	Based on 1.1 - 1.4 above Briefly outline recommer			**	water conservation measur	re retrofit implementation.		
	VFD installation on AHU	s						
	Reset schedule							
	Economizer							
3.0	Based on auditor evalua and/or cooling systems,					cs present an opportunity to apply so Yes No	lar heating	
	EN	ERGY A	ND WATER	CONSERVAT	ION MEASURE R	ETROFIT ASSESSMEN	г	-
1.0	Describe proposed ener Install VFDs on AHU's fa	n motors	ation measures:					
	Adjust AHU's reset sche	dule						
	Adjust AHU's economize							
2.0	Adjust AHU's economize Estimate of installed cos			\$15,190.33				
2.0		t of above r	neasures:		\$6,292	2.00		

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating house, and building configurations.

		Jeremy Dicks	on				т	exas Tech U	niversity-Phys	sical Plant /	/ 806 742 1696 11/24/2005
	Nam	e of Energy A	uditor						ation and Pho	one Numbe	er of Auditor Date
	TEXAS TEC	CH UNIVERS	ITY			CENTRAL I	HEATING AN	ID COOLING	PLANTI		Texas Tech university/Lubbock, Tx
	Fac	lity Name		-			<b>Building Na</b>	me(s)			Building/Campus Address
					Tex	as Tech Univ	versity				
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building					TING SCHE					BASIC HVAC CONTROL DATA	
Size (a)	J			Time Period	: Hrs/Occu	pants/% GSF					
80766	Days	(c) E	Daylight		(d) E	vening		(e)	Night		
!											Central Bidg. Panel
	M-F	12 Hrs	35	28%	4 Hrs	4	3%	8 Hrs	4	3%	(f) Yes <u>X</u> No
Date (b)				1			I	l			
Occupied	SAT	12 Hrs	4	3%	4 Hrs	4	3%	8 Hrs	4	3%	EMS :
1968							ĺ	1			(g) Yes X No
	SUN	12 Hrs	4	3%	4 Hrs	4	3%	8 Hrs	4	3%	<u> </u>
		GYUSINO									
Primary	Primary		Space		Space		Domest		Interior		Special Building
Heat	Cooling		Termina		Termina		Hot Wa		Lighting		Systems & Facilities
Source (h)			Heat (j		Cooling		Source		System (		(n)
Steam	Centrifuga	ol Chillers	Fan a	nd Coil	Fana	nd Coil	Heat E	changer	Fluore	scent	Operation room
Boiler	-								1		Machine room
Purchased									İ		Electrical substation
steam											
		DING CH		RISTICS							
		per day opera	ation		Yes X	No					ling modifications and additions.
	per year op				Yes	No X			ers (4) install	ation	
	Program Us				Yes	No _X_		Boiler instal			
4. Building	has exterior	floodlighting			Yes X	No		Chiller (2) in			· · · · · · · · · · · · · · · · · · ·
								Office build	ing annex		

Building Na	ne(s)	CENTRAL HI	EATING AND	COOLING PLAN	TI		(a) Building	Size(s) (Gros	ss Sq. Ft.)	80766				
ENERGY L	SE AND COST	DATA		For Year Ending:		8/31/2005		Metered X	Best Est	imate				
	ELECT	RICITY		NATURA	L GAS			WATER		PURCHASED THERMAL				TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	TWATER	CHILLED WA	TER	ENERGY
MONTH		\$			s			\$	l	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(0)	on on	(kk)	(11)	(mm)	(nn)
September	1,102,000	\$71,642	\$0.07	56,181.10	\$287,720.50	\$5.12	1,224.00	\$4,246.86	\$3.47	215 43	\$2,385.70	42,307.58	\$5,670.48	\$371,665.50
October	697,200	\$43,392	\$0.06	56,452.50	\$269,151.00	\$4.77	2,102.00	\$7,297.27	\$3.47	360,07	\$4,106.46	35,723.48	\$4,954.11	\$328,900.93
November	662,000	\$38,007	\$0.06	72,216.50	\$338,013.52	\$4.68	1,504.00	\$5,403.88	\$3.59	530.73	\$7,446.98	22,722.93	\$3,720.11	\$392,591.31
December	558.000	\$33.879	\$0.06	74,664.20	\$405,235.91	\$5.43	1,650.00	\$5,940.85	\$3.60	650.75	\$7,667.50	19,974.99	\$2,909.23	\$455,632.72
January	558,800	\$34,280	\$0.06	78,753,70	\$449,296.78	\$5.71	1,427.00	\$5,086.68	\$3.56	652.51	\$7,515.14	21,371.46	\$2,840.24	\$499,018.42
February	480,400	\$28,161	\$0.06	78,152.50	\$438,182.12	\$5.61	1,263.00	\$4,592.27	\$3.64	597.07	\$6,534.24	23,973.18	\$2,706.32	\$480,175.67
March	512,400	\$31,827	\$0.06	71,574.90	\$398,184.31	\$5.56	1,634.00	\$5,812.99	\$3.56	533.09	\$6,649.89	24,904.34	\$3,641.92	\$446,116.10
April	763,200	\$49,089	\$0.06	66,070.20	\$369,950.30	\$5.60	1,401.00	\$4,966.27	\$3.54	358.47	\$4,598.34	30,176.39	\$4,370.54	\$432,974.57
May	930,800	\$68,985	\$0.07	48,985.10	\$272,062.95	\$5.55	1,189.00	\$4,195.40	\$3.53	307.80	\$1,926.05	34,530.31	\$7,031.99	\$354,201.80
June	1,257,200	\$96,717	\$0.08	41,530.50	\$277,128.12	\$6.67	1,412.00	\$4,998.65	\$3.54	224.76	\$88.13	46,839.45	\$9,408.59	\$388,340.63
July	1,554,800	\$101,515	\$0.07	38,775.50	\$243,193.04	\$6.27	1,310.00	\$4,608,19	\$3.52	233.02	\$2,208.47	54,222.29	\$7,455.30	\$358,980.22
August	1,298,000	\$99,354	\$0.08	41,480.30	\$322,713.12	\$7.78	1,442.00	\$5,147.83	\$3.57	206.98	\$2,419.35	55,477.69	\$9,223.51	\$438,857.57
	1)		Avg.	2)		Avg.	3		Avg.	<b>(</b>		<b>5</b>		
Annual	10,374,801.00	\$696,848	\$0.07	724,837.00	\$4,070,831.67	\$5.73	17,558.00	\$62,297.14	\$3.55	4,870.66	\$53,546.23	412,224.10	\$63,932.34	\$4,947,455.44
Totals				L				L		L			L	

NNUAL ENERGY CONSU	MPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
oo) Electricity	10374801	KWH x 0.0116	=	120347.692	MMBTU	EUI =	Total Annua	ai BTU's	MMBTU/Sq.Ft/Yr.
op) Nat. Gas	724837	MMBTU x 1.0	=	724837	MMBTU		Building Gr	oss Sq. Ft.	
gg1) Steam/Hot Water	4870.66384	MMBTU x 1.0	3	4870.66384	MMBTU	EUI =	(uu)	855002.0446	
qq2) Steam	0	1.8S x 0.001390	=	0	MMBTU		(a)	80766	
rr) Chilled Water	412224.097	TON HRS x 0.012	=	4946.68917	MMBTU				
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	10.58616305	MMBTU/Sq.Ft./Yr.
tt) Other Fuel	0	×	=	0	MMBTU	i			
					_	ENERGY	COST INDEX	(ECI)	
		(uu) TOTAL ANNUAL BTU'S =		855002.045	MMBTU	ECI =	Annual Ene	rgy Costs	\$/Sq.Ft/Yr.
					-	į.	Building Gr	oss Sq. Ft.	
						ECI =	(nn)	4947455.441	
Do not include water costs	(hh).					i	(a)	80766	
	• •					1			
						ECI =	(ww)	61.25666049	\$/Sq.Ft/Yr.

TEXAS TECH UNIVERSITY	CENTRAL HEATING	AND COOLING PLANT I	80766
Facility Name	Building		Building Size(s) (GSF)
Provide the following recommend:  1. Scheduled preventive mainter In ExistenceX Yes  2. Provide a general estimate, ex	nance plan. No; Recommende xpressed as a range, of al	MEASURES e inspection of building(s): dYesNo nnual energy and water say	vings
which could result from imple System Changes	menting the following con % Cost Savings	System Changes	% Cost Savings
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ven Repair of caulking & Maintenance & repair		Water Systems Operat Repair all leaks Reduction of wate Reduce hot wate Increase chilled v	er consumption
Heating & Cooling System Operat Change in thermosta Provide locking ther Reset of air & water t Unoccupied reset or : Shut down non-critica	t control set points nostat covers emperatures shut down of system	Steam Trap main Pipe insulation re Subtot	ing  Ifuel ration  Itoring & control  ves, fans, motors, etc.  tenance  pair  al Subtotal 0
Lighting Systems Operations  Reduce illumination leading	evels	Other Measures (includ	ling water use) am Energy Recovery

Subtotal 0

Subtotal

Totals

566410

Form PUA 3

Reduce illumination levels Maximize use of daylight Install high efficiency lamps Reduce or delete evening cleaning hours

# ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT Describe proposed energy conservation measures: Install side stream waste heat recovery system on boiler

Based on auditor evaluation, indicate whether or not the building conditions and/or site characteristics present an opportunity to apply solar heating

2.0 Estimate of installed cost of above measures: \$500,000.00

3.0 Estimate of annual energy and water cost savings for above measures:

and/or cooling systems, or solar domestic hot water heating systems.

\$566,410.00

X Yes No

4.0 Projected simple payback period for above measures in years:

0.9

3.0

1.0

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	Jeremy Dickson						т	exas Tech U	niversity-Phy:	sical Plant/	806 742 1696	24/2005
	Name	of Energy A	uditor						ation and Pho	ne Numbe		Date
	TEXAS TEC	HUNIVERS	ITY			_	BUSINES	S ADMINIST	RATION		Texas Tech university/	Lubbock, Tx
	Facility	Name					В	uilding Name	(S)		Building/Campus	Address
1												
						as Tech Univ						
					Name	and Address	of Owner					
	BUILDI	NG DATA										
Building					TING SCHE					_	BASIC HVAC CONTROL DATA	
Size (a)				Time Period		pants/% GSF						
204495	Days	(c) [	Daylight		(d) E	vening		(e)	Night			
1		ŀ									Central Bldg. Panel	
	M-F	11 Hrs	4090	60%	3 Hrs	200	3%	0 Hrs	0	0%	(f) Yes X No	
Date (b)		ļ.										
Occupied	SAT	9 Hrs	400	6%	0 Hrs	0	0%	0 Hrs	0	0%	EMS	
1969						ĺ	l				(g) Yes X No	
	SUN	10 Hrs	200	3%	0 Hrs	0	0%	0 Hrs	0	0%		
		SYUSINO		MS								
Primary	Primary		Space		Space		Domest		Interior		Special Building	
Heat	Cooling		Termina		Termina		Hot Wat		Lighting		Systems & Facilities	
Source (h)			Heat (j		Cooling		Source		System (		(n)	
Steam	Centrifuga	d Chillers	Fan a	nd Coil	Fan ar	nd Coil	Heat Exc	:hanger	Fluore	scent		
Boiler							i					
			i				1					
	L		L				I		L		-l	
		DINGCH		RISTICS								
		per day oper	ation		Yes	No X					ing modifications and additions.	
	per year ope				Yes X	No		Recommiss	ioning - FY00			
	Program Us				Yes _X							
4. Building	has exterior	floodlighting			Yes X	No						

Building Nan	no/e\	BUSINESS AD	MINICTOAT	ION			(a) Buildin	g Size(s) (Gros	s So Ft)	204,495				
	SE AND COST			For Year E	odina	8/31/2005	(a) Duildin	** Metered		imate X				
LIVEINGT O		ECTRICITY			NATURAL GAS						PURCHASED THERMAL			
	KWH	COST	S/KWH	MMBTU		\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-	HOT WATER		WATER	TOTAL ENERGY
MONTH	1000	<b>e</b> ,	<b>4</b> //( <b>4</b> //)	, mind	\$			s	*****	MMBTU	COST	TON HRS	COST	COSTS*
, mortini	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	GD	(kk)	(0)	(mm)	(nn)
September	187,680	\$ 12,201,24	\$ 0.07	202.22	\$ 1,294.76	\$ 6.40	469.95	\$ 1,254.20	\$ 2.67	545.46	\$6,040.45	107,120.43	\$ 14,357.33	\$ 35,147.98
October	170,160	\$ 10,590,36	\$ 0.06	232.70	\$ 1,311.54	\$ 5.64	252.35	\$ 764.76	\$ 3.03	911.67	\$10,397.32	90,449.86	\$ 12,543.53	\$ 35,607.52
November	156,480	\$ 8,983,85	\$ 0.06	337,84	\$ 2,505.43	\$ 7.42	199.71	\$ 655.14	\$ 3.28	1,343.77	\$18,855.34	57,533.19	\$ 9,419.12	\$ 40,418.88
December	158,880	\$ 9,646.47	\$ 0.06	455.30	\$ 3,160.59	\$ 6.94	190.38	\$ 688.61	\$ 3.62	1,647.66	\$19,413.69	50,575.56	\$ 7,366.01	\$ 40,275.37
January	170,160	\$ 10,438.46	\$ 0.06	520.82	\$ 3,355.05	\$ 6.44	162.83	\$ 612.76	\$ 3.76	1,652.11	\$19,027.91	54,111.35	\$ 7,191.33	\$ 40,625.52
February	156,960	\$ 9,200.89	\$ 0.06	449.37	\$ 2,941.21	\$ 6.55	98.56	\$ 392.03	\$ 3.98	1,511.74	\$16,544.32	60,698.76	\$ 6,852,25	\$ 35,930.70
March	159,840	\$ 9,928.23	\$ 0.06	398.37	\$ 2,623.82	\$ 6.59	118.92	\$ 486.28	\$ 4.09	1,349.76	\$16,837.15	63,056.40	\$ 9,221.14	\$ 39,096.62
April	185,520	\$ 11,932.67	\$ 0.06	342.55	\$ 2,574.95	\$ 7.52	200.61	\$ 667.91	\$ 3.33	907.62	\$11,642.74	76,404.93	\$ 11,065.96	\$ 37,884.24
May	161,040	\$ 11,935.34	\$ 0.07	253.12	\$ 1,693.73	\$ 6.69	378.62	\$ 1,167.01	\$ 3.08	779.32	\$4,876.64	87,428.82	\$ 17,804.60	\$ 37,477.32
June	169,440	\$ 13,035.12	\$ 0.08	207.82	\$ 1,406.92	\$ 6.77	379.65	\$ 1,170.14	\$ 3.08	569.07	\$223.13	118,594.88	\$ 23,822.02	\$ 39,657.33
July	185,280	\$ 12,097.21	\$ 0.07	203.38	\$ 1,539.11	\$ 7.57	707.94	\$ 1,828.62	\$ 2.58	589.99	\$5,591.71	137,287.80	\$ 18,876.40	\$ 39,933.06
August	163,440	\$ 12,510.31	\$ 0.08	68.51	\$ 533.06	\$ 7.78	1,269.89	\$ 2,819.21	\$ 2.22	524.07	\$6,125.66	140,466.42	\$ 23,353.41	\$ 45,341.65
	(I)		Avg.	2)	1		3		Avg.	(4)	Į.	(5)		
Annual	2,024,881	\$132,500.14	\$ 0.07	3,672	\$ 24,940.18	\$ 6.86	4,429	\$ 12,506.69	\$ 3.23	12,332.25	\$ 135,576.06	1,043,728	\$161,873.11	\$ 467,396.18
Totals							L	L	L	L	L		L	

INNUAL ENERGY CONSUM	MPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
oo) Electricity	2.024.881	KWH x 0.0116	=	23,489	ммвти	EUI =	Total Annua	al BTU's	MMBTU/Sq.Ft/Yr.
pp) Nat. Gas	3,672	MCF x 1,00	=	3,672	MMBTU	1	Building Gr	oss Sq. Ft.	
qq1) Steam/Hot Water	12.332	MMBTU x 1.0	#.	12,332	MMBTU	EUI =	(uu)	52,018	
qq2) Steam		LBS x 0.001390	-	-	MMBTU	1	(a)	204,495	
rr) Chilled Water	1,043,728	TON HRS x 0.012	de	12,525	MMBTU	1			
ss) Propane or Butane		GAL x 0.095475	-	-	MMBTU	EUI =	(vv)	0.254371071	MMBTU/Sq.Ft/Yr.
tt) Other Fuel		x	-	-	MMBTU	1			
						ENERGY	COST INDEX	(ECI)	
		(uu) TOTAL ANNUAL BTU'S =		52,018	MMBTU	ECI =	Annual Enc	rgy Costs	\$/Sq.Ft./Yr.
						1	Building Gr		
						ECI =	(nn)	467,396	
Do not include water costs (	hh).					1	(a)	204,495	
* Electricity is metered by bu	uilding.					1			
The remaining values are me	etered at the Utilities Depar	tment				ECI =	(ww)	2.285611797	\$/Sq.Ft./Yr.
nd estimated by buildings b	v using its gross square fo	ot value.				1			

DDEI	IMINADV	WATED	ANDENERGY	AUDIT

PUA3

TEXAS TECH UNIVERSITY	BUSINESS	ADMINISTRATION	204495
Facility Name	Building Na	me(s)	Building Size(s) (GSF)
AND WATER C Provide the following recommendations 1. Scheduled preventive maintenance In Existence X Yes N 2. Provide a general estimate, express	plan. lo; Recommended sed as a range, of anni	ASURES aspection of building(s):  X Yes No ual energy and water say	ings
which could result from implementi			
	Cost Savings	System Changes	% Cost Savings
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventilation Repair of caulking & weath Maintenance & repair or or	nerstripping	Water Systems Operat Repair all leaks Reduction of wate Reduce hot water Increase chilled w	er consumption temperature
Heating & Cooling System Operations		Utility Plant & Distribution	on System Oper.
Change in thermostal cont Provide locking thermostal X Reset of air & water tempe Unoccupied reset or shut Change Shut down non-critical exh	covers ratures down of system	Steam Trap main Pipe insulation re	fuel ration toring & control yes, fans, motors, etc. tenance
Lighting Systems Operations  X Reduce illumination levels  Maximize use of daylight  X Install high efficiency lamp  Reduce or delete evening	s	Other Measures (included)	ling water use)
Vennce or delete averally.	Subtotal 20132	<u>-</u>	Subtotal 0 Totals 21067.0

	CH UNIVERSITY		BUSINESS	ADMINISTRATION	204	495
stitution		-	Building Na	ime	Buildir	ng Size (GSF)
	ENERG	YAND	WATER CONSER	VATION MEAS	JRE RETROFIT RECOMMENDATION	NS
1.0	Basic Building Data	1.1	Annual Energy Use	0.2543711	BTU/Sq.Ft./Yr.	
		1.2	Annual Energy Cost	2.2856118	\$/Sq.Ft./Yr.	
	1.3 Describe physical	ondition of	building envelope:	Good condition		
	1.4 Describe physical	ondition of	building energy and water-	using systems:	Good condition	
2.0	Based on 1.1 - 1.4 abov Briefly outline recomme Reset schedules			energy and water conse	vation measure retrofit implementation.	
	Time of day schedule o	timization				
	Economizers High efficiency lighting					
3.0	Based on auditor evalua		ite whether or not the buildi mestic hot water heating sy		e characteristics present an opportunity to apply solaX Yes No	heating
-	EN	ERGY	AND WATER CON	SERVATION ME	ASURE RETROFIT ASSESSMENT	
	Describe proposed ene Adjust AHU's reset sche		ation measures:	Retrofit (efficiency/	flumination level) existing lighting system	
1.0						
1.0	Adjust AHU's economiz	er operation				
2.0		er operation operation s	chedule	.41		
	Adjust AHU's economiz Update building utilities Estimate of installed co	er operation operation s at of above	chedule		\$21,067.00	

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		leremy Dicks					Te				806 742 1696 11/22/2005
	Nam	e of Energy A	uditor					Organiz	ation and Pho	ne Numbe	r of Auditor Date
	TEXAS TEC	CH UNIVERS	ITY				<b>ENGLISH &amp;</b>	PHILOSOP	HY		Texas Tech university/Lubbock, Tx
	Faci	lity Name		-		•	Building Na	me(s)			Building/Campus Address
1											
					Tex	as Tech Univ	ersity				
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building	L				TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup	ants/% GSF					
68100	Days	(c) l	Daylight		(d) E	vening		(e)	Night		
1											Central Bidg. Panel
	M-F	12 Hrs	3090	63%	4 Hrs	98	2%	0	0	0%	(f) Yes X No
Date (b)	i										
Occupied	SAT	6 Hrs	245	5%	0	0	0%	0	0	0%	EMS
2002											(g) Yes X No
	SUN	6 Hrs	98	2%	0	0	0%	0	0	0%	1
		SY USIN		MS							
Primary	Primary		Space		Space		Domesti	ic	Interior		Special Building
Heat	Cooling		Termina		Termina	1	Hot Wat	er	Lighting		Systems & Facilities
Source (h)	Source	(i)	Heat (j		Cooling (	k)	Source (	(1)	System (	m)	(n)
Steam	Centrifuga	I Chillers	Fan a	nd Coil	Fan ar	d Coil	Heat Ex	changer	Fluore	scent	
Boiler	1		1								
	l		1								
	<u></u>		1								
III. UNIQ				RISTICS							
		per day oper	ation			No X		<ol><li>List yea</li></ol>	r and type of i	major build	ling modifications and additions.
	per year ope				Yes X						
	Program Us				Yes X	No					
4. Building	has exterior	floodlighting			Yes X	No					
L											

Building Nar	ne(s)	ENGLISH &	PHILOSOPH	Υ			(a) Building	Size(s) (Gro	oss Sq. Ft.)	68100				
ENERGY U	SE AND COS	T DATA		For Year En	ding:	8/31/2005		** Metered	X Best	Estimate	κ			
	ELEC	TRICITY		NAT	URAL GAS			WATER		P	URCHASED TH	HERMAL		TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$		1	\$		l	\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	88,000	\$5,721	\$0.07	118.67	\$759.78	\$6.40	275.77	\$735.98	\$2.67	320.08	\$3,544.60	62,859.49	\$8,425.05	\$19,186.37
October	75,600	\$4,705	\$0.06	136.55	\$769.63	\$5.64	148.08	\$448.77	\$3.03	534.98	\$6,101.26	53,077.01	\$7,360.69	\$19,385.52
November	78,000	\$4,478	\$0.06	198.25	\$1,470.21	\$7.42	117.19	\$384.44	\$3.28	788.54	\$11,064.53	33,761.13	\$5,527.25	\$22,924.58
December	82,400	\$5,003	\$0.06	267.18	\$1,854.67	\$6.94	111.72	\$404.08	\$3.62	966.87	\$11,392.17	29,678.31	\$4,322.46	\$22,976.34
January	116,400	\$7,141	\$0.06	305.62	\$1,968.78	\$6.44	95.55	\$359.58	\$3.76	969.48	\$11,165.79	31,753.16	\$4,219.95	\$24,854.66
February	106,000	\$6,214	\$0.06	263.69	\$1,725.94	\$6.55	57.84	\$230.05	\$3.98	887.11	\$9,708.40	35,618.73	\$4,020.98	\$21,899.01
March	87,600	\$5,441	\$0.06	233.77	\$1,539.69	\$6.59	69.78	\$285.35	\$4.09	792.06	\$9,880.23	37,002.21	\$5,411.07	\$22,557.49
April	102,000	\$6,561	\$0.06	201.01	\$1,511.01	\$7.52	117.72	\$391.94	\$3.33	532.60	\$6,832.09	44,835.28	\$6,493.63	\$21,789.33
May_	78,800	\$5,840	\$0.07	148.53	\$993.90	\$6.69	222.18	\$684.82	\$3.08	457.31	\$2,861.67	51,304.23	\$10,447.94	\$20,828.52
June	70,800	\$5,447	\$0.08	121.95	\$825.59	\$6.77	222.78	\$686.65	\$3.08	333.94	\$130.94	69,592.83	\$13,979.03	\$21,068.90
July	74,000	\$4,832	\$0.07	119.35	\$903.17	\$7.57	415.43	\$1,073.06	\$2.58	346.22	\$3,281.28	80,562.05	\$11,076.89	\$21,165.96
August	68,400	\$5,236	\$0.08	159.50	\$1,240.93	\$7.78	745.19	\$1,654.34	\$2.22	307.53	\$3,594.61	82,427.30	\$13,704.05	\$25,429.52
	$\cup$		Avg.	(2)		Avg.	(3)	1	Avg.	<b>(4)</b>		5)		
Annual	1,028,000	\$66,617	\$0.07	2,274.06	\$15,563.31	\$6.86	2,599.23	\$7,339.07	\$3.23	7,236.70	\$79,557.58	612,471.73	\$94,988.99	\$264,066.21
Totals							l	l		L			l	

ANNL	AL ENERGY CONSU	JMPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
(00)	Electricity	1028000	KWH x 0.0116	=	11924.8	MMBTU	EUI =	Total Annua	al BTU's	MMBTU/Sq.Ft/Yr.
pp)	Nat. Gas	2274.06383	MMBTU x 1.0	=	2274.0638	MMBTU	ì	Building Gr	oss Sq. Ft.	
qq1)	Steam/Hot Water	7236.70431	MMBTU x 1.0	=	7236.7043	MMBTU	EUI ∞	(uu)	28785.22889	
qq2)	Steam	0	LBS x 0.001390	=	0	MMBTU	1	(a)	68100	
rr)	Chilled Water	612471.729	TON HRS x 0.012	=	7349.6608	MMBTU				
SS)	Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.422690586	MMBTU/Sq.Ft./Yr.
tt)	Other Fuel	0	x	=	0	MMBTU				
							ENERGY	COST INDEX	(ECI)	
			(uu) TOTAL ANNUAL BTU'S =		28785.229	MMBTU	ECI =	Annual Ene	rgy Costs	\$/Sq.Ft./Yr.
								Building Gr	oss Sq. Ft.	
							ECI =	(nn)	264066.2089	
'Do n	ot include water costs	(hh).						(a)	68100	
* Ele	stricity is metered by t	ouilding.								
he r	emaining values are	e metered at the Utilities (	Department				ECI =	(ww)	3.877624213	\$/Sq.Ft./Yr.
nd e	stimated by buildings	by using its gross square for	t value,				1			

_	_	_					_			 _	_	_	_	-						_	_	_							
P	R	Е	Ł	м	N	Α	R	Υ	W	١	Г	F	R	Δ	N	חו	) F	= 1	N	F	R	G	. `	Δ	ш	г	٦1	ıπ	Г

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	K AND LITER		AUDII		FUAS
TEXAS TECH UNIVERSITY	ENGLISH 8			68100	
Facility Name	Building Na	me(s)		Building Size	e(s) (GSF)
	COMMENDED ENER				
	CONSERVATION ME				ĺ
Provide the following recommendation:		nspect	ion of building(s):		
<ol> <li>Scheduled preventive maintenance</li> </ol>					1
In ExistenceYes _XN					l
<ol><li>Provide a general estimate, expres</li></ol>				ings	
which could result from implement	ing the following conse	rvation	measures.		
System Changes 9	6 Cost Savings	Syste	em Changes	% Cost Savi	ings
Ventilation System Operations		Wate	er Systems Operati	ons	
Reduced ventilation		<u></u>	Repair all leaks		
Variable ventilation			Reduction of water	r consumption	n !
Unoccupied area ventilation	n shut down	г	Reduce hot water		
Repair of caulking & weath	nerstripping	-	Increase chilled w		
Maintenance & repair or o		_		Subtotal	0
	Subtotal 1320				
		1			
Heating & Cooling System Operations		Utility	Plant & Distribution	n System On	er
Change in thermostat cont	rol set points		Equipment cleaning		-
Provide locking thermostal		_	Adjustment of air/		İ
Reset of air & water temper			Combustion monit		, I
Unoccupied reset or shut of		-	Adjustment of driv		
Shut down non-critical exh		_	Steam Trap maint		,,,,,,,,,
	Subtotal 528		Pipe insulation res		
	020	-		Subtotal	0
		1	Gubiota	Jubiotai	<del></del>
Lighting Systems Operations		Otho	r Measures (includ	ina watar waa)	
Reduce illumination levels		Cille	i ivieasures (IIICIUO	nig water use)	'
Maximize use of daylight					
	•				
Install high efficiency lamp					
Reduce or delete evening	•	<u> </u>		Subtotal	
	Subtotal 0	4		Totals	0
				i otais	0.0
1		P.			

TEXAS TE	CH UNIVERSITY		ENGLISH & PHILOSON		
Institution	Name		Building Name	Building Size (GSF)	
	ENERGY	AND WATER CONSER	VATION MEASUR	E RETROFIT RECOMMENDATIONS	_
1.0	Basic Building Data	1.1 Annual Energy Use 1.2 Annual Energy Cost	0.4226906 3.8776242	BTU/Sq.Ft/Yr. \$/Sq.Ft/Yr.	
	1.3 Describe physical cond	lition of building envelope:	Very good condition (N	ew building)	
	1.4 Describe physical conc	lition of building energy and water	-using systems:	Very good condition (New building)	
2.0	Based on 1.1 - 1.4 above, in Briefly outline recommender	1 1 55 11	•	on measure retrofit implementation.	
3.0	Based on auditor evaluation		ing conditions and/or site ch	aracteristics present an opportunity to apply solar heating Yes No	
	ENER	GY AND WATER CON	SERVATION MEAS	URE RETROFIT ASSESSMENT	_
1.0	Describe proposed energy				
2.0	Estimate of installed cost of	above measures: \$0.00			
3.0	Estimate of annual energy a	and water cost savings for above r	neasures:	\$0.00	
4.0	Projected simple payback p	eriod for above measures in year	#DIV/0!		

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, perating hours, and building configurations.

		eremy Dicks					Те				806 742 1696 11/22/2005
		of Energy A							ation and Pho	one Numbe	
		H UNIVERS	ITΥ				ENGINEER		R		Texas Tech university/Lubbock, Tx
	Facil	ity Name					Building Nar	ne(s)			Building/Campus Address
1											
						as Tech Univ					
					Name	and Address	of Owner				
	BUILDII	NG DATA									
Building	-				TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup	ents/% GSF					I
57665	Days	(c) [	Daylight		(d) E	vening		(e)	Night		
1											Central Bldg. Panel
	M-F	12 Hrs	1230	64%	4 Hrs	38	2%	0	0	0%	(f) Yes X No
Date (b)											
Occupied	SAT	6 Hrs	96	5%	0	0	0%	0	o	0%	EMS
1980											(g) Yes X No
	SUN	6 Hrs	38	2%	0	0	0%	0	0	0%	
II. MAJO	RENERO	SYUSING	SYSTE	MS							
Primary	Primary		Space		Space		Domesti	0	Interior		Special Building
Heat	Cooling		Termina	d	Termina	1	Hot Wate	er	Lighting		Systems & Facilities
Source (h)	Source	0	Heat (i		Cooling (	k)	_Source (	I)	System (	m)	(n)
Stearn	Centrifuga	l Chillers	Fan ai	nd Coil	Fan ar	nd Coil	Heat Ex	changer	Fluore	scent	
Boiler											
1									1		
L							L		1		
											7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
				RISTICS							
<ol> <li>Year rou</li> </ol>	nd, 24 hour	per day oper	ation		Yes _X_	No		5. List year	r and type of	major build	ing modifications and additions.
2. 9 month					Yes	No X					
<ol><li>Summer</li></ol>	Program Us	e			Yes	No X					
4. Building	has exterior	floodlighting			Yes X	No					

l														1
Building Nar	ne(s)	ENGINEERIN	IG CENTER				(a) Building	Size(s) (Gro	oss Sq. Ft.)	57665				
ENERGY U	SE AND COST	T DATA		For Year En	ding	8/31/2005		** Metered	X Best	Estimate2	<u> </u>		_	
	ELEC	TRICITY		NAT	TURAL GAS			WATER		P	URCHASED TI	HERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$		l	\$	l		\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	187,920	\$12,216.84	\$0.07	57.02	\$365.11	\$6.40	132.52	\$353.67	\$2.67	153.81	\$1,703.33	30,206.61	\$4,048.59	\$18,687.53
October	149,520	\$9,305.78	\$0.06	65.62	\$369.84	\$5.64	71.16	\$215.65	\$3.03	257.08	\$2,931.91	25,505.71	\$3,537.12	\$16,360.30
November	140,160	\$8,046.88	\$0.06	95.27	\$706.50	\$7.42	56.32	\$184.74	\$3.28	378.93	\$5,316.97	16,223.63	\$2,656.07	\$16,911.16
December	156,720	\$9,515.33	\$0.06	128.39	\$891.25	\$6.94	53.69	\$194.18	\$3.62	464.62	\$5,474.41	14,261.67	\$2,077.12	\$18,152.29
January	182,160	\$11,174.60	\$0.06	146.86	\$946.08	\$6.44	45.92	\$172.79	\$3.76	465.88	\$5,365.63	15,258.72	\$2,027.86	\$19,686.97
February	155,520	\$9,116.48	\$0.06	126.72	\$829.38	\$6.55	27.79	\$110.55	\$3.98	426.29	\$4,665.29	17,116.28	\$1.932.25	\$16,653.95
March	159,360	\$9,898.42	\$0.06	112.33	\$739.88	\$6.59	33.53	\$137.12	\$4.09	380.62	\$4,747.86	17,781.11	\$2,600.25	\$18,123.53
April	181,200	\$11,654.81	\$0.06	96.59	\$726.10	\$7.52	56.57	\$188.34	\$3.33	255.94	\$3,283.11	21,545.22	\$3,120.46	\$18,972.82
May	157,680	\$11,686.31	\$0.07	71.38	\$477.61	\$6.69	106.77	\$329.08	\$3.08	219.76	\$1,375.15	24,653.82	\$5,020.67	\$18,888.83
June	161,520	\$12,425.83	\$0.08	58.60	\$396.73	\$6.77	107.06	\$329.97	\$3.08	160.47	\$62.92	33,442.25	\$6,717.51	\$19,932.96
July	178,320	\$11,642.78	\$0.07	57.35	\$434.01	\$7.57	199.63	\$515.65	\$2.58	166.37	\$1,576.79	38,713.42	\$5,322.91	\$19,492.14
August	165,120	\$12,638.90	\$0.08	162.24	\$1,262.25	\$7.78	358.09	\$794.98	\$2.22	147.78	\$1,727.36	39,609.75	\$6,585.37	\$23,008.86
			Avg.	2		Avg.	3)		Avg.	<b>4</b>		<b>5</b> )		
Annual	1,975,200	\$129,323	\$0.07	1,178	\$8,145	\$6.86	1,249	\$3,527	\$3.23	3,478	\$38,231	294,318	\$45,646	\$224,871
Totals														

NNUAL ENERGY CONSU	IMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)	
o) Electricity	1975200	KWH x 0.0116	=	22912.32	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft./Yr.
p) Nat. Gas	1178	MMBTU x 1.0	=	1178	MMBTU	1	Building Gross Sq. Ft.	
q1) Steam/Hot Water	3478	MMBTU x 1.0	NI.	3478	MMBTU	EUI =	(uu) 31100.136	
q2) Steam	0	LBS x 0.001390	=	0	MMBTU	1	(a) 57665	
r) Chilled Water	294318	TON HRS x 0.012	=	3531.816	MMBTU	1		
s) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv) 0.539324304	MMBTU/\$q.Ft./Yr.
t) Other Fuel	0	×	=	0	MMBTU	1		
						ENERGY	COST INDEX (ECI)	
		(uu) TOTAL ANNUAL BTU'S =		31100.136	MMBTU	ECI =	Annual Energy Costs Building Gross Sq. Ft.	\$/Sq.Ft/Yr.
						ECI =	(nn) 224871	
On not include water costs	(hh).						(a) 57665	
Electricity is metered by b						1		
he remaining values are	metered at the Utilities	s Department				ECI =	(ww) 3.899609815	\$/Sq.Ft./Yr.
nd estimated by buildings t						1		•

					TFR					

PUA3

TEXAS TECH	UNIVERSITY	ENGINEER	NG C	ENTER	57665	
Facility Name	9	Building Nar	ne(s)		Building Siz	e(s) (GSF)
,						
	RECOMME	NDED ENERG	ΞŶ			
	AND WATER CONSE	RVATION ME	ASUI	RES		
Provide the for	ollowing recommendations based	on an on-site in	spect	ion of building(s):		1
<ol> <li>Schedule</li> </ol>	d preventive maintenance plan.					1
		lecommended _				
	a general estimate, expressed as				ngs	
	ould result from implementing the		vation	measures.		
System Char		Savings		em Changes	% Cost Sav	ings
	ystem Operations		Wate	er Systems Operation	ns	
_	Reduced ventilation			Repair all leaks		
_	Variable ventilation			Reduction of water		
	Unoccupied area ventilation shut			Reduce hot water		
'	Repair of caulking & weatherstrips	oing		Increase chilled wa		ure
'	Maintenance & repair or operating	controls			Subtotal	0
	Subtot	al0				
Heating & Co	poling System Operations		Utility	y Plant & Distributio	n System Op	er.
_X	Change in thermostat control set	points		Equipment cleaning		
	Provide locking thermostat covers	:		Adjustment of air/f		
<u>x</u>	Reset of air & water temperatures		_	Combustion monit		
	Unoccupied reset or shut down of			Adjustment of drive		ors, etc.
'	Shut down non-critical exhaust sy			Steam Trap mainte		
	Subte	otal450		Pipe insulation rep		
				Subtotal	Subtotal	0
						1
	ems Operations		Othe	r Measures (includi	ng water use	)
_	Reduce illumination levels					
	Maximize use of daylight					
	Install high efficiency lamps					l.
l '	Reduce or delete evening cleanin					i
	Subtot	al 5680			Subtotal	0
					Totals	6130.0
l			i			

TEXAS TE	CH UNIVERSITY			ENGINEERING CENTER	57665	
Institution	Name			Building Name	Building Size (GSF)	_
	ENERG	Y AND WATER	CONSERV	ATION MEASURE RET	ROFIT RECOMMENDATIONS	
1.0	Basic Building Data		Energy Use	0.5393243	BTU/Sq.Ft./Yr.	
		1.2 Annual I	Energy Cost	3.8996098	\$/Sq.Ft./Yr.	
	1.3 Describe physical of	condition of building er	velope:	Good condition		_
	1.4 Describe physical of	condition of building er	ergy and water-u	ising systems: Good of	condition	_
2.0	Based on 1.1 - 1.4 abov Briefly outline recommer Lighting retrofit Reset schedule			nergy and water conservation measu		_
	Time of day schedule or	otimization				
3.0	Economizer	dia la diada de la desa	and the building	dition dies eite ehere ete eiet	ics present an opportunity to apply solar heating	
3.0	and/or cooling systems,				Yes X No	
	EN	ERGY AND WA	TER CONS	ERVATION MEASURE	RETROFIT ASSESSMENT	
1.0	Describe proposed ener					_
	Adjust AHU's reset sche					_
	Update building utilities					
2.0	Estimate of installed cos		\$33,884.3	3		
3.0	Estimate of annual ener	gy and water cost sav	ngs for above m	easures: \$6,13	30.00	_

5.5

4.0 Projected simple payback period for above measures in years:

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	J	eremy Dickso	on				Te	xas Tech U	niversity-Phys	sical Plant /	806 742 1696	11/22/2005
	Name	of Energy A	uditor					Organiz	ation and Pho	ne Numbe		Date
	TEXAS TEC	HUNIVERS	TY				ENGINEERI	NG & TECH	NOLOGY LA	BS	Texas Tech universi	ty/Lubbock, Tx
	Faci	lity Name	-				Building Nan	ne(s)			Building/Campus Ad	dress
l												
						as Tech Unio						
					Name	and Address	of Owner					
	BUILDII	NG DATA										
Building					TING SCHED						BASIC HVAC CONTROL D	ATA
Size (a)				Time Period	Hrs/Occup		:					
21657	Days	(c) E	aylight		(d) E	vening		(e)	Night		_	
		1							Central Bldg. Panel			
	M - F	12 Hrs	50	66%	4 Hrs	0	0%	0%	(f) Yes <u>X</u> No			
Date (b)					_			5.40				
Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS	
1961							1				(g) Yes X No	
	SUN	6 Hrs	0	0%	0	0	0%	0	0	0%	1	
	R E N E R C	SYUSING	Space	MS	Space		Domestic		Interior		Special Building	
Primary Heat	Cooling		Termina		Termina		Hot Wate		Lighting		Systems & Facilities	
	Source		Heat (i				Source (		System (		(n)	
Source (h)			Fan a		Cooling (		Heat Ex		Fluore:		(n)	
Steam Boiler	Centrifuga	Chaters	⊦an a	id Coil	Fanar	ia Coii	Heat Ex	cnanger	Fluore	scent		
Boiler												
					l							
-					L				J			
III. UNIQ	ur ruu	DINCCH	ADACTE	DICTIC					-			
		per day opera		KISTICS		No X		5 Lietuas	r and type of	major huild	ing modifications and additions.	
	per year ope		30011		Yes X			J. LIST YES	and type or i	major bullu	my mountainers and additions.	
	Program Us				Yes_X_							
4. Building					Yes X							
a. Dallung	nas exterior	moonighting										
Form PUA 1												

Building Nam	ne(s)	ENGINEERII	NG & TECHI	IOLOGY LAE	s		(a) Building	Size(s) (Gre	oss Sq. Ft.)	21657				
ENERGY US	SE AND COST	DATA		For Year En	ding:	8/31/2005		** Metered	X Best	Estimate	X			
	ELEC	CTRICITY		NAT	URAL GAS			WATER		Р	URCHASED T	HERMAL		TOTAL
ł	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$			\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	53,400	\$3,472	\$0.07	21.42	\$137.12	\$6.40	49.77	\$132.83	\$2.67	57.77	\$639.71	11,344.57	\$1,520.51	\$5,901.75
October	48,600	\$3,025	\$0.06	24.64	\$138.90	\$5.64	26.72	\$80.99	\$3.03	96.55	\$1,101.13	9,579.07	\$1,328.42	\$5,674.19
November	43,200	\$2,480	\$0.06	35.78	\$265.34	\$7.42	21.15	\$69.38	\$3.28	142.31	\$1,996.87	6,093.04	\$997.53	\$5,809.32
December	45,000	\$2,732	\$0.06	48.22	\$334.72	\$6.94	20.16	\$72.93	\$3.62	174.50	\$2,056.00	5,356.19	\$780.10	\$5,975.94
January	52,600	\$3,227	\$0.06	55.16	\$355.32	\$6.44	17.24	\$64.89	\$3.76	174.97	\$2,015.15	5,730.65	\$761.60	\$6,423.70
February	46,000	\$2,696	\$0.06	47.59	\$311.49	\$6.55	10.44	\$41.52	\$3.98	160.10	\$1,752.12	6,428.29	\$725.69	\$5,527.30
March	48,400	\$3,006	\$0.06	42.19	\$277.88	\$6.59	12.59	\$51.50	\$4.09	142.95	\$1,783.13	6,677.97	\$976.56	\$6,095.37
April	55,200	\$3,550	\$0.06	36.28	\$272.70	\$7.52	21.25	\$70.74	\$3.33	96.12	\$1,233.02	8,091.65	\$1,171.94	\$6,298.87
May	46,400	\$3,439	\$0.07	26.81	\$179.37	\$6.69	40.10	\$123.59	\$3.08	82.53	\$516.46	9,259.13	\$1,885.59	\$6,143.91
June	46,000	\$3,539	\$0.08	22.01	\$149.00	\$6.77	40.21	\$123.92	\$3.08	60.27	\$23.63	12,559.77	\$2,522.87	\$6,358.23
July	50,200	\$3,278	\$0.07	21.54	\$163.00	\$7.57	74.97	\$193.66	\$2.58	62.48	\$592.19	14,539.44	\$1,999.10	\$6,225.58
August	43,200	\$3,307	\$0.08	25.58	\$198.98	\$7.78	134.49	\$298.57	\$2.22	55.50	\$648.74	14,876.07	\$2,473.24	\$6,926.22
	p		Avg.	2		Avg.	<b>3</b>			<b>4</b> )		(5)		
Annual	578,200	\$37,751	\$0.07	407.20	\$2,783.81	\$6.86	469.10	\$1,324.52	\$3.23	1,306.04	\$14,358.15	110,535.84	\$17,143.14	\$73,360.38
Totals	1	L		L			L	L	L	l		<u> </u>		

ANNUAL ENERGY CONS	JMPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
oo) Electricity	578200	KWH x 0.0116	=	6707.12	MMBTU	EUI =	Total Annua	al BTU's	MMBTU/Sq.Ft./Yr.
pp) Nat. Gas	407.20194	MMBTU x 1.0	=	407.20194	MMBTU		Building Gr	oss Sq. Ft.	
gg1) Steam/Hot Water	1306.04421	MMBTU x 1.0	=	1306.0442	MMBTU	EUI =	(uu)	9746.796175	
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU		(a)	21657	
rr) Chilled Water	110535.835	TON HRS x 0.012	=	1326.43	MMBTU	ı			
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.450052924	MMBTU/Sq.Ft/Yr.
tt) Other Fuel	0	×	= .	.0	MMBTU	1			
					_	ENERGY	COST INDEX	(ECI)	
	(	uu) TOTAL ANNUAL BTU'S =		9746.7962	MMBTU	ECI ≂	Annual Ene	rgy Costs	\$/Sq.Ft./Yr.
			-			1	Building Gr	oss Sq. Ft.	
	_					ECI =	(nn)	73360.38107	
'Do not include water costs	(hh).					1	(a) '	21657	
** Electricity is metered by	building.								
The remaining values as	e metered at the Utilities D	epartment				ECI =	(ww)	3.387375032	\$/Sq.Ft./Yr.
and estimated by buildings	by using its gross square foot	value.							

TEXAS TECH UNIVERSITY	EN	SINEER	ING 8	TECHNO	LOGY LA	21657	
Facility Name	Bui	ding Na	me(s)			Building Size(s	) (GSF)
REC	OMMENDED	ENER	GY				
AND WATER O	ONSERVATI	ON ME	ASU	RES			
Provide the following recommendations	based on an o	n-site in	spect	tion of buil	ding(s):		
1. Scheduled preventive maintenance	plan.						
In Existence X Yes N	o; Recomm	ended .	_X_	Yes	No		
<ol><li>Provide a general estimate, express</li></ol>	sed as a range	of annu	ıal en	ergy and v	vater savi	ngs	
which could result from implementi	ng the following	g conser	vation	n measure	\$.		
System Changes 9	Cost Savings		Syst	em Chang	es	% Cost Saving	s
Ventilation System Operations			Wate	er System:	s Operation	ns	
Reduced ventilation				Repair al	l leaks		
Variable ventilation				Reductio	n of water	consumption	
Unoccupied area ventilation	n shut down			Reduce I	not water	temperature	
Repair of caulking & weath	erstripping		_	Increase	chilled wa	ter temperature	:
Maintenance & repair or or	perating control	ls				Subtotal	0
	Subtotal	0					
Heating & Cooling System Operations			Utilit	y Plant & I	Distributio	n System Oper.	
Change in thermostat cont	rol set points		<u></u>	Equipme	nt cleanin	g	
Provide locking thermostat	covers		<u></u>	Adjustme	ent of air/f	uel ration	
Reset of air & water tempe	ratures			Combust	ion monit	oring & control	
Unoccupied reset or shut of	down of system			Adjustme	ent of drive	es, fans, motors	, etc.
Shut down non-critical exh	aust systems			Steam Ti	rap mainte	nance	
	Subtotal	0		Pipe insu	lation rep	air	
			1		Subtotal	Subtotal	0

Subtotal 0

Other Measures (including water use)

\*\*\* Noisy chiller area.

Subtotal

Totals

0

Ear protection higly recommended.

Form PUA 3

Lighting Systems Operations

Reduce illumination levels Maximize use of daylight

Install high efficiency lamps
Reduce or delete evening cleaning hours

	ECH UNIVERSITY			ENGINEERING & TECHNOLOGY LABS	21657
stitution	Name		_	Building Name	Building Size (GSF)
	ENERG	YAND	WATER CONSER	VATION MEASURE RETROFIT R	ECOMMENDATIONS
1.0	Basic Building Data	1.1	Annual Energy Use	0.4500529	BTU/Sq.Ft./Yr.
		1.2	Annual Energy Cost	3.387375	\$/Sq.Ft./Yr.
	1.3 Describe physical c	ondition of	building envelope:	Good condition	<u>.</u>
	1.4 Describe physical c	ondition of	building energy and water-	using systems: Good condition	
			J	· · · — — — — — — — — — — — — — — — — —	
20	Based on 1.1 - 1.4 above	e indicate	the need and potential for e	nergy and water conservation measure retrofit imp	plementation.
2.0	Based on 1.1 - 1.4 above Briefly outline recommer			nergy and water conservation measure retrofit imp	
2.0				•	
2.0				•	
	Briefly outline recommer	nded retrof	it options:		
2.0	Briefly outline recommer	nded retrof	it options:	ng conditions and/or site characteristics present ar	opportunity to apply solar heating
	Based on auditor evalua and/or cooling systems,	nded retrof	it options:  ate whether or not the buildii mestic hot water heating sy	ng conditions and/or site characteristics present ar stems. X Yes	n opportunity to apply solar heating No
	Based on auditor evalua and/or cooling systems,	nded retrof	it options:  ate whether or not the buildii mestic hot water heating sy	ng conditions and/or site characteristics present ar	n opportunity to apply solar heating No

\$0.00

#DIV/0!

\$0.00

2.0

3.0

Estimate of installed cost of above measures:

Estimate of annual energy and water cost savings for above measures:

Projected simple payback period for above measures in years:

Energy Auditor Certification: Thereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or instronal buildings. Therefore experience in the experience in conducting energy audit I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		leremy Dicks	on				Te	xas Tech U	niversity-Phys	sical Plant /	806 742 1696	11/22/2005
	Name	e of Energy A	uditor		•			Organiz	ation and Pho	one Numbe	er of Auditor	Date
	TEXAS TEC	H UNIVERS	ITY				ELECTRICA	L ENGINEE	RING		Texas Tech university/Lul	bbock, Tx
	Faci	lity Name		-			Building Nar	ne(s)		•	Building/Campus Address	s
1												
1					Tex	as Tech Uni	versity					
					Name	and Address	s of Owner					
I. BASIC	BUILDI	NG DATA										
Building				OPERA	TING SCHE	DULE					BASIC HVAC CONTROL DATA	
Size (a)				Time Period	f: Hrs/Occu	pants/% GSF	-					
98734	Days	(c) I	Daylight		(d) E	vening		(e)	Night			
					T				Central Bidg. Panel			
	M-F	12 Hrs	2073	63%	4 Hrs	66	0%	(f) YesXNo				
Date (b)									ł			
Occupied	SAT	6 Hrs	165	5%	0	0	0%	0	0	0%	EMS	
1928											(g) Yes X No	
	SUN	6 Hrs	66	2%	0	0	0%	0	0	0%		
II. MAJO	RENER	SYUSIN	SSYSTE	MS								
Primary	Primary	,	Space		Space		Domestic	С	Interior		Special Building	
Heat	Cooling	ı	Termina	d	Termina	al .	Hot Wate	er	Lighting	1	Systems & Facilities	
Source (h)	Source	(i)	Heat (i	)	Cooling	(k)	Source (	I)	System (	m)	(n)	
Steam	Centrifuga	al Chillers	Fan a	nd Coil	Fan a	nd Coil	Heat Ex	changer	Fluore	scent		
Boiler			i		1		1		i			
					l		1		1			
							1		1			
		DINGCH		RISTICS	3							
1. Year rou	nd, 24 hour	per day oper	ation		Yes	No X		5. List year	r and type of	major build	ling modifications and additions.	
2. 9 month	per year ope	eration			Yes X	No						
3. Summer	Program Us	se			Yes X	No						
4. Building	has exterior	floodlighting			Yes X	No						***************************************

Building Name(s) ELECTRICAL ENGINEERING (a) Building Size(s) (Gross Sq. Ft.) 98734														
ENERGY U	SE AND COS	T DATA		For Year En	ding	8/31/2005		** Metered		Estimate :	<del></del>			
		CTRICITY		NAT	URAL GAS			WATER		P	URCHASED TI	IERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$	i		\$	1	ı	<b>S</b>	1	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September		\$3,198.53	\$0.07	97.64	\$625.14	\$6.40	226.90	\$605.55	\$2.67	263.36	\$2,916.44	51,719.74	\$6,931.99	\$14,277.65
October	49,920	\$3,106.90	\$0.06	112.35	\$633.24	\$5.64	121.84	\$369.24	\$3.03	440.17	\$5,020.02	43,670.88	\$6,056.25	\$15,185.65
November	50,760	\$2,914.24	\$0.06	163.11	\$1,209.67	\$7.42	_96.42	\$316.31	\$3.28	648.80	\$9,103.71	27,778.10	\$4,547.73	\$18,091.66
December	55,920	\$3,395.21	\$0.06	219.83	\$1,525.99	\$6.94	91.92	\$332.47	\$3.62	795.52	\$9,373.29	24,418.82	\$3,556.45	\$18,183.41
January	57,000	\$3,496.66	\$0.06	251.46	\$1,619.88	\$6.44	78.62	\$295.85	\$3.76	797.67	\$9,187.03	26,125.97	\$3,472.11	\$18,071.54
February	51,480	\$3,017.72	\$0.06	216.96	\$1,420.07	\$6.55	47.59	\$189.28	\$3.98	729.90	\$7,987.91	29,306.49	\$3,308.39	\$15,923.38
March	51,000	\$3,167.79	\$0.06	192.34	\$1,266.83	\$6.59	57.42	\$234.78	\$4.09	651.69	\$8,129.29	30,444.80	\$4,452.14	\$17,250.83
April	61,200	\$3,936.39	\$0.06	165.39	\$1,243.23	\$7.52	96.86	\$322.48	\$3.33	438.22	\$5,621.33	36,889.72	\$5,342.85	\$16,466.29
May	44,040	\$3,263.99	\$0.07	122.21	\$817.77	\$6.69	182.81	\$563.46	\$3.08	376.27	\$2,354.53	42,212.27	\$8,596.39	\$15,596.13
June .	40,800	\$3,138.77	\$0.08	100.34	\$679.28	\$6.77	183.30	\$564.97	\$3.08	274.76	\$107.73	57,259.82	\$11,501.72	\$15,992.47
July	48,720	\$3,181.00	\$0.07	98.20	\$743.11	\$7.57	341.81	\$882.89	\$2.58	284.86	\$2,699.78	66,285.11	\$9,113.88	\$16,620.67
August	39,960	\$3,058.69	\$0.08	60.79	\$472.94	\$7.78	613.13	\$1,361.17	\$2.22	253.03	\$2,957.58	67,819.81	\$11,275.46	\$19,125.84
Annual	600,000	\$38,876	Avg. \$0.07	1.801	\$12,257	Avg. \$6.86	3) 2,139	\$6,038	Avg. \$3.23	4) 5,954	\$65,459	5) 503.932	\$78.155	#200 786
Totals	000,000	400,070	40.07	1,501	Ψ12,201	\$0.00	2,139	\$0,036	93.23	5,954	\$65,459	503,932	\$78,100	\$200,786

ANNUAL ENERGY CONSU	JMPTION IN BTU'S:					ENERGY	UTILIZATIO	N INDEX (EUI)	
oo) Electricity	600000	KWH x 0.0116	=	6960	MMBTU	EUI =	Total Anni	ual BTU's	MMBTU/Sa.Ft/Yr.
pp) Nat. Gas	1801	MMBTU x 1.0	=	1801	MMBTU	j	<b>Building G</b>	ross Sq. Ft.	
qq1) Steam/Hot Water	5954	MMBTU x 1.0	-	5954	MMBTU	EUI =	(uu)	20762.184	
qq2) Steam	0	LBS x 0.001390	26	0	MMBTU	1	(a)	98734	
r) Chilled Water	503932	TON HRS x 0.012	=	6047.184	MMBTU	1			
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.210284036	MMBTU/Sq.Ft,/Yr.
tt) Other Fuel	0	×	=	0	MMBTU	1	3		
					_	ENERGY	COST INDE	K (ECI)	
	(	uu) TOTAL ANNUAL BTU'S =		20762.184	MMBTU	ECI =	Annual En	ergy Costs	\$/Sq.Ft./Yr.
					_	İ	Building G	ross Sq. Ft.	
						ECI =	(nn)	200786	
Do not include water costs						1	(a)	98734	
Electricity is metered by b	ouilding.					1			
he remaining values are	e metered at the Utilities D	epartment				ECI =	(ww)	2.033605445	\$/Sq.Ft./Yr.
nd estimated by buildings I	by using its gross square foot	value.				1	37	0.000000110	woq. um.
orm PUA 2					-			~	

TEXAS TECH UNIVERSITY ELE	CTRICAL ENGINEERING 9873	4
	ling Name(s) Building	Size(s) (GSF)
RECOMMENDED	ENERGY	
AND WATER CONSERVATION		
Provide the following recommendations based on an o	n-site inspection of building(s):	
Scheduled preventive maintenance plan.		
In Existence X Yes No; Recommo	ended X Yes No	
<ol><li>Provide a general estimate, expressed as a range,</li></ol>		
which could result from implementing the following		
System Changes % Cost Savings		Savings
Ventilation System Operations	Water Systems Operations	
Reduced ventilation	Repair all leaks	
Variable ventilation	Reduction of water consum	
Unoccupied area ventilation shut down	Reduce hot water temperat	
Repair of caulking & weatherstripping	Increase chilled water temp	
Maintenance & repair or operating control	s Subto	otal 0
Subtotal	<del>  </del>	
Heating & Cooling System Operations	Utility Plant & Distribution System	n Oper.
X Change in thermostat control set points	Equipment cleaning	
Provide locking thermostat covers	Adjustment of air/fuel ration	١
X Reset of air & water temperatures	Combustion monitoring & c	
Unoccupied reset or shut down of system	Adjustment of drives, fans,	motors, etc.
Shut down non-critical exhaust systems	Steam Trap maintenance	
Subtotal	402 Pipe insulation repair	
·	Subtotal Subto	otal 0
Lighting Systems Operations	Other Measures (including water	· use)
X Reduce illumination levels	- *	

Subtotal Totals

10027.0

Form PUA 3

Maximize use of daylight

Maximize use or dayingin.
Install high efficiency lamps
Reduce or delete evening cleaning hours
Subtotal 9625

TEXAS TE	CH UNIVERSITY		_	ELECTRICAL ENG	INEERING	98734	
Institution I	Name		_	Building Name		Building Size (GSF)	
	ENERG	YAND	WATER CONSER	VATION MEASU	JRE RETROFIT	RECOMMENDATIONS	
1.0	Basic Building Data	1.1	Annual Energy Use	0.210284		BTU/Sq.Ft./Yr.	
		1.2	Annual Energy Cost	2.0336054		\$/Sq.Ft./Yr.	
	1.3 Describe physical co	ondition of b	uilding envelope:	Good condition			
	1.4 Describe physical co	endition of b	uilding energy and water-	using systems:	Good condition		
2.0	Based on 1.1 - 1.4 above Briefly outline recommen		e need and potential for e	nergy and water conser		•	
	Lighting retrofit						
	Reset schedule						
	Time of day schedule opt	imization					
3.0		an indicate					
3.0			estic hot water heating sy		characteristics present Yes	an opportunity to apply solar heating	
	undror cooling systems, c	i solai dolli	estic not water neating sy	stems.	165	No	
-	ENE	RGY A	ND WATER CONS	ERVATION ME	SURE RETRO	FIT ASSESSMENT	
1.0	Describe proposed energ	y conservat	ion measures:			•	
	Retrofit (efficiency/illumin	ation level)	existing lighting system				
	Adjust AHU's reset sched						
	Update building utilities o						
2.0	Estimate of installed cost	of above m	easures: \$57,869.3	3			
3.0	Estimate of annual energ	y and water	cost savings for above m	easures;	\$10,027.00		
4.0	Projected simple payback	period for a	above measures in years	5.8	<u> </u>		
Form PUA	4						

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If further certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dicks					Te				806 742 1696 11/22/2005
		e of Energy A							ation and Pho	ne Numbe	
		H UNIVERS	TY				EDUCATION				Texas Tech university/Lubbock, Tx
ì	Faci	lity Name					<b>Building Nan</b>	ne(s)			Building/Campus Address
l					_						
<u> </u>						s Tech Univ					
					Name :	and Address	of Owner				
	BUILDI	NG DATA									
Building					TING SCHEO						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup						
85000	Days	(c) E	Daylight		(d) E	vening		(e)	Night		
					i				1		Central Bidg. Panel
	M-F	12 Hrs	1240	63%	4 Hrs	39	2%	0	0	0%	(f) YesX No
Date (b)											
Occupied	SAT	6 Hrs	98	5%	0	0	0%	0	0	0%	EMS
2002											(g) Yes X No
1	SUN	6 Hrs	39	2%	lo	0	0%	0	0	0%	
		00							·		
II. MAJO	RENER	SYUSING	SYSTE	M S							
Primary	Primary	,	Space		Space		Domestic	c	Interior		Special Building
Heat	Cooling	1	Termina	1	Terminal		Hot Wate	er	Lighting		Systems & Facilities
Source (h)	Source	0	Heat (i	)	Cooling (	O.	Source (	D	System (i	n)	(n)
Steam	Centrifuga	d Chillers	Fan ar	nd Coil	Fan an	d Coil	Heat Ex	changer	· Fluore	scent	
Boiler									1		
1	1				1		1		1		
1	·				L						
III. UNIQ	UE BUIL	DINGCH	ARACTE	RISTICS							A STATE OF THE STA
1. Year rou	ind, 24 hour	per day oper	ation		Yes	No_X_		5. List yea	r and type of i	najor build	ing modifications and additions.
	per year ope				Yes X	No					
3. Summer	Program Us	se			Yes X						
		floodlighting			Yes X						
l. Lunding	saturior	giinig									

Building Nam		EDUCATION	:				'							
							(a) Building	Size(s) (Gre		85000				
ENERGY U	SE AND COST			For Year En		8/31/2005		** Metered	X Best	Estimate				
		TRICITY			URAL GAS			WATER		Р	URCHASED TI	HERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$			\$		l	\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	84,000	\$5,461	\$0.07	89.99	\$576.17	\$6.40	209.13	\$558.12	\$2.67	242.73	\$2,687.99	47,668.45	\$6,388.99	\$15,672.18
October	73,200	\$4,556	\$0.06	103.55	\$583.64	\$5.64	112.29	\$340.32	\$3.03	405.69	\$4,626.79	40,250.07	\$5,581.86	\$15,688.40
November	76,800	\$4,409	\$0.06	150.34	\$1,114.91	\$7.42	88.87	\$291.54	\$3.28	597.97	\$8,390.60	25,602.19	\$4,191.50	\$18,397.80
December	80,800	\$4,906	\$0.06	202.61	\$1,406.46	\$6.94	84.72	\$306.43	\$3.62	733.21	\$8,639.07	22,506.05	\$3,277.86	\$18,535.63
January	115,600	\$7,091	\$0.06	231.76	\$1,492.99	\$6.44	72.46	\$272.68	\$3.76	735.19	\$8,467.39	24,079.48	\$3,200.13	\$20,524.68
February	99,200	\$5,815	\$0.06	199.97	\$1,308.84	\$6.55	43.86	\$174.45	\$3.98	672.72	\$7,362.20	27,010.87	\$3,049.24	\$17,709.77
March	78,400	\$4,870	\$0.06	177.27	\$1,167.60	\$6.59	52.92	\$216.39	\$4.09	600.64	\$7,492.51	28,060.01	\$4,103.40	\$17,849.60
April	117,600	\$7,564	\$0.06	152.43	\$1,145.85	\$7.52	89.27	\$297.22	\$3.33	403.89	\$5,181.00	34,000.09	\$4,924.34	\$19,112.46
May	86,800	\$6,433	\$0.07	112.64	\$753.71	\$6.69	168.49	\$519.32	\$3.08	346.80	\$2,170.10	38,905.71	\$7,923.02	\$17,799.26
June	76,400	\$5,877	\$0.08	92.48	\$626.08	\$6.77	168.94	\$520.71	\$3.08	253.23	\$99.29	52,774.56	\$10,600.77	\$17,724.35
July	80.800	\$5,276	\$0.07	90.50	\$684.90	\$7.57	315.03	\$813.74	\$2.58	262.55	\$2,488.30	61,092.88	\$8,399.97	\$17,662.47
August	74,000	\$5,664	\$0.08	82.74	\$643.71	\$7.78	565.10	\$1,254.54	\$2.22	233.21	\$2,725.91	62,507.37	\$10,392.24	\$20,680.64
	ρ —		Avg.	2)		Avg.	3)		Avg.	4)		5)		
Annual	1,043,600	\$67,922	\$0.07	1,686.28	\$11,504.84	\$6.86	1,971.08	\$5,565.46	\$3.23	5,487.83	\$60,331.17	464,457.73	\$72,033.32	\$217,357.21
Totals				L						l				

ANNUAL ENERGY CONSU	JMPTION IN BTU'S:					ENERGY	UTILIZATION	I INDEX (EUI)	
(oo) Electricity	1043600	KWH x 0.0116	=	12105.76	MMBTU	EUI =	Total Annu	al BTU's	MMBTU/Sq.Ft/Yr.
(pp) Nat. Gas	1686.28306	MMBTU x 1.0	=	1686.283	1 MMBTU		Building G	ross Sq. Ft.	
(qq1) Steam/Hot Water	5487.8341	MMBTU x 1.0	=	5487.834	1 MMBTU	EUI =	(uu)	24853.3699	
(qq2) Steam	0	LBS x 0.001390	10	0	MMBTU	1	(a)	85000	
(rr) Chilled Water	464457.728	TON HRS x 0.012	=	5573.492	7 MMBTU	1			
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.292392587	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	0	×	= .	0	MMBTU	1			•
						ENERGY	COST INDEX	(ECI)	
	(uu)	TOTAL ANNUAL BTU'S =		24853.37	MMBTU	ECI =	Annual En	ergy Costs	\$/Sq.Ft./Yr.
						İ	Building G	ross Sq. Ft.	
						ECI =	(nn)	217357.2122	
*Do not include water costs						1	(a)	85000	
** Electricity is metered by t									
The remaining values are	e metered at the Utilities Depar	rtment				ECI =	(ww)	2.557143673	\$/Sq.Ft./Yr.
and estimated by buildings	by using its gross square foot valu	e.							
Form PUA 2									

TEXAS TECH UNIVERSITY	EDUCATI	ON		85000	
Facility Name	Building N			Building Size(s) (C	GSF)
RECOM	MENDED ENE	RGY			
AND WATER CON	SERVATION M	EASU	RES		
Provide the following recommendations bas	ed on an on-site	inspect	ion of building(s)	:	
1. Scheduled preventive maintenance plan	١.				
In Existence YesX No;	Recommended		Yes No		
2. Provide a general estimate, expressed a	as a range, of an	nual en	ergy and water s	avings	
which could result from implementing the	ne following cons	ervation	n measures.		
System Changes % Co	st Savings	Syst	em Changes	% Cost Savings	
Ventilation System Operations		Wate	er Systems Oper	ations	
Reduced ventilation		_	Repair all leaks		
Variable ventilation		_	Reduction of wa	ater consumption	
Unoccupied area ventilation sh	ut down	-	Reduce hot wat	er temperature	
Repair of caulking & weatherst	ripping	_	Increase chilled	water temperature	
Maintenance & repair or operat	ting controls			Subtotal	0
Sub	total1087	4			
Heating & Cooling System Operations		Utilit	y Plant & Distribu	ution System Oper.	
Change in thermostat control s	et points		Equipment clea	ning	
Provide locking thermostat cov	ers		Adjustment of a	ir/fuel ration	
Reset of air & water temperatu	res		Combustion mo	nitoring & control	
Unoccupied reset or shut down	of system		Adjustment of d	lrives, fans, motors, et	.c.
Shut down non-critical exhaust	systems		Steam Trap ma	intenance	
Su	ıbtotal 435		Pipe insulation	repair	
			Subtr	otal Subtotal	0

Subtotal 0

Other Measures (including water use)

Subtotal

0.0

Totals

Form PUA 3

Lighting Systems Operations

Reduce illumination levels Maximize use of daylight Install high efficiency lamps Reduce or delete evening cleaning hours

\$0.00

#DIV/0!

3.0

Estimate of annual energy and water cost savings for above measures:

Projected simple payback period for above measures in years:

Energy Auditor Cartification: I hereby certify that I. <u>Jeremy Dickson</u> (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If further certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dicks			_		T				/ 806 742 1696		11/22/2005
	Name	of Energy A	Auditor					Organiz	ation and Pho	ne Numbe	r of Auditor		Date
	TEXAS TEC	HUNIVERS	ITY					RANE HAL	L			T	exas Tech university/Lubbock, Tx
	Facility	/ Name			•		Bi	uilding Name	e(s)				Building/Campus Address
								-					- ·
					Te	kas Tech Uni	versity						
					Name	and Address	s of Owner						
	BUILDII	NG DATA											
Building					TING SCHE						BASIC I	IVAC C	CONTROL DATA
Size (a)				Time Period		pants/% GSI	=				1		
75358	Days	(c) [	Daylight		(d)	Evening		(e)	Night				
											Central Bldg.		
	M-F	11	1700	66%	0	0	0%	0	0	0%	(f) Yes	х	_ No
Date (b)						1					1		
Occupied	SAT	0	0	0%	0	0	0%	0	0	0%	EMS		
1939									1		(g) Yes	Х	_ No
	SUN	0	0	0%	0	0	0%	0	0	0%	1		
	RENERO	SYUSING	G SYSTE	MS									
Primary	Primary		Space		Space		Domesti	С	Interior		Special Building		
Heat	Cooling		Termina	il	Termin	al	Hot Wat	er	Lighting		Systems & Facilities		
Source (h)	Source	(i)	Heat (j		Cooling		Source (	D	System (i	m)	(n)		
Steam	Centrifuga	l Chillers	Fan a	nd Coil	Fana	nd Coil	Heat Exc	hanger	Fluore	scent			
Boiler			i		1		1		1				
	1		1		1		1		1				
							1				1		
III. UNIQ				RISTICS	3								
	ind, 24 hour ;		ation		Yes_X_	No		<ol><li>List yea</li></ol>	ir and type of i	major build	ing modifications and addition	ns.	
2. 9 month					Yes	No_X							
	Program Us				Yes	No_X							
<ol><li>Building</li></ol>	has exterior	floodlighting			Yes_X_	No							

<b>Building Nar</b>	ne(s)	DRANE HALI					(a) Building	Size(s)(Gros	ss Sq. Ft.):	75,358				
ENERGY U	ISE AND C	OST DATA		For Year En	ding	8/31/2005		** Metered _	X Best	Estimate	<u> </u>	-		
	E	LECTRICITY		NAT	URAL GAS		WATER			P	URCHASED	THERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED	VATER	ENERGY
MONTH		\$	ŀ		\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	79,680	\$5,180.07	\$0.07	74.52	\$477.13	\$6,40	173.18	\$462.18	\$2.67	201.01	\$2,225.95	39,474.71	\$5,290.79	\$13,636.12
October	72,000	\$4,481.11	\$0.06	85.75	\$483.31	\$5.64	92.99	\$281.82	\$3.03	335.96	\$3,831.49	33,331.48	\$4,622.39	\$13,700.13
November	67,680	\$3,885.65	\$0.06	124.50	\$923.27	\$7.42	73.60	\$241.42	\$3.28	495.19	\$6,948.34	21,201.43	\$3,471.02	\$15,469.71
December	72,960	\$4,429.80	\$0.06	167.78	\$1,164.70	\$6.94	70.16	\$253.76	\$3.62	607.18	\$7,154.10	18,637.49	\$2,714.43	\$15,716.79
January	73,920	\$4,534.62	\$0.06	191.93	\$1,236.36	\$6.44	60.01	\$225.81	\$3.76	608.82	\$7,011.93	19,940.46	\$2,650.06	\$15,658.79
February	68,400	\$4,009.56	\$0.06	165.60	\$1,083.86	\$6.55	36.32	\$144.47	\$3.98	557.09	\$6,096.71	22,367.97	\$2,525.11	\$13,859.71
March	72720	\$4,516.90	\$0.06	146.80	\$966.90	\$6.59	43.82	\$179.20	\$4.09	497.40	\$6,204.62	23,236.77	\$3,398.06	\$15,265.68
April	83040	\$5,341.14	\$0.06	126.23	\$948.89	\$7.52	73.93	\$246.13	\$3.33	334.47	\$4,290.44	28,155.81	\$4,077.89	\$14,904.50
May	78480	\$5,816.48	\$0.07	93.28	\$624.15	\$6.69	139.53	\$430.05	\$3.08	287.19	\$1,797.08	32,218.20	\$6,561.13	\$15,228.90
June	78720	\$6,055.98	\$0.08	76.58	\$518.46	\$6.77	139.90	\$431.21	\$3.08	209.71	\$82.23	43,703.14	\$8,778.60	\$15,866.47
July	84240	\$5,500.16	\$0.07	74.95	\$567.17	\$7.57	260.88	\$673,86	\$2.58	217.42	\$2,060.59	50,591.62	\$6,956.10	\$15,757.88
August	75360	\$5,768.34	\$0.08	109,10	\$848,85	\$7.78	467.96	\$1,038.90	\$2.22	193.12	\$2,257.35	51,762.97	\$8,605.91	\$18,519.35
	$\rho$		Avg.	<b></b>		Avg.	3		Avg.	4)		6)		
Annual	907200	\$59,519.80	\$0.07	1437.0152	\$9,843.06	\$6.86	1632.2737	\$4,608.81	\$3.23	4544.5297	\$49,960.84	384622.04	\$59,651.50	\$183,584.00
Totals	1	1		I	1		I			I		i i		i

ANNUAL ENERGY CON	SUMPTION IN B	TU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
oo) Electricity	907200		KWH x 0.0116	=	10523.52	MMBTU	EUI =	Total Annu	al BTU's	MMBTU/Sq.Ft./Yr.
pp) Nat. Gas	1437.01516		MMBTU x 1.0	=	1437.0152	MMBTU		Building Gr	oss Sq. Ft.	
qq1) Steam/Hot Water	4544.5297		MMBTU x 1.0	=	4544.5297	MMBTU	EUI =	(uu)	21120.529	
qq2) Steam	0		LBS x 0.001390	=	0	MMBTU	1	(a)	75358	
rr) Chilled Water	384622.038		TON HRS x 0.012	=	4615.4645	MMBTU	1			
ss) Propane or Butane	0		GAL x 0.095475	4	0	MMBTU	EUI =	(vv)	0.2802692	MMBTU/Sq.Ft./Yr.
tt) Other Fuel	0		x	=	0	MMBTU	1			
						_	ENERGY	COST INDEX	(ECI)	
		(uu) TOTAL	ANNUAL BTU'S =		21120.529	MMBTU	ECI =	Annual En	ergy Costs	\$/Sq.Ft./Yr.
							1	Building Gr	oss Sq. Ft.	
							ECI =	(nn)	183584	
Do not include water cos	its (hh).						1	(a)	75358	
* Electricity is metered b	y building.									
The remaining values :	are metered at	the Utilities Departm	ent				ECI =	(ww)	2.4361581	\$/Sq.Ft./Yr.
and estimated by building	s by using its gro	ss square foot value.								
orm PUA 2										

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PUA3

TEXAS TECH UNIVERSITY	DRANE HALI	L 75358	
Facility Name	Building Nam	ne(s) Building Size(s	) (GSF)
	an. Recommended _ I as a range, of annua	ASURES pection of building(s):  X Yes No all energy and water savings	
		System Changes % Cost Saving	s
Ventilation System Operations  Reduced ventilation  Variable ventilation  Unoccupied area ventilations  Repair of caulking & weathers  Maintenance & repair or oper  St.  Heating & Cooling System Operations  X. Change in thermostat control	shut down stripping ating controls bbtotal 0 set points	Water Systems Operations Repair all leaks Reduction of water consumption Reduce hot water temperature   Increase chilled water temperature Subtotal Utility Plant & Distribution System Oper. Equipment cleaning	0
Z Reset of air & water temperat Unoccupied reset or shut dow Shut down non-critical exhau	ures vn of system	Adjustment of air/fuel ration Combustion monitoring & control Adjustment of drives, fans, motors Steam Trap maintenance Pipe insulation repair Subtotal Subtotal	, etc.
Lighting Systems Operations  X Reduce illumination levels  Maximize use of daylight  X Install high efficiency lamps  Reduce or delete evening cle		Other Measures (Including water use)	0 7805.0

\$7.805.00

5.7

\$44 217 40

20

3.0

Update building utilities operation schedule

Estimate of installed cost of above measures:

Estimate of annual energy and water cost savings for above measures:

Projected simple payback period for above measures in years:

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If further certify that I have no financial inferest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy incise, operating hours and building conflictuations.

	J	Jeremy Dickso	on			/ 806 742 1696 11/22/2005					
	Name	e of Energy A	uditor						ation and Pho	one Numbe	
	TEXAS TEC	CH UNIVERSI	ITY				DEVELOPM	IENT OFFIC	E		Texas Tech university/Lubbock, Tx
	Faci	lity Name					<b>Building Nar</b>	ne(s)			Building/Campus Address
ł											
						as Tech Univ					
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building					TING SCHE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup						
6594	Days	(c) E	Daylight		(d) E	vening		(e)	Night		_
l .		1		1		1			İ	İ	Central Bldg. Panel
	M-F	12 Hrs	50	71%	0	0	0%	0	0	0%	(f) Yes <u>X</u> No
Date (b)				1	i	I					
Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS
1944						i .			1 _	l	(g) Yes <u>X</u> No
	SUN	0 Hrs	0	0%	0	0	0%	0	. 0	0%	
L	O. E. V. C. D.	GYUSING		•••							
Primary	Primary		Space	MS	Space		Domesti		Interior		Special Building
Heat	Cooling		Termina		Termina		Hot Wat		Lighting		Systems & Facilities
Source (h)			Heat (i		Cooling		Source		System (		(n)
Steam	Centrifuga			nd Coil		nd Coil		changer	Fluore		(1)
Boiler	Сениница	ar Crimers	Falla	iu coii	l rairai	io con	l lieat C	aciangei	110010	SOCIAL	
Boilei							1				
1	ł		İ		İ		1				
	l								٠		Annual Annual Control
II. UNIQ	HE BIIII	DINGCH	ARACTE	RISTICS							
		per day opera				No		5. List yea	r and type of	major build	ling modifications and additions.
2. 9 month					Yes	No_X		,.	***	,	•
	Program Us				Yes	No X					
		floodlighting				No					
1		gg									

Building Nan	ne(s)	DEVELOPM	ENT OFFIC	E			(a) Building	Size(s) (Gro
ENERGY U	SE AND CO	OST DATA		For Year En	ding:	8/31/2005		** Metered _
	El	ECTRICITY		NAT	URAL GAS			WATER
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST
MONTH		\$			\$			\$
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)
September	79,680	\$5,180	\$0.07	6.52	\$41.75	\$6.40	15.15	\$40.44
October	72,000	\$4,481	\$0.06	7.50	\$42.29	\$5.64	8.14	\$24.66
November	67,680	\$3,886	\$0.06	10.89	\$80.79	\$7.42	6.44	\$21.13
December	72,960	\$4,430	\$0.06	14.68	\$101.91	\$6.94	6.14	\$22.20
January	73,920	\$4,535	\$0.06	16.79	\$108.18	\$6.44	5.25	\$19.76
February	68,400	\$4,010	\$0.06	14.49	\$94.84	\$6.55	3.18	\$12.64
March	72,720	\$4,517	\$0.06	12.85	\$84.61	\$6.59	3.83	\$15.68
April	83,040	\$5,341	\$0.06	11.05	\$83.03	\$7.52	6.47	\$21.54
May	78,480	\$5,816	\$0.07	8.16	\$54.61	\$6.69	12.21	\$37.63
June	78,720	\$6,056	\$0.08	6.70	\$45.37	\$6.77	12.24	\$37.73
July	84,240	\$5,500	\$0.07	6.56	\$49.63	\$7.57	22.83	\$58.96
August	75,360	\$5,768	\$0.08	0.80	\$6.19	\$7.78	40.95	\$90.91
	$\circ$		Avg.	<b>2</b>		Avg.	3	
Annual Totals	907,200	\$59,520	\$0.07	116.99	\$793.20	\$6.86	142.83	\$403.28

IAUNUAL	ENERGY CON:	SUMPTION IN	BTUS

(00)	Electricity	907200		KWH x 0.0116	=	10523.52
(pp)	Nat. Gas	116.99108		MMBTU x 1.0	=	116.99108
(qq1)	Steam/Hot Water	397.6569		MMBTU x 1.0	=	397.6569
(qq2)	Steam	0		LBS x 0.001390	=	0
(rr)	Chilled Water	33655.322		TON HRS x 0.012	=	403.86386
(ss)	Propane or Butane	0		GAL x 0.095475	=	0
(tt)	Other Fuel	0		×	=	0
				_		
			(uu) TOTA	L ANNUAL BTU'S =		11442.032

\*Do not include water costs (hh).

and estimated by buildings by using its gross square foot value.

<sup>\*\*</sup> Electricity is metered by building.

The remaining values are metered at the Utilities Department

oss Sq. Ft.)	6594							
X Best	Estimate	X						
	F	URCHASED	THERMAL		TOTAL			
\$/MGAL	STEAM-HC	T WATER	CHILLED V	NATER	ENERGY			
	MMBTU	COST	TON HRS	COST	COSTS*			
(ii)	(ii)	(kk)	(II)	(mm)	(nn)			
\$2.67	17.59	\$194.78	3,454.13	\$462.96	\$5,919.99			
\$3.03	29.40	\$335.26	2,916.58	\$404.47	\$5,287.80			
\$3.28	43.33	\$608.00	1,855.17	\$303.72	\$4,899.28			
\$3.62	53.13	\$626.00	1,630.82	\$237.52	\$5,417.44			
\$3.76	53.27	\$613.56	1,744.84	\$231.89	\$5,508.01			
\$3.98	48.75	\$533.48	1,957.25	\$220.95	\$4,871.47			
\$4.09	43.52	\$542.92	2,033.27	\$297.34	\$5,457.44			
\$3.33	29.27	\$375.42	2,463.70	\$356:83	\$6,177.96			
\$3.08	25.13	\$157.25	2,819.17	\$574.11	\$6,640.08			
\$3.08	18.35	\$7.19	3,824.13	\$768.15	\$6,914.42			
\$2.58	19.02	\$180.31	4,426.88	\$608.68	\$6,397.73			
\$2.22	16.90	\$197.52	4,529.38	\$753.04	\$6,815.99			
Avg.	4)		5					
\$3.23	397.66	\$4,371.69	33,655.32	\$5,219.64	\$70,307.62			
	L	1	l	l	l			
	ENERGY U	TILIZATION	INDEX (EUI)					
MMBTU	EUI =	Total Annua		MMB"	ΓU/Sq.Ft./Yr.			
MMBTU		Building Gro						
MMBTU	EUI =	(uu)	11442.032					

MMBTU	EUI =	Total Ann	nual BTU's	MMBTU/Sq.Ft./Yr.
MMBTU		Building	Gross Sq. Ft.	
MMBTU	EUI =	(uu)	11442.032	
MMBTU		(a)	6594	
MMBTU				
MMBTU	EUI =	(vv)	1.7352187	MMBTU/Sq.Ft./Yr.
MMBTU				
	ENERGY	COST INDE	EX (ECI)	
MMBTU	ECI =	Annual E	nergy Costs	\$/Sq.Ft./Yr.
		Building	Gross Sq. Ft.	
	ECI =	(nn)	70307.616	
		(a)	6594	
	ECI =	(ww)	10.662362	\$/Sq.Ft./Yr.
	1			

							-				_		_		_	
DDE	 мик	IΛ	PV	\A/ A	·Τ	FR		ΝП	= N	1 =	P 1	r v	Δ	. 11	n	ГТ

PUA3

TEXAS TECH UNIVERSITY	DEVELO	PMENT OFFICE	6594
Facility Name	Building N	lame(s)	Building Size(s) (GSF)
	olan. ; Recommended ed as a range, of an	REASURES inspection of building(s)  X Yes No nual energy and water s	
	Cost Savings	System Changes	% Cost Savings
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventilation Repair of caulking & weathe Maintenance & repair or opi Heating & Cooling System Operations Change in thermostat contr Provide locking thermostat. Reset of air & water temper Unoccupied reset or shut di Shut down non-critical exha	erstripping erating controls Subtotal 0  of set points covers atures own of system	Utility Plant & Distribl Equipment clea Adjustment of a	ater consumption ter temperature   d water temperature Subtotal 0  uttion System Oper. taining air/fuel ration onitoring & control trives, fans, motors, etc.
Lighting Systems Operations Reduce illumination levels Maximize use of daylight Install high efficiency lamps Reduce or delete evening o		Pipe insulation Subt Other Measures (incl *** Noisy chiller area Ear protection higly r	otal Subtotal 0

TEXAS TE	CH UNIVERSITY	DEVELOPMENT OFFICE	6594									
Institution N	ame	Building Name	Building Size (GSF)									
	ENERGY AND WATER CONSERV	ATION MEASURE	RETROFIT RECOMMENDATIONS									
1.0	Basic Building Data 1.1 Annual Energy Use 1.2 Annual Energy Cost	1.73521866 10.6623622	BTU/Sq.Ft./Yr.  \$/Sq.Ft./Yr.									
	1.3 Describe physical condition of building envelope:	Good condition										
	1.4 Describe physical condition of building energy and water-usi	ing systems:	Good condition									
2.0	Based on 1.1 - 1.4 above, indicate the need and potential for ene Briefly outline recommended retrofit options:	orgy and water conservation	measure retrofit implementation.									
3.0	Based on auditor evaluation, indicate whether or not the building conditions and/or site characteristics present an opportunity to apply solar heating and/or cooling systems, or solar domestic hot water heating systems.											
	ENERGY AND WATER CONSE	RVATION MEASU	RE RETROFIT ASSESSMENT									
1.0	Describe proposed energy conservation measures:											
2.0	Estimate of installed cost of above measures:											
3.0	Estimate of annual energy and water cost savings for above mea	sures:	\$0.00									
4.0	Projected simple payback period for above measures in years:	#DIV/0!										

Energy Auditor Certification: I hereby certify that 1, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	Jeremy Dickson Texas Tech Univer								Jniversity-Physical Plant / 806 742 1696 11/22/20					
	Nam	e of Energy A	uditor					Organiz	ation and Pho	one Numbe	er of Auditor Date			
		HUNIVERSI					EXERCISE:	SCIENCES	CENTER		Texas Tech university/Lubbock, Tx			
	Faci	lity Name		-			<b>Building Nar</b>	ne(s)			Building/Campus Address			
Į.					Tex	as Tech Univ	ersity							
					Name	and Address	of Owner							
I. BASIC	BUILDI	NG DATA												
Building				OPERA	TING SCHEE	ULE					BASIC HVAC CONTROL DATA			
Size (a)				Time Period	: Hrs/Occup	pants/% GSF								
47837	Days	(c) E	aylight		(d) E	vening		(e)	Night					
i				T							Central Bldg. Panel			
	M-F	12 Hrs	630	45%	4 Hrs	28	2%	0	0	0%	(f) Yes X No			
Date (b)									İ	l				
Occupied	SAT	6 Hrs	70	5%	0	0	0%	0	0	0%	EMS			
1958		1							1	į.	(g) Yes X No			
	SUN	6 Hrs	28	2%	0	0	0%	0	0	0%				
		GY USINC												
Primary	Primary		Space		Space		Domesti		Interior		Special Building			
Heat	Cooling		Termina		Termina		Hot Wat		Lighting		Systems & Facilities			
Source (h)			Heat (		Cooling		Source (		System (		(n)			
Steam	Centrifuga	al Chillers	Fana	nd Coil	Fan ar	nd Coil	Heat Ex	changer	Fluore	scent				
Boiler	1		1				1		ı					
1	1		1				1		1					
			<u></u>		L				1					
				RISTICS										
		per day opera	ation		Yes	No X		<ol><li>List yea</li></ol>	r and type of	major build	ding modifications and additions.			
	per year op				Yes X	No								
	Program U				Yes X									
<ol> <li>Building</li> </ol>	has exterior	floodlighting			Yes X	No								

Building Name(s) EXERCISE SCIENCES CENTER (a) Building Size(s) (Gross Sq. Ft.) 47837														
ENERGY L	SE AND COS	T DATA		For Year En	ding:	8/31/2005		** Metered	X Best	Estimate	X_			
	ELEC	CTRICITY		NAT	URAL GAS	WATER				PURCHASED THERMAL				TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WA	TER	ENERGY
MONTH		8			\$	i		\$	1	MMBTU	COST	TON HRS	COST	COSTS*
i	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	28,880	\$1,877.51	\$0.07	47.31	\$302.88	\$6.40	109.93	\$293.39	\$2.67	127.60	\$1,413.03	25,058.41	\$3,358.57	\$7,245.39
October	26,080	\$1,623.16	\$0.06	54.44	\$306.81	\$5.64	59.03	\$178.90	\$3.03	213.26	\$2,432.22	21,158.71	\$2,934.28	\$7,475.36
November	21,360	\$1,226.32	\$0.06	79.03	\$586.09	\$7.42	46.72	\$153.26	\$3.28	314.34	\$4,410.78	13,458.59	\$2,203.39	\$8,579.84
December	19,920	\$1,209.45	\$0.06	106.51	\$739.35	\$6.94	44.54	\$161.08	\$3.62	385.43	\$4,541.40	11,831.01	\$1,723.11	\$8,374.39
January	28,960	\$1,776.55	\$0.06	121.83	\$784.84	\$6.44	38.09	\$143.34	\$3.76	386.47	\$4,451.15	12,658.13	\$1,682.25	\$8,838.13
February	27,840	\$1,631.96	\$0.06	105.12	\$688.03	\$6.55	23.06	\$91.71	\$3.98	353.64	\$3,870.17	14,199.11	\$1,602.93	\$7,884.80
March	25,840	\$1,605.01	\$0.06	93.19	\$613.78	\$6.59	27.82	\$113.75	\$4.09	315.75	\$3,938.67	14,750.62	\$2,157.08	\$8,428.30
April	29,200	\$1,878.15	\$0.06	80.13	\$602.35	\$7.52	46.93	\$156.24	\$3.33	212.32	\$2,723.56	17,873.21	\$2,588.63	\$7,948.93
May	21,040	\$1,559.36	\$0.07	59.21	\$396.21	\$6.69	88.57	\$273.00	\$3.08	182.30	\$1,140.78	20,452.00	\$4,164.98	\$7,534.33
June	22,320	\$1,717.09	\$0.08	48.61	\$329.12	\$6.77	88.81	\$273.73	\$3.08	133.12	\$52.20	27,742.60	\$5,572.63	\$7,944.76
July	20,160	\$1,316.28	\$0.07	47.58	\$360.04	\$7.57	165.61	\$427.77	\$2.58	138.02	\$1,308.06	32,115.39	\$4,415.71	\$7,827.85
August	21,040	\$1,610.48	\$0.08	43.49	\$338.39	\$7.78	297.06	\$659.49	\$2.22	122.59	\$1,432.96	32,858.95	\$5,463.00	\$9,504.32
	$\circ$		Avg.	0		Avg.	3		Avg.	<b>(4)</b>		(5)		
Annual	292,640	\$19,031	\$0.07	886.45	\$6,047.88	\$6.86	1,036.16	\$2,925.66	\$3.23	2,884.85	\$31,714.97	244,156.75	\$37,866.57	\$97,586.40
Totals					<u> </u>		<u> </u>	L	<u> </u>			l	<u> </u>	

NNU	AL ENERGY CONS	JMPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
00)	Electricity	292640	KWH x 0.0116	=	3394.624	MMBTU	EUI ≂	Total Annua	al BTU's	MMBTU/Sq.Ft./Yr.
pp)	Nat. Gas	886.447502	MMBTU x 1.0	=	886.4475	MMBTU		Building Gr	oss Sq. Ft.	
qq1)	Steam/Hot Water	2884.85187	MMBTU x 1.0	=	2884.8519	MMBTU	EUI =	(uu)	10095.80438	
	Steam	0	LBS x 0.001390	-	0	MMBTU		(a)	47837	
	Chilled Water	244156.751	TON HRS x 0.012	=	2929.881	MMBTU	Į.			
SS)	Propane or Butane	0	GAL x 0.095475	=	. 0	MMBTU	EUI =	(vv)	0.211045935	MMBTU/Sq.Ft./Yr.
tt)	Other Fuel	0	x	=	0	MMBTU	i			
							ENERGY	COST INDEX	(ECI)	
			(uu) TOTAL ANNUAL BTU'S =		10095.804	MMBTU	ECI =	Annual Ene	ergy Costs	\$/Sq.Ft./Yr.
							1	Building Gr	oss Sq. Ft.	
							ECI =	(nn)	97586.40462	
'Do no	ot include water costs	(hh).					1	(a)	47837	
* Elec	tricity is metered by	building.					I			
The r	emaining values ar	e metered at the Utilities	Department				ECI =	(ww)	2.03997752	\$/Sq.Ft./Yr.
		by using its gross square for					I			

P	REI	IMI	JARY	WATER	ANDE	NERGY	AUDIT

PUA3

TEXAS TECH UNIVERSITY	EXERCISE	SCIENCES CENTER	47837
Facility Name	Building Nar	ne(s)	Building Size(s) (GSF)
RECON	MENDED ENERG	3Y	
AND WATER COM			
Provide the following recommendations ba	sed on an on-site in	spection of building(s):	
1. Scheduled preventive maintenance pla	ın.		
In Existence X Yes No:	Recommended _	No	
<ol><li>Provide a general estimate, expressed</li></ol>			ings
which could result from implementing			
	ost Savings	System Changes	% Cost Savings
Ventilation System Operations		Water Systems Operati	ons
Reduced ventilation		Repair all leaks	
Variable ventilation		Reduction of wate	
Unoccupied area ventilation s		Reduce hot water	
Repair of caulking & weathers		Increase chilled w	
Maintenance & repair or opera			Subtotal0
Su	btotal 0		
Heating & Cooling System Operations		Utility Plant & Distribution	on System Oper.
Change in thermostat control	set points	Equipment cleaning	ng
Provide locking thermostat co	vers	Adjustment of air/	fuel ration
Reset of air & water temperate	ures	Combustion moni	toring & control
Unoccupied reset or shut dow	n of system	Adjustment of driv	es, fans, motors, etc.
Shut down non-critical exhaus	st systems	Steam Trap maint	tenance
	Subtotal 195	Pipe insulation rep	pair
		Subtota	al Subtotal 0
Lighting Systems Operations		Other Measures (includ	ling water use)
Reduce illumination levels			
Maximize use of daylight		_	
Install high efficiency lamps			
Reduce or delete evening clea	aning hours		
	ibtotal 0		Subtotal 0
		1	Totals 195.0
		1	

EXAS TE	CH UNIVERSITY			EXERCISE SCIENCES CENTER	47837	
stitution			_	Building Name	Building Size (GSF)	
	ENERG	YAND	WATER CONSERV	VATION MEASURE RETRO	FIT RECOMMENDATIONS	
1.0	Basic Building Data	1.1	Annual Energy Use	0.2110459	BTU/Sq.Ft/Yr.	
		1.2	Annual Energy Cost	2.0399775	\$/Sq.Ft./Yr.	
	1.3 Describe physical c	ondition of	building envelope:	Regular condition		
	1.4 Describe physical c	ondition of	building energy and water-	using systems: Regular co	ndition	
						-
2.0				nergy and water conservation measure re	etrofit implementation.	
	Briefly outline recommer Reset schedule	ded retrof	it options:			-
	Economizer					
3.0	Resed on auditor evalua	tion indica	ate whether or not the building	og conditions and/or site characteristics n	resent an opportunity to apply solar heating	-
5.0			mestic hot water heating sy		s No	
	EN	EBCV	AND WATER CONS	SERVATION MEASURE RET	POFIT ASSESSMENT	-
	LI	LKO1	AND WATER CONC	ZERVATION MENOGRE RE		
1.0	Describe proposed ener		ration measures:			
	Adjust AHU's reset sche					-
	Adjust AHU's economize	r operatio	n setpoint			-
2.0	Estimate of installed cos	t of above	measures: \$208.33			-
				*****		
3.0	Estimate of annual ener	wand wa	ter cost savings for above m	easures: \$195.00		

1.1

Estimate of annual energy and water cost savings for above measures:

Projected simple payback period for above measures in years:

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no finencial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		Jeremy Dickso				Te	xas Tech Ur	niversity-Phys	806 742 1696 11/22/2005		
	Nam	e of Energy A	uditor					Organiz	ation and Pho	one Numbe	
	TEXAS TEC	CH UNIVERSI	TY				JOURNALIS	M			Texas Tech university/Lubbock, Tx
	Fac	lity Name		-			<b>Building Nan</b>	ne(s)		•	Building/Campus Address
		•									
					Texa	s Tech Univ	ersity				
					Name a	and Address	of Owner				
	BUILDI	NG DATA			_						
Building					TING SCHED						BASIC HVAC CONTROL DATA
Size (a)				Time Period	. Hrs/Occup						
19245	Days	(c) E	Daylight		(d) E						
l	[				1				1	Central Bldg. Panel	
	M-F	12 Hrs	391	61%	4 Hrs	13	2%	0	0	0%	(f) Yes X No
Date (b)									I		1
Occupied	SAT	6 Hrs	32	5%	0	0	0%	0	0	0%	EMS
1941	1	1							1		(g) Yes X No
	SUN	6 Hrs	13	2%	0	0	0%	0	0	0%	
		GYUSINO									
Primary	Primar		Space		Space		Domesti		Interior		Special Building
Heat	Cooling		Termina		Terminal		Hot Wate		Lighting		Systems & Facilities
Source (h)			Heat (		Cooling (		Source (		System (		(n)
Steam	Centrifug	al Chillers	Fan a	nd Coil	Fan an	d Coil	Heat Ex	changer	Fluore	scent	
Boiler									1		
l	l										4
									1		
		DINGCH		RISTICS							***************************************
		per day opera	ation			No X		<ol><li>List yea</li></ol>	r and type of	major build	fing modifications and additions.
	per year op					No					
	r Program U					No					
<ol><li>Building</li></ol>	has exterior	floodlighting			Yes X	No					
1											

			:.											
Building Nam		JOURNALIS	М				(a) Building			19245				
ENERGY US	SE AND COST	DATA		For Year En	ding:	8/31/2005		** Metered	XBest	Estimate	x			
	ELEC	CTRICITY		NA1	URAL GAS	WATER				PURCHASED THERMAL				TOTAL
1 .	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$	1	ŀ	\$	i	l	s	l	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ij)	(kk)	(H)	(mm)	(nn)
September	95,200	\$6,189	\$0.07	8.39	\$53.73	\$6.40	19.50	\$52.05	\$2.67	22.64	\$250.66	4,445.21	\$595.79	\$7,141.26
October	83,200	\$5,178	\$0.06	9.66	\$54.43	\$5.64	10.47	\$31.74	\$3.03	37.83	\$431.46	3,753.43	\$520.52	\$6,216.32
November	83,600	\$4,800	\$0.06	14.02	\$103.97	\$7.42	8.29	\$27.19	\$3.28	55.76	\$782.45	2,387.47	\$390.87	\$6,104.12
December	80,400	\$4,882	\$0.06	18.89	\$131.16	\$6.94	7.90	\$28.58	\$3.62	68.37	\$805.62	2,098.75	\$305.67	\$6,152.54
January	82,400	\$5,055	\$0.06	21.61	\$139.23	\$6.44	6.76	\$25.43	\$3.76	68.56	\$789.61	2,245.48	\$298.42	\$6,307.51
February	74,400	\$4,361	\$0.06	18.65	\$122.05	\$6.55	4.09	\$16.27	\$3.98	62.73	\$686.55	2,518.84	\$284.35	\$5,470.49
March	82,000	\$5,093	\$0.06	16.53	\$108.88	\$6.59	4.93	\$20.18	\$4.09	56.01	\$698.70	2,616.67	\$382.65	\$6,303.72
April	82,800	\$5,326	\$0.06	14.21	\$106.85	\$7.52	8.32	\$27.72	\$3.33	37.66	\$483.14	3,170.60	\$459.21	\$6,402.63
May	75,600	\$5,603	\$0.07	10.50	\$70.29	\$6.69	15.71	\$48.43	\$3.08	32.34	\$202.37	3,628.06	\$738.84	\$6,662.95
June	78,000	\$6,001	\$0.08	8.62	\$58.38	\$6.77	15.75	\$48.56	\$3.08	23.61	\$9.26	4,921.37	\$988.55	\$7,105.34
July	76,400	\$4,988	\$0.07	8.44	\$63.87	\$7.57	29.38	\$75.88	\$2.58	24.48	\$232.04	5,697.08	\$783.32	\$6,143.38
August	70,400	\$5,389	\$0.08	17.07	\$132.82	\$7.78	52.70	\$116.99	\$2.22	21.75	\$254.20	5,828.98	\$969.10	\$6,861.79
1	$\circ$	T .	Avg.	(2)		Avg.	3		Avg.	•		(S)		
Annual	964,400	\$62,864	\$0.07	166.61	\$1,145.65	\$6.86	183.81	\$518.99	\$3.23	511.76	\$5,626.05	43,311.96	\$6,717.30	\$76,872.06
Totals				l				L		L				

ANNU	INNUAL ENERGY CONSUMPTION IN BTU'S:							ENERGY UTILIZATION INDEX (EUI)			
(00)	Electricity	964400	KWH x 0.0116	-	11187.04	MMBTU	EUI =	Total Annu	al BTU's	MMBTU/Sq.Ft./Yr.	
pp)	Nat. Gas	166.605959	MMBTU x 1.0	= .	166.60596	MMBTU	1	Building Gr	ross Sq. Ft.		
qq1)	Steam/Hot Water	511.755607	MMBTU x 1.0	22	511.75561	MMBTU	EUI =	(uu)	12385.14507		
qq2)	Steam	0	LBS x 0.001390	=	0	MMBTU		(a)	19245		
rr)	Chilled Water	43311.9591	TON HRS x 0.012	=	519.74351	MMBTU	i				
ss)	Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.643551316	MMBTU/Sq.Ft./Yr.	
tt)	Other Fuel	0	x	=	0	MMBTU	1				
							ENERGY COST INDEX (ECI)				
(uu) TOTAL ANNUAL BTU'S =					12385.145 MMBTU			Annual Energy Costs		\$/Sq.Ft./Yr.	
							i	Building Gross Sq. Ft.			
								(nn)	76872.06097		
*Do not include water costs (hh).								(a)	19245		
* Ele	ctricity is metered by t	ouilding.	1								
The remaining values are metered at the Utilities Department								(wov)	3.994391321	\$/Sq.Ft.Yr.	
and e	stimated by buildings	by using its gross square foo	1	-							

TEXAS TECH UNIVERSITY	JOURNALIS	M		19245			
Facility Name	Building Nar	ne(s)	<del></del>	Building Size(s) (GSF)			
	olan. ; Recommended _	ASUF spection	on of building(s):	ngs			
which could result from implementing		vation	measures.				
	Cost Savings		m Changes	% Cost Sav	ings		
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventilation Repair of caulking & weathe Maintenance & repair or ope	rstripping		r Systems Operation Repair all leaks Reduction of water Reduce hot water t Increase chilled wa	consumptio emperature			
Heating & Cooling System Operations	Utility Plant & Distribution System Oper.						
Change In thermostat contro Provide locking thermostat of Reset of air & water temper Unoccupied reset or shut do Shut down non-critical exha	covers atures own of system	_	Equipment cleanin Adjustment of air/fit Combustion monito Adjustment of drive Steam Trap mainte Pipe insulation rep	g uel ration oring & contr es, fans, mot enance air	ol ors, etc.		
			Subtotal	Subtotal	0		
Lighting Systems Operations Reduce illumination levels Maximize use of daylight Install high efficiency lamps Reduce or delete evening		*** No	Measures (includit pisy chiller area. rotection higly reco	mmended.	0		
				Totals	2041.0		

EXAS T	ECH UNIVERSITY			JOURNALISM	19245	
stitution				Building Name	Building Size (GSF)	
	ENERG	Y AND WATE	RCONSER	VATION MEASURE RE	TROFIT RECOMMENDATIONS	
1.0	Basic Building Data		Energy Use	0.6435513	BTU/Sq.Ft./Yr.	
		1.2 Annual	Energy Cost	3.9943913	\$/\$q.Ft/Yr.	
	1.3 Describe physical of	ondition of building e	nvelope:	Good condition		
	1.4 Describe physical of	condition of building e	nergy and water-	using systems: Regul	lar condition	
2.0	Briefly outline recommer			energy and water conservation meas	•	
	Lighting retrofit Reset schedule					
	Economizer					
3.0	Based on auditor evalua and/or cooling systems,				stics present an opportunity to apply solar heating Yes No	
	EN	ERGY AND W	TER CON	SERVATION MEASURE	RETROFIT ASSESSMENT	
1.0	Describe proposed ener Adjust AHU's reset sche	dule	sures:	Retrofit (efficiency/illumination	level) existing lighting system	
	Adjust AHU's economize	er operation setpoint				
2.0	Estimate of installed cos	t of above measures	\$11,447.4	11		
3.0	Estimate of annual ener	nv and water cost say	ings for above m	neasures: \$2.0	141.00	

5.6

Projected simple payback period for above measures in years:

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	J	leremy Dicks	on				Te	xas Tech U	niversity-Phys	sical Plant	/ 806 742 1696	1/22/2005
	Name	e of Energy A	uditor					Organiz	ation and Pho	one Numbe	er of Auditor	Date
		H UNIVERS				INTERNAT	IONAL TEXTI	LE CENTER			Texas Tech university/Lubb	ock, Tx
	Faci	lity Name		•			Building Nan	ne(s) .		•	Building/Campus Address	
		•										
					Texa	s Tech Uni	versity					
					Name :	and Address	s of Owner			-		
	BUILDI	NG DATA										
Building					TING SCHEE						BASIC HVAC CONTROL DATA	
Size (a)		Time Period: Hrs/Occupants/% GSF										
109376	Days (c) Daylight (d) Evening (e) Night											
		1					1		1		Central Bldg. Panel	
	M-F	12 Hrs	60	66%	0	2	2%	0	0	0%	(f) YesXNo	
Date (b)							1 1		-			
Occupied	SAT	6 Hrs	5	5%	0	0	0%	0	0	0%	EMS	
1984		1		1			1				(g) Yes X No No	
	SUN	6 Hrs	2	2%	0	0	0%	. 0	0	0%	1	
		SYUSING		M S			1		r		le	
Primary	Primary		Space		Space		Domestic Hot Water		Interior		Special Building Systems & Facilities	
Heat	Cooling		Termina		Terminal				Lighting		1-2	
Source (h)			Heat (j		Cooling (		Source (		System (		(n)	
Steam Boiler	Centrifuga	il Chillers	Fan a	nd Coil	Fan an	a Con	neat Ex	changes	Fluore	scent		
Boller					İ		1		1			
					1				1			
	L				J							
IS LINIO	HE BILL	DINGCH	ADACTE	DICTICS								
		per day oper		NIO IIO	Yes X	No	_	5 Lietupe	r and time of	major build	ling modifications and additions.	
	per year ope		30011			No_X		o. Liat yea	i and type or	mojor bunc	ang modifications and additions.	
	Program Us				Yes							
4. Building						No						
Danoning	······	g										

Building Nam	ne(s)	INTERNATIO	NAL TEXTI	LE CENTER			(a) Building	Size(s) (Gross		109376				
ENERGY U	SE AND COST	DATA		For Year En	ding:	8/31/2005		** Metered>	Best Est	imate X	_			
	ELE	CTRICITY		NA.	TURAL GAS			WATER		P	URCHASED T	HERMAL		TOTAL
i	KWH	COST	\$/KWH	MCF	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA		ENERGY
MONTH		s			\$	l	1	\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(8)	(mm)	(nn)
September	256,320	\$16,664	\$0.07	2,765.00	\$15,595.04	\$5.64	251.36	\$670.82	\$2.67	T				\$32,929.44
October	266,160	\$16,565	\$0.06	1,537.00	\$3,549.44	\$2.31	134.97	\$409.04	\$3.03					\$20,523.66
November	240,960	\$13,834	\$0.06	2,476.00	\$14,275.19	\$5.77	106.82	\$350.41	\$3 28					\$28,459.62
December	257,760	\$15,650	\$0.06	1,960.00	\$12,105.54	\$6.18	101.83	\$368.31	\$3.62					\$28,123.86
January	314,880	\$19,316	\$0.06	2,550.00	\$17,504.08	\$6.86	87.09	\$327.74	\$3.76					\$37,148.13
February	249,120	\$14,603	\$0.06	1,988.00	\$13,102.44	\$6.59	52.72	\$209.68	\$3.98					\$27,915.37
March	271,200	\$16,845	\$0.06	1,849.00	\$12,573.75	\$6.80	63.61	\$260.09	\$4.09					\$29,679.04
April	300,240	\$19,311	\$0.06	2,143.00	\$16,694.23	\$7.79	107.30	\$357.24	\$3.33					\$36,362.94
May	271,440	\$20,118	\$0.07	2,212.00	\$16,507.68	\$7.46	202.51	\$624.19	\$3.08					\$37,249.40
June	92,160	\$7,090	\$0.08	1,390.00	\$11,325.29	\$8.15	203.06	\$625.86	\$3.08					\$19,041.08
July	153,120	\$9,997	\$0.07	1,203.00	\$9,815.91	\$8.16	378.65	\$978.06	\$2.58					\$20,791.40
August	175,200	\$13,410	\$0.08	71.45	\$555.90	\$7.78	679.21	\$1,507.88	\$2.22					\$15,474.24
	$\circ$		Avg.	<b>(2)</b>		Avg.	3		Avg.	<b>4</b>		5)		
Annual	2,848,560	\$183,404	\$0.07	22,144.45	\$143,604.49	\$6.62	2,369.11	\$6,689.31	\$3,23	0.00	\$0.00	0.00	\$0.00	\$333,698.18
Totals	I	}		1	l		1	l		I	l	1	l	I

ANNUAL ENERGY CONSU	JMPTION IN BTU'S:	V				ENERGY	UTILIZATION	INDEX (EUI)	
(oo) Electricity	2848560	KWH x 0.0116	=	33043.296	MMBTU	EUI =	Total Annu	al BTU's	MMBTU/Sq.Ft/Yr.
(pp) Nat. Gas	22764.4931	MMBTU x 1.03	=	23447.42794	MMBTU	1	Building G	ross Sq. Ft.	
qq1) Steam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU	EUI =	(vu)	56490.72394	
qq2) Steam	0	LBS x 0.001390	=	0	MMBTU	1	(a)	109376	
(rr) Chilled Water	0	TON HRS x 0.012	=	0	MMBTU	1			
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.516481897	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	0	x	22	0	MMBTU	1			
			-		_	ENERGY	COST INDEX	(ECI)	
		(uu) TOTAL ANNUAL BTU'S =		56490.72394	MMBTU	ECI =	Annual En	ergy Costs	\$/Sq.Ft./Yr.
							Building G	ross Sq. Ft.	
						ECI =	(nn)	333698.1814	
'Do not include water costs	(hh).					1	(a)	109376	
** Electricity is metered by						1			
The remaining values ar	e metered at the Utilitie	s Department				ECI =	(ww)	3.050926908	\$/Sq.Ft./Yr.
and estimated by buildings	by using its gross square f	oot value.				1			
Form PUA 2									

TEXAS TECH UNIVERSITY INTERNAT	IONAL TEXTILE CENTER 109376
Facility Name Building Na	ame(s) Building Size(s) (GSF)
RECOMMENDED ENER  AND WATER CONSERVATION MI Provide the following recommendations based on an on-site i 1. Scheduled preventive maintenance plan. In Existence X Yes No: Recommended 2. Provide a general estimate, expressed as a range, of ann which could result from implementing the following conse System Changes % Cost Savings  Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventilation shut down Repair of caulking & weatherstripping Maintenance & repair or operating controls	EASURES nspection of building(s): XYes No ual energy and water savings
Subtotal   0	Utility Plant & Distribution System Oper.  Equipment cleaning  Adjustment of air/fuel ration  Combustion monitoring & control  Adjustment of drives, fans, motors, etc.  Steam Trap maintenance  Pipe insulation repair  Subtotal 0
Lighting Systems Operations  Reduce illumination levels  Maximize use of daylight  Install high efficiency lamps  Reduce or delete evening cleaning hours  Subtotal 0	Other Measures (including water use)  *** Noisy chiller area.  Ear protection higly recommended.  99120 Performance Contract  Subtotal 99120.0  Totals 99120.0

TEXAS TE	CH UNIVERSITY		INTERNATIONAL TE	XTILE CENTER	109376	
Institution	Name		Building Name	-	Building Size (GSF)	
	ENERGY AND	WATER CONSER	VATION MEASU	RE RETROFIT R	ECOMMENDATIONS	
1.0	Basic Building Data 1.1 1.2	Annual Energy Use Annual Energy Cost	0.5164819 3.0509269		BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.	
	1.3 Describe physical condition of	building envelope:	Good condition			
	1.4 Describe physical condition of	building energy and water-t	using systems:	Good condition (Exce	eption: AHU 3-85/Regular condition)	
2.0	Based on 1.1 - 1.4 above, indicate Briefly outline recommended retrofi		,		lementation.	
3.0	Based on auditor evaluation, indica and/or cooling systems, or solar do			characteristics present an		
	ENERGY	AND WATER CONS	ERVATION MEA	SURE RETROFIT	T ASSESSMENT	
1.0	Describe proposed energy conserv VFDs on AHUs and lighting upgrad		Smaller, more efficie	nt chiller. VFDs on coolin	g towers, ddc controls on AHUs,	
2.0	Estimate of installed cost of above	measures: \$553,446.0	00			
3.0	Estimate of annual energy and wat	er cost savings for above m	easures:	\$99,120.00		
4.0	Projected simple payback period for	or above measures in years	5.6			

Energy Auditor Certification: I hereby certify that I. JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If further certify that this very infrared interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		Jeremy Dickso			_		Te				806 742 1696 11/22/2005
		e of Energy A							ation and Pho		
	TEXAS TEC	CH UNIVERSI	TY						URAL CENT	ER	Texas Tech university/Lubbock, Tx
	Faci	lity Name					<b>Building Nar</b>	ne(s)			Building/Campus Address
l											
İ						as Tech Univ					
					Name	and Address	of Owner				
I. BASIC	BUILDI	NG DATA									
Building				OPERA	TING SCHEE	DULE					BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup	pants/% GSF	:				T
34700	Days	(c) Daylight (d) Evening (e) Night									
l :							i				Central Bidg, Panel
	M-F	12 Hrs	30	76%	0	0	0%	0	0	0%	(f) Yes X No
Date (b)				Ī		1			1		
Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS
1996						i					(g) Yes X No
	SUN	6 Hrs	0	0%	0	0	0%	0	0	0%	
II. MAJO	RENER	GYUSING	SYSTE	MS							
Primary	Primary	,	Space		Space		Domesti	c	Interior		Special Building
Heat	Cooling		Termina	1	Termina	ıi	Hot Wate	er	Lighting	1	Systems & Facilities
Source (h)	Source	0	Heat (i	)	Cooling (	(k)	Source (	1)	System (	(m)	(m)
Steam	Centrifuga	d Chillers	Fan ar	nd Coil	Fan ar	nd Coil	Heat Ex	changer	Fluore	scent	
Boiler	"				1						
	1				l				1		
	[				1		l		l		
III. UNIQ	UE BUIL	DINGCH	ARACTE	RISTICS	3						
		per day opera				No		5. List vea	r and type of	major build	ling modifications and additions.
	per year op				Yes	No X				,.	•
	Program U:				Yes	No X					
		floodlighting				No					
l" Saliding	IIII GAIGIOI	griding									

Building Nar		INTERNATIO	MAL CULTU	IRAL CENTE	R		(a) Building			34700				
ENERGY U	SE AND COS	T DATA		For Year En	ding:	8/31/2005		** Metered	X Best	Estimate	<u> </u>			_
	ELEC	TRICITY		NAT	URAL GAS			WATER		PI	URCHASED T	HERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WA	TER	ENERGY
MONTH		. \$	1		\$		l	\$	ŀ	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	47,880	\$3,387	\$0.07	51.60	\$261.50	\$5.07	13.20	\$20.86	\$1.58					\$3,669.39
October	44,040	\$2,867	\$0.07	58.10	\$276.85	\$4.77	17.30	\$28.20	\$1.63					\$3,171.88
November	38,640	\$2,475	\$0.06	496.80	\$2,333.41	\$4.70	12.80	\$20.86	\$1.63					\$4,829.02
December	37,440	\$2,163	\$0.06	1,406.60	\$7,633.59	\$5.43	9.10	\$14.83	\$1.63					\$9,811.90
January	40,560	\$2,324	\$0.06	1,490.50	\$8,499.56	\$5.70	9.10	\$14.83	\$1.63					\$10,838.49
February	33,960	\$2,032	\$0.06	1,426.00	\$7,995.24	\$5.61	12.90	\$21.03	\$1.63					\$10,047.94
March	36,000	\$2,241	\$0.06	600.10	\$3,338.62	\$5.56	13.60	\$22.17	\$1.65					\$5,601.70
April	43,200	\$2,583	\$0.06	303.30	\$1,698.30	\$5.60	13.40	\$21.84	\$1.56					\$4,302.72
May	42,240	\$2,559	\$0.06	45.20	\$250.10	\$5.53	14.00	\$22.82	\$1.39					\$2,831.61
June	46,560	\$3,223	\$0.07	38.70	\$258.65	\$6.68	16.40	\$26.73	\$1.16					\$3,508.65
July	53,400	\$4,608	\$0.09	45.20	\$282.59	\$6.25	23.00	\$37.49	\$2.43					\$4,928.29
August	52,080	\$2,911	\$0.06	45.20	\$271.53	\$6.01	15.40	\$25.10	\$8.37					\$3,207.27
	5		Avg.	2)		Avg.	3		Avg.	<b>④</b>		(3)		
Annual	516,000	\$33,372	\$0.07	6,007.30	\$33,099.94	\$5.58	170.20	\$276.76	\$2.19	0.00	\$0.00	0.00	\$0.00	\$66,748.86
Totals					L							L		

NNUAL ENERGY CONS	UMPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
oo) Electricity	516000	KWH x 0.0116	=	5985.6	MMBTU	EUI =	Total Annua	al BTU's	MMBTU/Sq.Ft./Yr.
p) Nat. Gas	6175.5044	MMBTU x 1.0	=	6175.5044	MMBTU	1	Building Gra	oss Sq. Ft.	
qq1) Steam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU	EUI ≈	(uu)	12161.1044	
qq2) Steam	0	LBS x 0.001390	=	0	MMBTU		(a)	34700	
r) Chilled Water	0	TON HRS x 0.012	=	0	MMBTU				
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.350464104	MMBTU/Sq.Ft/Yr.
t) Other Fuel	0	x	=	0	MMBTU				
		<del></del>				ENERGY	COST INDEX	(ECI)	
	(ui	) TOTAL ANNUAL BTU'S =		12161.104	MMBTU	ECI =	Annual Ene	rgy Costs	\$/Sq.Ft./Yr.
							Building Gr	oss Sq. Ft.	
						ECI =	(nn)	66748.86	
Do not include water costs	s (hh).					1	(a)	34700	
Electricity is metered by	building.								
he remaining values ar	e metered at the Utilities De	partment				ECI =	(ww)	1.923598271	\$/Sq.Ft./Yr.
nd estimated by buildings	by using its gross square foot v	alue.				1			
orm PUA 2									

	TER AND ENER			PUA3
TEXAS TECH UNIVERSITY		IONAL CULTURAL CEN		
Facility Name	Building Na	ame(s)	Building Size	(s) (GSF)
	RECOMMENDED ENER	CV		
AND WA	RECOMMENDED ENER TER CONSERVATION ME			
Provide the following recommend				
Scheduled preventive mainter		ispection of building(s):		
In ExistenceXYes		X Yes No		
Provide a general estimate, e			inas	
which could result from imple			iiigs	
System Changes	% Cost Savings	System Changes	% Cost Savin	
Ventilation System Operations	76 Cost Gavings	Water Systems Operati		ys
Reduced ventilation		Repair all leaks	Ulis	
Variable ventilation		Reduction of wate	r consumption	
Unoccupied area ver	stilation shut down	Reduce hot water		
Repair of caulking &		Increase chilled w		
	r or operating controls	Increase crimed w	Subtotal	0
Wall tellance & repai	Subtotal 334		Subidiai _	· ·
	300(0(a) 334	-		
Heating & Cooling System Opera	tions	Utility Plant & Distribution	on System One	
Change in thermosta		Equipment cleani		
Provide locking them		Adjustment of air/		
Reset of air & water		Combustion moni		
Unoccupied reset or		Adjustment of driv		s. etc.
Shut down non-critic		Steam Trap maint		0, 0.0.
_	Subtotal 133	Pipe insulation rei		
			l Subtotal	0
		Gubtoto		
Lighting Systems Operations		Other Measures (includ	ing water use)	
Reduce illumination I	evels			
Maximize use of day	light			
Install high efficiency				
Reduce or delete eve				
_	Subtotal 0		Subtotal	0
	· <del></del>	1	Totals	467.0
			=	

EXAS T	ECH UNIVERSITY			INTERNATIONAL CULTURAL CENTER	34700	PUA4
nstitution	Name			Building Name	Building Size (GSF)	
	ENERGY	AND WATER	CONSERV	ATION MEASURE RETROFIT	RECOMMENDATIONS	
1.0	Basic Building Data		Energy Use Energy Cost	0.3504841	BTU/Sq.Ft/Yr.	
	1.3 Describe physical cor			Good condition	wageton.	
	1.4 Describe physical cor	ndition of building ene	ergy and water-us	ing systems: Good condition		
2.0	Based on 1.1 - 1.4 above, Briefly outline recommend	indicate the need and ed retrofit options;	d potential for ene	ergy and water conservation measure retrofit	Implementation.	
3.0	Based on auditor evaluation and/or cooling systems, or	on, indicate whether o	or not the building	conditions and/or site characteristics present	an opportunity to apply solar heating	
	ENE	RGY AND WA	TER CONSE	RVATION MEASURE RETRO	FIT ASSESSMENT	
1.0	Describe proposed energy	conservation measu	res:			
2.0	Estimate of installed cost of	f share mass was	\$0.00			
3.0	Estimate of annual energy	and water cost savin	gs for above mea	sures: \$467.00		

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, persiants hovers, and building configurators.

	.1	leremy Dicks	nn				Te	xas Tech Ur	niversity-Phys	ical Plant /	/ 806 742 1696 11/22/2005	
		e of Energy A						Organiza	ation and Pho	ne Numbe		
		HUNIVERS					INDUSTRIAL	LENGINEE	RING		Texas Tech university/Lubbock, Tx	
		lity Name					Building Nan	ne(s)			Building/Campus Address	
		•										
						s Tech Uni						
					Name a	nd Address	of Owner					
	BUILDE	NG DATA										
Building					TING SCHED						BASIC HVAC CONTROL DATA	
Size (a)				Time Period	: Hrs/Occup		:					
28130	Days	(c) [	Daylight		(d) E	vening		(e)	Night			
! I											Central Bldg. Panel	
	M - F	12 Hrs	290	89%	4 Hrs	7	2%	. 0	0	0%	(f) Yes <u>X</u> No	
Date (b)							1	_			FMS	
Occupied	SAT	6 Hrs	16	5%	-0	0	0%	0	0	0%		
1925		1			1		l	_	1 _		(g) Yes X No	
	SUN	6 Hrs	7	2%	0	0	0%	0	0	0%		
		GY USIN					Domestic		Interior		Special Building	
Primary	Primary		Space		Space						Systems & Facilities	
Heat	Cooling		Termina		Terminal		Hot Wate		Lighting		(n)	
Source (h)	Source		Heat (j		Cooling (		Source (		System (		(n)	
Steam	Centrifuga	al Chillers	Fana	nd Coil	Fan an	d Coil	Heat Ex	changer	Fluore	scent		
Boiler			l		i				1			
!			1		1				1			_
	L		<u> </u>		L		ــــــــــــــــــــــــــــــــــــــ					
III. UNIQ	UE BUIL	DINCCH	ADACTE	DISTICS	,			- 60				
		per day oper		NIJ IIU		No X			r and type of	maior build	ding modifications and additions.	
Year rou     9 month			auon		Yes X			o. List yea	, one type of	mojor bund	ang mounocoro ano accessoro.	
	Program U				Yes X							
		se floodlighting			Yes X							
A. Building	nas extenor	noouigning			162 _ 7_							
į.												

	ilding Name(s) INDUSTRIAL ENGINEERING (a) Building Size(s) (Gross Sq. Ft.) 28130													
Building Nam			ENGINEER					** Metered		Estimate	<del></del>			
ENERGY US	SE AND COST			For Year En		8/31/2005			X Best			IFFO. AAI		TOTAL
	ELEC	TRICITY		NAT	URAL GAS			WATER			URCHASED TI			
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC		CHILLED WA		ENERGY
MONTH		s			s			\$	1	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	27,480	\$1,786	\$0.07	27.82	\$178.11	\$6.40	64.65	\$172.53	\$2.67	75.03	\$830.91	14,735.31	\$1,974.97	\$4,943.01
October	24,000	\$1,494	\$0.06	32.01	\$180.41	\$5.64	34.71	\$105.20	\$3.03	125.41	\$1,430.24	12,442.14	\$1,725.47	\$4,935.02
November	27.600	\$1,585	\$0.06	46.47	\$344.64	\$7.42	27.47	\$90.12	\$3.28	184.85	\$2,593.71	7,914.17	\$1,295.68	\$5,908.73
December	30,240	\$1,836	\$0.06	62.63	\$434.77	\$6.94	26.19	\$94.72	\$3.62	226.65	\$2,670.52	6,957.09	\$1,013.26	\$6,049.30
January	31,080	\$1,907	\$0.06	71.64	\$461.52	\$6.44	22.40	\$84.29	\$3.76	227.26	\$2,617.45	7,443.47	\$989.23	\$6,059.08
February	26,880	\$1,576	\$0.06	61.81	\$404.59	\$6.55	13.56	\$53.93	\$3.98	207.95	\$2,275.81	8,349.62	\$942.58	\$5,252.60
March	27,000	\$1,677	\$0.06	54.80	\$360.93	\$6.59	16.36	\$66.89	\$4.09	185.67	\$2,316.09	8,673.94	\$1,268.45	\$5,689.42
April	30,120	\$1,937	\$0.06	47.12	\$354.21	\$7.52	27.60	\$91.88	\$3.33	124.85	\$1,601.56	10,510.14	\$1,522.22	\$5,507.18
May	22,920	\$1,699	\$0.07	34.82	\$232.99	\$6.69	52.08	\$160.53	\$3.08	107.20	\$670.82	12,026.57	\$2,449.17	\$5,212.21
June	19,800	\$1,523	\$0.08	28.59	\$193.53	\$6.77	52.22	\$160.96	\$3.08	78.28	\$30.69	16,313.72	\$3,276.92	\$5,185.33
July	20,400	\$1,332	\$0.07	27.98	\$211.72	\$7.57	97.38	\$251.54	\$2.58	81.16	\$769.19	18,885.09	\$2,596.61	\$5,161.00
August	18,960	\$1,451	\$0.08	43.49	\$338.39	\$7.78	174.68	\$387.81	\$2.22	72.09	\$842.64	19,322.33	\$3,212.46	\$6,232.55
			Avg.	2)		Avg.	3		Avg.	<b>(4)</b>		5)		
Annual	306,480	\$19,803	\$0.07	539.18	\$3,695.79	\$6.86	609.30	\$1,720.40	\$3.23	1,696.40	\$18,649.62	143,573.58	\$22,267.00	\$66,135.44
Totals				1	l					1				

ANNUAL ENERGY CONSU	JMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)	
(oo) Electricity	306480	KWH x 0.0116	=	3555.168	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft./Yr.
(pp) Nat. Gas	539.182452	MMBTU x 1.0	=	539.18245	MMBTU	1	Building Gross Sq. Ft.	
qq1) Steam/Hot Water	1696.4041	MMBTU x 1.0	=	1696.4041	MMBTU	EUI =	(uu) 7513.637529	
qq2) Steam	0	LBS x 0.001390	200	0	MMBTU	i i	(a) 28130	
rr) Chilled Water	143573.581	TON HRS x 0.012	=	1722.883	MMBTU	1		
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv) 0.267104071	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	0	x	=	0	MMBTU	1		
						ENERGY	COST INDEX (ECI)	
	(tiu) TO	TAL ANNUAL BTU'S =		7513.6375	MMBTU	ECI =	Annual Energy Costs	\$/Sq.Ft/Yr.
					_	1	Building Gross Sq. Ft.	
						ECI =	(nn) 66135.4409	
*Do not include water costs	(hh).					1	(a) 28130	
** Electricity is metered by I								
	e metered at the Utilities Departm	nent				ECI =	(ww) 2.351064376	\$/Sq.Ft./Yr.
	by using its gross square foot value.					1		
Form PUA 2	-,							

DDELIMIN	ADV	WATED	ANDEN	IEPGV	

PUA3

TEXAS TECH UNIVERSITY	INDUSTRIAL	RIAL ENGINEERING 28130				
Facility Name	Building Nam	ne(s)	Building Size(s) (GSF)			
RECOMMEN AND WATER CONSER Provide the following recommendations based or  1. Scheduled preventive maintenance plan. In Existence X Yes No; Rec 2. Provide a general estimate, expressed as ar which could result from implementing the fol	VATION MEAn an on-site instructions on on-site instructions on the commended _ range, of annual	ASURES spection of building(s):  X Yes No all energy and water sav	ings			
System Changes % Cost Sa	vings	System Changes	% Cost Savings			
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventilation shut do Repair of caulking & weatherstrippin Maintenance & repair or operating c Subtotal	wn ng	Water Systems Operati Repair all leaks Reduction of wate Reduce hot water Increase chilled w	er consumption temperature			
Heating & Cooling System Operations		Utility Plant & Distribution				
Change in thermostat control set po Provide locking thermostat covers  Reset of air & water temperatures Unoccupied reset or shut down of stone Shut down non-critical exhaust systems.	ystem ems	Steam Trap main: Pipe insulation re	fuel ration toring & control res, fans, motors, etc. tenance			
Lighting Systems Operations  X Reduce illumination levels  Maximize use of daylight  L Install high efficiency lamps  Reduce or delete evening cleaning  Subtotal	hours	Other Measures (includ				

TEXAS T	ECH UNIVERSITY			INDUSTRIAL ENGINEERING	28130	
Institution	Name			Building Name	Building Size (GSF)	•
	ENERG	Y AND WATE	R CONSERV	ATION MEASURE RETRO	OFIT RECOMMENDATIONS	
1.0	Basic Building Data	1.1 Annua	I Energy Use	0.2671041	BTU/Sq.Ft./Yr.	
		1.2 Annua	l Energy Cost	2.3510644	\$/Sq.Ft./Yr.	
	1.3 Describe physical of	condition of building e	envelope:	Good condition		-
	1.4 Describe physical of	condition of building e	energy and water-u	sing systems: Good cond	lition	-
2.0	Based on 1.1 - 1.4 abov Briefly outline recomme Lighting retrofit Reset schedule			ergy and water conservation measure	retrofit implementation.	-
	Economizer					
3.0	Based on auditor evalua and/or cooling systems,				oresent an opportunity to apply solar heating es No	-
	EN	ERGY AND W	ATER CONS	ERVATION MEASURE RE	TROFIT ASSESSMENT	
1.0	Describe proposed ener Adjust AHU's reset sche	edule		Retrofit (efficiency/illumination level)	existing lighting system	-
	Adjust AHU's economiz	er operation setpoint				
2.0	Estimate of installed co	st of above measures	\$16,636.25			-
3.0	Estimate of annual ener	gy and water cost sa	vings for above me	sasures: \$2,867.0	0	-
4.0	Projected simple payba	ck period for above n	neasures in years:	5.8		

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further cortify that I have no financial reflexed in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, peraintal proxy, and building configurations.

		leremy Dickso	on				Te				806 742 1696 11/22/2005
	Nam	e of Energy A	uditor					Organiza	ation and Pho	one Numbe	
	TEXAS TE	HUNIVERSI	TY				HUMAN SCI	ENCES			Texas Tech university/Lubbock, Tx
	Fac	lity Name					<b>Building Nar</b>	ne(s)		-	Building/Campus Address
		-									
					Tex	s Tech Univ	ersity				
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building				OPERA	TING SCHEE	DULE					BASIC HVAC CONTROL DATA
Size (a)				Time Perior	d: Hrs/Occup						
175428	Days	(c) D	aylight		(d) E	vening		(e)	Night	_	
1					į .					0%	Central Bidg. Panel
	M-F	12 Hrs	3509	60%	0	117	2%	0	0	(f) Yes X No	
Date (b)									1		
Occupied	SAT	0 Hrs	292	5%	0	0	0%	0	0	0%	EMS
1925											(g) Yes X No
l	SUN	0 Hrs	117	2%	0	0	0%	0	0	0%	
II. MAJO	RENER	GYUSINO	SYSTE	MS							
Primary	Primar	,	Space		Space		Domesti	c	Interior		Special Building
Heat	Cooling	, !	Termina	a .	Termina	1	Hot Wat	er	Lighting	3	Systems & Facilities
Source (h)	Source	(i)	Heat (i	)	Cooling	(k)	Source (	3)	System (	(m)	(n) ·
Steam	Centrifug	al Chillers	Fan ai	nd Coil	Fan a	nd Coil	Heat Ex	changer	Fluore	scent	
Boiler			1		1				1		
					1				1		
l					1				1		
	•										
III. UNIQ	UE BUIL	DINGCH	ARACTE	RISTIC	S						
1. Year rou	ınd, 24 hour	per day opera	ation		Yes	No X		5. List year	r and type of	major build	ling modifications and additions.
2. 9 month	per year op	eration			Yes X	No					
3. Summer	Program U	se			Yes X	No					
		floodlighting		*	Yes X						
		3				_					

1														1
Building Na	ame(s)	<b>HUMAN SCIEN</b>	ICES					g Size(s) (G						
ENERGY	USE AND CO	OST DATA		For Year E	nding	8/31/2005		** Metered_	X Bes	t Estimate _	X			
	1	LECTRICITY		N.	ATURAL GA	NS		WATER				ED THERMAL		TOTAL
1 .	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-H	IOT WATER		WATER	ENERGY
MONTH		\$			\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	68,400.00	\$ 4,446,74	\$0.07	173.48	\$1,110.73	\$6.40	403.15	\$1,075.93	\$2.67	467.93	\$5,181.86	91,894.29	\$12,316.57	\$24,131.83
October	68,400.00	\$ 4,257.06	\$0.06	199.63	\$1,125.12	\$5.64	216.48	\$656.06	\$3.03	782.08	\$8,919.44	77,593.28	\$10,760.59	\$25,718.26
November	64,200.00	\$ 3,685.86	\$0.06	289.82	\$2,149.30	\$7.42	171.33	\$562.02	\$3.28	1,152.76	\$16,175.24	49,355.40	\$8,080.28	\$30,652.70
December	61,800.00	\$ 3,752.22	\$0.06	390.59	\$2,711.35	\$6.94	163.32	\$590.73	\$3.62	1,413.46	\$16,654.22	43,386.73	\$6,319.00	\$30,027.51
January	58,200.00	\$ 3,570.28	\$0.06	446.79	\$2,878.16	\$6.44	139.69	\$525.66	. \$3.76	1,417.28	\$16,323.27	46,419.94	\$6,169.15	\$29,466.53
February	60,600.00	\$ 3,552.33	\$0.06	385.49	\$2,523.15	\$6.55	84.55	\$336.31	\$3.98	1,296.86	\$14,192.70	52,071.02	\$5,878.27	\$26,482.76
March	64,200.00	\$ 3,987.69	\$0.06	341.74	\$2,250.87	\$6.59	102.02	\$417.16	\$4.09	1,157.91	\$14,443.91	54,093.54	\$7,910.45	\$29,010.07
April	74,400.00	\$ 4,785.42	\$0.06	293.86	\$2,208.95	\$7.52	172.09	\$572.98	\$3.33	778.61	\$9,987.84	65,544.70	\$9,493.04	\$27,048.22
May	57,600.00	\$ 4,268.97	\$0.07	217.14	\$1,452.99	\$6.69	324.81	\$1,001.14	\$3.08	668.55	\$4,183.47	75,001.66	\$15,273.85	\$26,180.41
June	54,000.00	\$ 4,154.25	\$0.08	178.28	\$1,206.94	\$6.77	325.69	\$1,003.82	\$3.08	488.18	\$191.41	101,737.75	\$20,435.95	\$26,992.37
July	54,000.00	\$ 3,525.74	\$0.07	174.47	\$1,320.34	\$7.57	607.31	\$1,568.70	\$2.58	506.13	\$4,796.90	117,773.66	\$16,193.30	
August	52,200.00	\$ 3,995.58	\$0.08	275.62	\$2,144.40	\$7.78	1,089.39	\$2,418.49	\$2.22	449.58	\$5,254.96	120,500.46	\$20,033.95	\$33,847.38
	0		Avg.	<b>②</b>		Avg.	3		Avg.	4)		5)		
Annual	738,000	\$47,982	\$0.07	3,367	\$23,082	\$6.86	3,800.00	\$10,729	\$3.23	10,579	\$116,305	895,372	\$138,864	\$336,963
Totals		'		1			1			i		1		

ANNU	AL ENERGY CONS	SUMPTION IN BTU'S:					ENERGY	UTILIZATIO	N INDEX (EUI)	
(00)	Electricity	738,000.00	KWH x 0.0116	==	8,560.80		EUI =	Total Annua		MMBTU/Sq.Ft./Yr.
(pp)	Nat. Gas	3,367.00	MMBTU x 1.0	=	3,367.00	MMBTU	t	Building Gr		
(qq1)	Steam/Hot Water	10,579.00	MMBTU x 1.0	=	10,579.00		EUI =	(uu)	33,251.26	
	Steam	-	LBS x 0.001390	=		MMBTU	1	(a)	175,428.00	
(rr)	Chilled Water	895,372.00	TON HRS x 0.012	=	10,744.46	MMBTU	1			
	Propane or Butane	-	GAL x 0.095475	=	-	MMBTU	EUI =	(vv)	0.18954365	MMBTU/Sq.Ft./Yr
(tt)	Other Fuel	-	×	=	-	MMBTU	1			
1.	-					_	ENERGY	COST INDE	X (ECI)	
ļ		(uu) 1	FOTAL ANNUAL BTU'S =		33,251.26	MMBTU	ECI =	Annual Ene	ergy Costs	\$/Sq.Ft./Yr.
l							ļ	Building Gr	oss Sq. Ft.	
1							ECI =	(nn)	336,963.00	
*Do n	ot include water cos	ts (hh),					ļ	(a)	175,428.00	
** Ele	ctricity is metered b	v building.					1			
The re	emaining values are	metered at the Utilities Departme	ent				ECI =	(ww)	1.92080512	\$/Sq.Ft./Yr.
		s by using its gross square foot v								
	PUA 2						•			

PRELIMINARY WATE	RANDENER	GΥ	AUDIT		PUA3
TEXAS TECH UNIVERSITY	HUMAN SC	IENCE	ES	175428	
Facility Name	Building Na	me(s)		Building Siz	ze(s) (GSF)
	OMMENDED ENERG		RES		
Provide the following recommendations  1. Scheduled preventive maintenance in Existence X Yes Yes Provide a general estimate, express which could result from implementi	plan. o; Recommended sed as a range, of annu	X ial ene	Yes No ergy and water sa		
System Changes %	Cost Savings	Syste	m Changes	% Cost Sa	vings
Ventilation System Operations Reduced ventilation X. Variable ventilation Unoccupied area ventilation Repair of caulking & weath Maintenance & repair or op  Heating & Cooling System Operations X. Change in thermostat cont Provide locking thermostat X. Reset of air & water tempe Unoccupied reset or shut Shut down non-critical exh	perstripping perating controls Subtotal 10176  rol set points a covers pratures down of system		or Systems Oper: Repair all leaks Reduction of we Reduce hot wat Increase chilled Plant & Distribu Equipment clea Adjustment of Combustion ma Adjustment of Steam Trap ma Pipe insulation Subto	atter consumptic er temperature water tempera Subtotal attion System O ning ir/fuel ration nitoring & cont rives, fans, mo intenance	ture 0 per.
Lighting Systems Operations  X Reduce illumination levels  Maximize use of daylight  X Install high efficiency lamp  Reduce or delete evening	s	Othe	r Measures (incl	uding water us Subtotal Totals	0 28010.0

TEXAS TI	ECH UNIVERSITY		HUMAN SCIENCES	175428	
nstitution	Name		Building Name	Building Size (GSF)	
	ENERGY A	ND WATER CONSE	RVATION MEASURE RE	TROFIT RECOMMENDATIONS	
1.0	Basic Building Data 1	.1 Annual Energy Use	0.1895437	BTU/Sq.Ft/Yr.	
	1	.2 Annual Energy Cost	1.9208051	\$/Sq.Ft./Yr.	
	1.3 Describe physical condition	on of building envelope:	Good condition		_
	1.4 Describe physical condition	on of building energy and wate	r-using systems: Good	condition	_
2.0	Based on 1.1 - 1.4 above, indic	cate the need and potential for	energy and water conservation mean	sure retrofit implementation.	
	Briefly outline recommended re	etrofit options: Lighting re	trofit		_
	Reset schedule				_
	Time of day schedule optimiza	tion			
	Economizer				
	VFD installation on AHUs				_
3.0	Based on auditor evaluation, in	ndicate whether or not the build		tics present an opportunity to apply solar heating	
	and/or cooling systems, or sola	ar domestic hot water heating s	ystems	YesX No	
	ENERG	Y AND WATER CON	SERVATION MEASURE	RETROFIT ASSESSMENT	
1.0	Describe proposed energy con		Retrofit (efficiency/illumination	evel) existing lighting system	
	Adjust AHU's reset schedule/E				
	Update building utilities operat				
	Install VFDs on AHU's fan mot				<b>—</b> .
2.0	Estimate of installed cost of ab	ove measures: \$156,158	.33		
3.0	Estimate of annual energy and	water cost savings for above	measures: \$28,	010.00	
4.0	Projected simple payback period	od for above measures in yea	rs: 5.6	-	

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	Jeremy Dickson -							xas Tech Ur	niversity-Phys	ical Plant	/ 806 742 1696 11/22/2005
		e of Energy A						Organiz	ation and Pho	ne Numbe	er of Auditor Date
		HUNIVERS					HOLDEN HA				Texas Tech university/Lubbock, Tx
		lity Name					Building Nan	ne(s)			Building/Campus Address
l		,					•				
						as Tech Univ					
					Name	and Address	of Owner				
I. BASIC	BUILDI	NG DATA									
Building					ING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period							
178442	Days	(c) [	Daylight		(d) E	vening		(e)	Night		
									1		Central Bldg. Panel
	M-F	12 Hrs	3271	55%	0	0	0%	0	0	0%	(f) Yes X No
Date (b)			Ī.	1							
Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS
1949			1								(g) Yes X No
1	SUN	0 Hrs	0	0%	. 0	0	0%	0	0	0%	
	•										
H. MAJO	RENER	GYUSINO	SSYSTE	MS							
Primary	Primary	,	Space		Space		Domesti	C	Interior		Special Building
Heat	Cooling		Termina	ıt	Termina	il	Hot Wat	er	Lighting		Systems & Facilities
Source (h)	Source	(i)	Heat (j	)	Cooling	(k)	Source (	l)	System (	m)	(n)
Steam	Centrifuga	al Chillers	Fan a	nd Coil	Fan ai	nd Coil	Heat Ex	changer	Fluore	scent	
Boiler	l		1				ŀ		1		
1	1						!		1		
1	l		l				1				
III. UNIQ	UE BUIL	DINGCH	ARACTE	RISTICS							
1. Year rou	ınd, 24 hour	per day oper	ation		Yes X	No		5. List yea	r and type of	major buik	ding modifications and additions.
2. 9 month	per year op	eration			Yes	No X					
3. Summer	Program Us	se			Yes	No X					
4. Building	has exterior	floodlighting			Yes X	No					
1											

Building Na		HOLDEN HALL						Size(s) (Gro		178442				
ENERGY	USE AND CO	OST DATA		For Year E	nding	8/31/2005		** Metered	X Best E	stimate X	_			
		LECTRICITY		N	ATURAL GA	AS		WATER			PURCHASE			TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	OT WATER	CHILLE	WATER	ENERGY
MONTH		\$		1	S S			\$	1	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	142,400.00	\$ 9,257.55	\$0.07	176.46	\$1,129.81	\$6.40	410.08	\$1,094.41	\$2.67	475.97	\$5,270.88	93,473.11	\$12,528.18	\$29,280.84
October	132,400.00	\$ 8,240.27	\$0.06	203.05	\$1,144.45	\$5.64	220.20	\$667.33	\$3.03	795.52	\$9,072.68	78,926.40	\$10,945.47	\$30,070.19
November	120,800.00	\$ 6,935.38	\$0.06	294.80	\$2,186.23	\$7.42	174.27	\$571.67	\$3.28	1,172.57	\$16,453.14	50,203.36	\$8,219.11	\$34,365.54
December	128,000.00	\$ 7,771.58	\$0.06	397.30	\$2,757.93	\$6.94	166.13	\$600.88	\$3.62	1,437.75	\$16,940.35	44,132.15	\$6,427.56	\$34,498.30
January	124,400.00	\$ 7,631.32	\$0.06	454.47	\$2,927.61	\$6.44	142.09	\$534.70	\$3.76	1,441.63	\$16,603.72	47,217.48	\$6,275.14	\$33,972.49
February	112,400.00	\$ 6,588.81	\$0.06	392.12	\$2,566.50	\$6.55	86.00	\$342.09	\$3.98	1,319.14	\$14,436.55	52,965.64	\$5,979.26	\$29,913.20
March	117,200.00	\$ 7,279.71	\$0.06	347.61	\$2,289.54	\$6.59	103.77	\$424.32	\$4.09	1,177.80	\$14,692.07	55,022.91	\$8,046.36	\$32,732.00
April	141,200.00	\$ 9,082.00	\$0.06	298.91	\$2,246.90	\$7.52	175.05	\$582.82	\$3.33	791.99	\$10,159.44	66,670.81	\$9,656.14	\$31,727.30
May	113,600.00	\$ 8,419.36	\$0.07	220.87	\$1,477.95	\$6.69	330.39	\$1,018.34	\$3.08	680.03	\$4,255.35	76,290.25	\$15,536.26	\$30,707.26
June	119,200.00	\$ 9,170.13	\$0.08	181.34	\$1,227.67	\$6.77	331.28	\$1,021.07	\$3.08	496.57	\$194.70	103,485.69	\$20,787.06	\$32,400.62
July	116,400.00	\$ 7,599.93	\$0.07	177.47	\$1,343.02	\$7.57	617.75	\$1,595.65	\$2.58	514.83	\$4,879.32	119,797.11	\$16,471.52	\$31,889.45
August	110,000.00	\$ 8,419.81	\$0.08	117.32	\$912.81	\$7.78	1,108.10	\$2,460.04	\$2.22	457.30	\$5,345.24	122,570.76	\$20,378.15	\$37,516.05
	D		Avg.	2		Avg.	③		Avg.	<b>4</b>		(5)		
Annual	1,478,000	\$96,396	\$0.07	3,262	\$22,210	\$6.86	3,865	\$10,913	\$3.23	10,761	\$118,303	910,756	\$141,250	\$389,073
Totals												L		

ANNUAL ENERGY CON	SUMPTION IN BTU'S:	-				ENERGY U	TILIZATION	INDEX (EUI)	
(oo) Electricity	1,478,000.00	KWH x 0.0116	=	17144.8	MMBTU	EUI =		ual BTU's	MMBTU/Sq.Ft./Yr.
(pp) Nat. Gas	3,262.00	MMBTU x 1.0	=		MMBTU		Building (	Gross Sq. Ft.	
(qq1) Steam/Hot Water	10,761.00	MMBTU x 1.0	=	10,761.00	MMBTU	EUI ≃	(uu)	42,096.87	
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU		(a)	178,442.00	
(rr) Chilled Water	910,756,00	TON HRS x 0.012	20	10,929.07	MMBTU				
(ss) Propane or Butane	-	GAL x 0.095475	=		MMBTU	EUŧ =	(vv)	0.23591347	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	-	_ x	=	-	MMBTU	1			
1		-	-			ENERGY C	OST INDEX	(ECI)	
1	(uu) TOT	AL ANNUAL BTU'S =		42,096.87	MMBTU	ECI =	Annual E	nergy Costs	\$/Sq.Ft./Yr.
					-	1	Building (	Gross Sq. Ft.	
						ECI =	(nn)	389,073.00	
*Do not include water co:	sts (hh).					1	(a)	178,442.00	
** Electricity is metered b	v building.					ł			
The remaining values are	metered at the Utilities Department					ECI =	(ww)	2.18038915	\$/Sq.Ft./Yr.
	gs by using its gross square foot value	t.				i			
Form DLIA 2	Fr			,		•			

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PUA3

TEXAS TECH UNIVERSITY	HOLDEN HA	ALL	178442	
Facility Name	Building Nar	me(s)	Building Size	s) (GSF)
RECOMM AND WATER CONS Provide the following recommendations base  1. Scheduled preventive maintenance plan. In Existence X Yes No:	ed on an on-site in	ASURES		
2. Provide a general estimate, expressed a			vings	
which could result from implementing the	e following conser	vation measures.		
	t Savings	System Changes	% Cost Savin	gs
Ventilation System Operations Reduced ventilation X. Variable ventilation Variable ventilation Unoccupied area ventilation shit Repair of caulking & weathersti Maintenance & repair or operati Subt  Heating & Cooling System Operations Change in thermostat control se Provide locking thermostat control se Provide locking thermostat cove X. Reset of air & water temperatur Unoccupied reset or shut down Shut down non-critical exhaust	pping ng controls otal 7767  It points rs es of system	Water Systems Opera Repair all leaks Reduction of wate Reduce hot wate Increase chilled v  Utility Plant & Distribut Equipment clean Adjustment of air Combustion mor Adjustment of dir Steam Trap mair Pipe insulation re	er consumption r temperature   water temperatur Subtotal _  fon System Ope ling fuel ration itoring & control ves, fans, motor tenance	
Lighting Systems Operations  X Reduce illumination levels  Maximize use of daylight  X Install high efficiency lamps  Reduce or delete evening clean  Subt		Other Measures (inclu	Subtotal	0 26055.0

	IMINARY WATER AND ENERGY A	HOLDEN HALL	178442	
Institution		Building Name	Building Size (GSF)	-
	ENERGY AND WATER CONSE	PVATION MEASURE RETR	OFIT RECOMMENDATIONS	
	ENERGY AND WATER GONGE	WENDONE KEIN	OTT REGOMMENDATIONS	
1.0	Basic Building Data 1.1 Annual Energy Use	0.2359135	BTU/Sq.Ft./Yr.	
	1.2 Annual Energy Cost	2.1803891	\$/Sq.Ft./Yr.	
	1.3 Describe physical condition of building envelope:	Good condition		_
				-
	1.4 Describe physical condition of building energy and wa	ter-using systems: Good con	dition	-
2.0	Based on 1.1 - 1.4 above, indicate the need and potential f	or energy and water conservation measure	retrofit implementation.	
	B. B. W	33	•	
	Lighting retrofit			-
	Reset schedule			-
	Time of day schedule optimization			-
	Economizer			-
3.0	Based on auditor evaluation, indicate whether or not the bu	ilding conditions and/or site characteristics	present an opportunity to apply solar heating	-
	and/or cooling systems, or solar domestic hot water heating	g systems.	Yes X No	
	ENERGY AND WATER CO	NSERVATION MEASURE RE	TROFIT ASSESSMENT	
	Describe proposed energy conservation measures:	Install VFDs on AHU Motors		
1.0				_
1.0	Retrofit (efficiency/illumination level) existing lighting syster	m		
1.0				-
1.0	Retrofit (efficiency/illumination level) existing lighting syster			-
2.0	Retrofit (efficiency/illumination level) existing lighting syster Adjust AHU's reset schedule/Economizer operation setpoir	nt		-

Projected simple payback period for above measures in years:

Energy Auditor Certification: I hereby certify that t. \_\_legemy <u>Dickson</u>\_(name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that this audit reflects the current energy rices, operation how, and building outlinearions.

		Jeremy Dicks			_		Te				/ 806 742 1696 11/22/2005	
		e of Energy A							zation and Pho	one Numbe		
	TEXAS TEC	CH UNIVERS	ITY		_		FORE	IGN LANG	UAGE		Texas Tech university/Lubbock, T	x
1	Facility	y Name			_		Bu	uilding Nam	e(s)		Building/Campus Address	
ì												
						as Tech Univ						
					Name	and Address	of Owner					
	BUILDI	NG DATA										
Building				OPERA	TING SCHE	DULE					BASIC HVAC CONTROL DATA	
Size (a)				Time Perio	d: Hrs/Occu	pants/% GSF						
66858	Days	(c)	Daylight		(d) I	vening		(e)	) Night			
				1					1		Central Bldg, Panel	
	M-F	12	1100	50%	4	50	2%	0	0	0%	(f) Yes X No	
Date (b)	-		1	· · · · · ·		1			1			
Occupied	SAT	0	0	0%	0	0	0%	0	0	0%	EMS	
1967									+		(g) Yes <u>X</u> No	
	SUN	0	0	0%	0	0	0%	0	0	0%	187 1-2	
				/					·		<u> </u>	
II. MAJO	RENERO	SYUSIN	GSYSTE	MS				***************************************			7	
Primary	Primary	,	Space		Space		Domesti	c	Interior		Special Building	
Heat	Cooling		Termina	4	Termina	ıl	Hot Wate	er	Lighting	i	Systems & Facilities	
Source (h)	Source	a	Heat (i	١	Cooling	(k)	Source (	D.	System (	m)	(n)	
Steam	Centrifuga	d Chillers	Fan ar			nd Coii	Heat Exc		Fluore			
Boiler	1						1		1			
			l		1		1		1			
	l		1		l		1		1			
	·										<u> </u>	
III IINIO	HE BILL	DINGCH	ARACTE	PICTIC	0							
		per day oper		KISTIC:	Yes	No X		E Lietwor	or and hope of	major build	fing modifications and additions.	
	per year ope		auon		Yes_X			o. List yes	ar arru type or	major build	ang mounications and additions.	
	Program Us				Yes X	No						
						No						
4. bullding	nas extenor	floodlighting			Yes_X_	No						

\$/Sq.Ft,/Yr.

\$/Sa.Ft./Yr.

<b>Building Nan</b>		EIGN LANGU	AGE				(a) Building	g Size(s)(Gro	ss Sq. Ft.):	66,858				
ENERGY U	SE AND CO	ST DATA		For Year E		8/31/2005		" Metered	X Best	Estimate	X			
		LECTRICITY			ATURAL G			WATER			PURCHAS	ED THERMA	L	TOTAL
f	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-H	IOT WATER	CHILLE	DWATER	ENERGY
MONTH		\$			\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(pp) .	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	55,440.00	\$3,604.20	\$0.07	66.11	\$423.31	\$6.40	153.65	\$410.05	\$2.67	178.34	\$1,974.88	35,022.17	\$4,694.01	\$11,106.46
October	51,000.00	\$3,174.12	\$0.06	76.08	\$428.80	\$5.64	82.50	\$250.03	\$3.03	298.06	\$3,399.32	29,571.86	\$4,101.01	\$11,353.28
November	50,280.00	\$2,886.68	\$0.06	110.45	\$819.13	\$7.42	65.29	\$214.19	\$3.28	439.33	\$6,164.60	18,810.01	\$3,079.51	\$13,164.11
December	45,720.00	\$2,775.91	\$0.06	148.86	\$1,033.33	\$6.94	62.24	\$225.14	\$3.62	538.69	\$6,347.15	16,535.27	\$2,408.26	\$12,789.78
January	48,360.00	\$2,966.64	\$0,06	170.28	\$1,096.91	\$6.44	53.24	\$200.34	\$3.76	540.15	\$6,221.02	17,691.27	\$2,351.15	\$12,836.06
February	50,280.00	\$2,947.38	\$0.06	146.92	\$961.61	\$6.55	32.22	\$128.17	\$3.98	494.25	\$5,409.03	19,844.97	\$2,240.29	\$11,686.48
March	47,640.00	\$2,959.09	\$0.06	130.24	\$857.84	\$6.59	38.88	\$158.98	\$4.09	441.29	\$5,504.77	20,615.78	\$3,014.78	\$12,495.46
April	59,520.00	\$3,828.33	\$0.06	111.99	\$841.86	\$7.52	65.59	\$218.37	\$3.33	296.74	\$3,806.50	24,979.98	\$3,617.93	\$12,312.99
May	46,560.00	\$3,450.75	\$0.07	82.76	\$553.75	\$6.69	123.79	\$381.55	\$3.08	254.79	\$1,594.38	28,584.15	\$5,821.07	\$11,80150
June	41,640.00	\$3,203.39	\$0.08	67.95	\$459.98	\$6.77	124.12	\$382.57	\$3.08	186.05	\$72.95	38,773.64	\$7,788.42	\$11,907.31
July	45,480.00	\$2,969.46	\$0.07	66.49	\$503.20	\$7.57	231.45	\$597.85	\$2.58	192.89	\$1,828.17	44,885.14	\$6,171.49	\$12,070.16
August	40,440.00	\$3,095.43	\$0.08	1,008.00	\$7,623.92		415.18	\$921.72	\$2.22	171.34	\$2,002.74	45,924.37	\$7,635.21	\$21,279.01
Annual	582,360.00	\$37,861,39	Avg. \$0,07	2.186.13	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Avg. \$6.84	3) 1.448.16	\$4,088.96	Avg. \$3.23	4.031.93	\$44.325.51	5) 341,238.62	<b>#</b> EO 000 44	\$154.802.60
Totals	302,300,00	\$37,001.38	\$0.07	2,100.13	""""""	\$0.04	1,440.10	\$4,000.90	\$3.23	4,031.93	\$44,325.51	341,238.62	\$52,923.11	\$154,8U∠.6U
ANNUAL EN	NERGY CONS	UMPTION IN	BTU'S:							ENERGY	JTILIZATION	INDEX (EUI)		
(oo) Electri		582,360.00	L		KWH x 0.0		=	6,755.38		EUI =	Total Annua		MMB	TU/Sq.Ft./Yr.
(pp) Nat. (		2,186.13			MMBTU x		=	2,186.13		}	<b>Building Gro</b>	ss Sq. Ft.		
	n/Hot Water	4,031.93			MMBTU x		=	4,031.93		EUI =	(uu)	17,068.30		
(qq2) Steam					LBS x 0.00		=		MMBTU		(a)	66,858.00		
	d Water	341,238.62			TON HRS		=	4,094.86		l				
(ss) Propai	ne or Butane	-			GAL x 0.09	95475	=	-	MMBTU	EUI =	(vv)	0.25529183	MMB	TU/Sq.Ft./Yr.

(uu) TOTAL ANNUAL BTU'S =

MMSTU

ECI =

ECI = (nn)

FCI =

17,068.30 MMBTU

ENERGY COST INDEX (ECI) Annual Energy Costs

(a)

(ww)

Building Gross Sq. Ft.

154.802.60

66.858.00

2.31539388

\*Do not include water costs (hh). \*\* Electricity is metered by building.

The remaining values are metered at the Utilities Department and estimated by buildings by using its gross square foot value.

Form PUA 2

(tt) Other Fuel

į	_	_							_				_	_	_														
	Р	R	Εí	L	ΙĐ	ЛΙ	N	Α	R	v	w	Α	т	F	R	Δ	· N	n	F	N	F	R	G	v	Δ	-11	n	1	٦

PHA3

	=			I UAU
TEXAS TECH UNIVERSITY		LANGUAGE	66858	
Facility Name	Building Na	me(s)	Building Size(	s) (GSF)
	DMMENDED ENER	- '		
	ONSERVATION M			
Provide the following recommendations		nspection of building(s):		
Scheduled preventive maintenance	plan.			
In Existence X Yes N	lo; Recommended	XYesNo		
<ol><li>Provide a general estimate, express</li></ol>			ings	
which could result from implementi	ng the following conse	ervation measures.		
	Cost Savings	System Changes	% Cost Saving	js
Ventilation System Operations		Water Systems Operation	ons	
Reduced ventilation		Repair all leaks		j
_X_ Variable ventilation		Reduction of wate	r consumption	
Unoccupied area ventilation	shut down	Reduce hot water	temperature	
Repair of caulking & weather	erstripping	Increase chilled wa	ater temperatur	e
Maintenance & repair or op	erating controls		Subtotal	0
	Subtotal 2938			
		1		
Heating & Cooling System Operations		Utility Plant & Distribution	n System Oper	,
X Change in thermostat contr	ol set points	Equipment cleaning		
Provide locking thermostat	covers	Adjustment of air/i		i
X Reset of air & water temper	atures	Combustion monit	orina & control	1
Unoccupied reset or shut do	own of system	Adjustment of driv		s. etc.
Shut down non-critical exha	ust systems	Steam Trap maint	enance	
	Subtotal 310	Pipe insulation rep	air	i
			Subtotal	0
Lighting Systems Operations		Other Measures (includi	ng water use)	
X Reduce illumination levels		X Noise/Vibration or		om
Maximize use of daylight				
X Install high efficiency lamps				i i
Reduce or delete evening of		<u> </u>		ŀ
	Subtotal 6540		Subtotal	0
`	Jubicius	1	Totals	9788.0
			=	2.00.0

TEXAS TE	CH UNIVERSITY		F	OREIGN LANGUAGE		66,858
Institution N	lame			Building Name		Building Size (GSF)
	ENERG	YAND	WATER CONSER	VATION MEASUR	E RETROFIT RECOMMEND	ATIONS
1.0	Basic Building Data	1.1	Annual Energy Use	0.2552918	BTU/Sq.Ft/	٧r
		1.2	Annual Energy Cost	2.3153939	\$/Sq.Ft./Yr.	
	1.3 Describe physical c	ondition of b	uilding envelope:	Good condition		
	1.4 Describe physical c	andition of h	uilding energy and water-	ueina evetame:	Good condition	
	1.4 Describe priyarear e	Jildillon or b	cliding cricity and water	daing systems.	Good containen	
2.0	Based on 1.1 - 1.4 above	, indicate th	e need and potential for e	energy and water conservation	on measure retrofit implementation.	
	Briefly outline recommer	ded retrofit	options: Lighting rel	trofit		·
	Reset schedule					
	Time of day schedule op	timization				
	Economizer					
	Variable Frequency Drive					
3.0					racteristics present an opportunity to app	ly solar heating
	and/or cooling systems,	or solar dom	estic hot water heating sy	stems.	X Yes No	
	EN	ERGY A	ND WATER CONS	SERVATION MEAS	URE RETROFIT ASSESSM	ENT
1.0	Describe proposed ener	ni conconiol	ion moneuros:	Datrofit /officianov/illumin	nation level) existing lighting system	
1.0	Install variable frequency			Tenont (emclericy/marin	lation levely existing lighting system	
	Adjust AHU's reset sche		in o o nixed apeced tono		·······	
	Adjust AHU's economize		setnoint			
2.0	Estimate of installed cos			40		<del></del>
3.0	Estimate of annual energ	y and water	cost savings for above m	easures:	\$9,788.00	
4.0	Projected simple paybac	k period for	above measures in years	5.4		
Form DLIA						

Energy Auditor Certification: Thereby contri) that 1, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial analytic instituonal buildings. If further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		leremy Dicks			_		Te				806 742 1696 11/22/2005
		e of Energy A							ation and Pho	ne Numbe	
		H UNIVERS	ITY				FOOD TECH	INOLOGY			Texas Tech university/Lubbock, Tx
	Faci	lity Name					Building Nar	ne(s)			Building/Campus Address
						as Tech Uni					
					Name	and Addres	s of Owner				
	BUILDI	NG DATA									
Building					TING SCHE						BASIC HVAC CONTROL DATA
Size (a)				Time Perio	: Hrs/Occu						
17400	Days	(c) E	Daylight		(d) E	vening		(e)	Night	_	
1					1	1					Central Bidg. Panel
	M-F	12 Hrs	350	63%	4 Hrs	11	2%	0	0	0%	(f) Yes X_No
Date (b)		1			}	Į.	1 1				
Occupied	SAT	6 Hrs	28	5%	0	0	0%	0	_ 0	0%	EMS
1976					1	É			}		(g) Yes X No
	SUN	6 Hrs	11	2%	0	0	0%	. 0	0	0%	
		SYUSING		M S							,
Primary Heat	Primary		Space		Space		Domestic		Interior		Special Building
Source (h)	Coating		Termina		Termina		Hot Wate		Lighting		Systems & Facilities
Steam			Heat (j)		Cooling		Source (I		System (i		(n)
Boiler	Centrifuga	ii Chillers	ran ar	id Coil	Fan ar	ad Coll	Heat Ex	changer	Fluores	scent	
Doner					1		1		l		
					l		1		l		
<b></b>	L		L						L		<u> </u>
III. UNIQ	HE BILL	DINCCH	ADACTE	DICTIO							
		per day opera		KISTICS	Yes	No X		5 U.A .			
	per year ope		1001)			No		5. List yea	r and type of i	major buildi	ing modifications and additions.
	Program Us				Yes X	No	-				
		floodlighting				No					<del></del>
Saliding	THE CARRIOT	griding									
Form PUA 1				-							

Building Na	me(s)	FOOD TECH	NOLOGY				(a) Building	Size(s) (Gr	000 Ca (TL)	17400				
	ISE AND COS		IIIOLOO1	For Year En	dina:	8/31/2005	(a) building			Estimate	×			
	ELEC	TRICITY			URAL GAS			WATER	71 0001		URCHASED T	HERMAI		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		s		1	\$			\$	l	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(ħh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September		\$3,089	\$0.07	17.21	\$110.17	\$6.40	39.99	\$106.72	\$2.67	46.41	\$513.97	9,114.63	\$1,221.63	\$5,041.80
October	47,200	\$2,938	\$0.06	19.80	\$111.60	\$5.64	21.47	\$65.07	\$3.03	77.57	\$884.68	7,696.17	\$1,067.30	\$5,066.27
November	44,160	\$2,535	\$0.06	28.75	\$213.18	\$7.42	16.99	\$55.74	\$3.28	114.34	\$1.604.36	4,895.36	\$801.45	\$5,210.05
December	43,840	\$2,662	\$0.06	38.74	\$268.93	\$6.94	16.20	\$58.59	\$3.62	140.20	\$1,651.87	4.303.36	\$626.76	\$5,267.91
January	46,080	\$2,827	\$0.06	44.32	\$285.47	\$6.44	13.86	\$52.14	\$3.76	140.57	\$1,619.04	4.604.21	\$611.89	\$5,395.32
February	40,960	\$2,401	\$0.06	38.24	\$250.26	\$6.55	8.39	\$33.36	\$3.98	128.63	\$1,407.72	5,164,72	\$583.04	\$4,675.42
March	40,320	\$2,504	\$0.06	33.90	\$223.25	\$6.59	10.12	\$41.38	\$4.09	114.85	\$1,432.63	5,365.32	\$784.61	\$4,986,29
April	45,600	\$2,933	\$0.06	29.15	\$219.10	\$7.52	17.07	\$56.83	\$3.33	77.23	\$990.65	6.501.12	\$941.58	\$5,141,16
May	35,840	\$2,656	\$0.07	21.54	\$144.12	\$6.69	32.22	\$99.30	\$3.08	66.31	\$414.94	7.439.11	\$1,514.95	\$4,829.56
June	35,680	\$2,745	\$0.08	17.68	\$119.71	\$6.77	32.30	\$99.56	\$3.08	48.42	\$18.99	10.090.96	\$2,026,96	\$5,010.11
July	40,960	\$2,674	\$0.07	17.31	\$130.96	\$7.57	60.24	\$155.59	\$2.58	50.20	\$475.79	11,681,50	\$1,606.15	\$5.042.83
August	36,640	\$2,805	\$0.08	25.12	\$195.41	\$7,78	108.05	\$239.88	\$2.22	44.59	\$521.22	11,951.96	\$1,987.09	\$5,748,16
	$\rho$ —		Avg.	2)		Avg.	3)		Avg.	(4)		5)		
Annual	504,800	\$32,769	\$0.07	331.73	\$2,272.16	\$6.86	376.89	\$1,064.16	\$3.23	1,049.32	\$11,535.85	88,808.40	\$13,773.40	\$61,414.87
Totals						1	l	i						

INNUAL ENERGY CONS	UMPTION IN BTU'S:	-				ENERGY	UTILIZATION	INDEX (EUI)	
oo) Electricity	504800	KWH x 0.0116	=	5855.68	MMBTU	EUI =	Total Annu	al BTU's	MMBTU/Sq.Ft/Yr.
pp) Nat. Gas	331.72848	MMBTU x 1.0	=	331.72848	MMBTU	1	Building Gr		
qq1) Steam/Hot Water	1049.32213	MMBTU x 1.0	-	1049.3221	MMBTU	EUI =	(uu)	8302.431414	
qq2) Steam	0	LBS x 0.001390		0	MMBTU	1	(a)	17400	
rr) Chilled Water	88808.4007	TON HRS x 0.012	=	1065.7008	MMBTU	1			
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.477151231	MMBTU/Sq.Ft/Yr.
tt) Other Fue!	0	x	=	0	MMBTU	1	-		
					_	ENERGY	COST INDEX	(ECI)	
	(uu) TOT	'AL ANNUAL BTU'S =		8302.4314	MMBTU	ECI =	Annual Ene	ergy Costs	\$/Sq.Ft./Yr.
					-	ł	Building Gr	oss Sq. Ft.	
						ECI =	(nn)	61414.86813	
Do not include water costs						1	(a)	17400	
<ul> <li>Electricity is metered by</li> </ul>						ı			
	re metered at the Utilities Departme	ent				ECI =	(ww)	3.529590122	\$/Sq.Ft./Yr.
nd estimated by buildings	by using its gross square foot value.					1			

PRELIMINARY WATER AND ENE TEXAS TECH UNIVERSITY FOOD TE	RGY AUDIT PUA CHNOLOGY 17400
Facility Name Building	
RECOMMENDED ENE AND WATER CONSERVATION IN	MEASURES
Provide the following recommendations based on an on-site 1. Scheduled preventive maintenance plan.	inspection of building(s):
In Existence X Yes No; Recommended	I_X Yes No
<ol><li>Provide a general estimate, expressed as a range, of an which could result from implementing the following cons</li></ol>	
System Changes % Cost Savings	System Changes % Cost Savings
Ventilation System Operations Reduced ventilation X Variable ventilation Unoccupied area ventilation shut down Repair of caulking & weatherstripping Maintenance & repair or operating controls Subtotal 3390	Water Systems Operations  Repair all leaks Reduction of water consumption Reduce hot water temperature Increase chilled water temperature Subtotal 0
Heating & Cooling System Operations Change in thermostat control set points Provide locking thermostat covers X. Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 123	Utility Plant & Distribution System Oper.  Equipment cleaning  Adjustment of air/fuel ration  Combustion monitoring & control  Adjustment of drives, fans, motors, etc.  Steam Trap maintenance  Pipe insulation repair  Subtotal 0
Lighting Systems Operations	Other Measures (including water use)

Subtotal \_\_\_1699

Subtotal Totals

5212.0

Form PUA 3

X\_

<u>x</u>

Reduce illumination levels Maximize use of daylight

Install high efficiency lamps
Reduce or delete evening cleaning hours

TEXAS T	ECH UNIVERSITY	FOOD TECHNOLOGY	17400	
nstitution	Name	Building Name	Building Size (GSF)	_
	ENERGY AND WATER CO	NSERVATION MEASURE RETRO	OFIT RECOMMENDATIONS	
1.0	Basic Building Data 1.1 Annual Energy 1,2 Annual Energy		BTU/Sq.Ft/Yr. \$/Sq.Ft/Yr.	
	1.2 Annual Energy	3.5295901	\$/\$q.Ft/11.	
	1.3 Describe physical condition of building envelope	Regular condition		-
	1.4 Describe physical condition of building energy a	nd water-using systems: Good cond	dition	
2.0	Based on 1.1 - 1.4 above, indicate the need and pote Briefly outline recommended retrofit options:	ntial for energy and water conservation measure		_
	Lighting retrofit VFD installation on AHUs			_
	Reset schedule			
	Economizer			_
3.0	Based on auditor evaluation, indicate whether or not and/or cooling systems, or solar domestic hot water h		present an opportunity to apply solar heating es No	
	ENERGY AND WATER	CONSERVATION MEASURE RE	TROFIT ASSESSMENT	
1.0	Describe proposed energy conservation measures: Install VFDs on AHU's fan motors	Retrofit (efficiency/illumination level)	existing lighting system	<u>·</u>
	Adjust AHU's reset schedule			
	Adjust AHU's economizer operation setpoint			
2.0	Estimate of installed cost of above measures:	16,689.93		_
3.0	Estimate of annual energy and water cost savings for	above measures: \$5,212.0	0	_
4.0	Projected simple payback period for above measures	in years: 3.2		

Energy Auditor Certification: Thereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		Jeremy Dicks					Te				/ 806 742 1696 11/22/2005		
		e of Energy A							ation and Pho	one Numbe			
	TEXAS TEC	CH UNIVERS	TY				FISHERIES	& WILDLIFE	2		Texas Tech university/Lubbock, Tx		
	Faci	lity Name					<b>Building Na</b>	me(s)			Building/Campus Address		
1													
					Texa	as Tech Univ	rersity						
					Name	and Address	of Owner						
	BUILDI	NG DATA											
Building				OPERA	TING SCHEE	ULE					BASIC HVAC CONTROL DATA		
Size (a)				Time Period	: Hrs/Occup	ants/% GSF							
8486	Days	(c) (	Daylight		(d) E	vening		(e)	Night				
i											Central Bldg. Panel		
	M-F	12 Hrs	240	74%	4 Hrs	6	2%	0	0	0%	(f) Yes X No		
Date (b)	1												
Occupied	SAT	6 Hrs	16	5%	0	0	0%	. 0	0	0%	EMS		
1961											(g) Yes X No		
	SUN	6 Hrs	6	2%	0	0	0%	0	. 0	0%			
L													
	RENER		SYSTE	MS_									
Primary	Primary		Space		Space		Domesti		Interior		Special Building		
Heat	Cooling		Termina		Termina:		Hot Wat		Lighting		Systems & Facilities		
Source (h)			Heat (j		Cooling (		Source (		System (		(n)		
Steam	Centrifuga		Fan a	nd Coil	Fan ar	d Coil	Heat Ex	changer	Fluore:	scent			
Boiler	Also freeze	rs & cooler			1		l		I				
1	l				l		l						
	<u> </u>				L		L		L				
	UE BUIL			RISTICS									
	ınd, 24 hour		ation										
	per year op					No X							
	r Program Us					No_X							
4. Building	has exterior	floodlighting			Yes X	No							
1													

Building Nan		FISHERIES	& WILDLIFE				(a) Building	Size(s) (Gr	oss Sq. Ft.)	8486				
ENERGY U	SE AND COST	DATA		For Year En	ding:	8/31/2005			X Best	Estimate	x			
		CTRICITY			TURAL GAS			WATER		P	URCHASED T	HERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MM8TU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$	l		\$ .			\$	1	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	21,480	\$1,396	\$0.07	8.39	\$53.73	\$6.40	19.50	\$52.05	\$2.67	22.64	\$250.66	4,445.21	\$595.79	\$2,348.66
October	18,660	\$1,161	\$0.06	9.66	\$54.43	\$5.64	10.47	\$31.74	\$3.03	37.83	\$431.46	3,753.43	\$520.52	\$2,199.50
November	16,620	\$954	\$0.06	14.02	\$103.97	\$7.42	8.29	\$27.19	\$3.28	55.76	\$782.45	2,387.47	\$390.87	\$2,258.66
December	17,820	\$1,082	\$0.06	18.89	\$131.16	\$6.94	7.90	\$28.58	\$3.62	68.37	\$805.62	2,098.75	\$305.67	\$2,352,97
January	20,940	\$1,285	\$0.06	21.61	\$139.23	\$6.44	6.76	\$25.43	\$3.76	68.56	\$789.61	2,245.48	\$298.42	\$2,537.25
February	15,600	\$914	\$0.06	18.65	\$122.05	\$6.55	4.09	\$16.27	\$3.98	62.73	\$686.55	2,518.84	\$284.35	\$2,023,68
March	16,440	\$1,021	\$0.06	16.53	\$108.88	\$6.59	4.93	\$20.18	\$4.09	56.01	\$698.70	2,616.67	\$382.65	\$2,231.56
April	20,520	\$1,320	\$0.06	14.21	\$106.85	\$7.52	8.32	\$27.72	\$3.33	37.66	\$483.14	3,170.60	\$459.21	\$2,396.77
May	18,840	\$1,396	\$0.07	10.50	\$70.29	\$6.69	15.71	\$48.43	\$3.08	32.34	\$202.37	3,628.06	\$738.84	\$2,456.23
June	19,740	\$1,519	\$0.08	8.62	\$58.38	\$6.77	15.75	\$48.56	\$3.08	23.61	\$9.26	4.921.37	\$988.55	\$2,623.36
July	20,280	\$1,324	\$0.07	8.44	\$63.87	\$7.57	29.38	\$75.88	\$2.58	24.48	\$232.04	5,697.08	\$783.32	\$2,479.23
August	17,940	\$1,373	\$0.08	7.72	\$60.03	\$7.78	52.70	\$116.99	\$2.22	21.75	\$254.20	5.828.98	\$969.10	\$2,773.52
	$\cup$		Avg.	2		Avg.	3)		Avg.	(4)		5)		
Annual	224,880	\$14,746	\$0.07	157.25	\$1,072.86	\$6.86	183.81	\$518.99	\$3.23	511.76	\$5,626.05	43,311.96	\$6,717.30	\$28,681,38
Totals										1 1		l '		

ANNUAL ENERGY CONSU	JMPTION IN BTU'S:				ENERG	Y UTILIZATIO	ON INDEX (EUI)	
(oo) Electricity	224880	KWH x 0.0116	=	2608.608 MME	ITU EUI =	Total Ann	rual BTU's	MMBTU/Sq.Ft/Yr.
(pp) Nat. Gas	157.250528	MMBTU x 1.0	=	157.25053 MME	ITU	Building (	Gross Sa. Ft.	
(qq1) Steam/Hot Water	511.755607	MMBTU x 1.0	=	511.75561 MME	TU EUI =	(uu)	3797.357644	
(qq2) Steam	0	LBS x 0.001390	=	0 MME	mu	(a)	8486	
(rr) Chilled Water	43311.9591	TON HRS x 0.012	=	519.74351 MME	πu			
(ss) Propane or Butane	0	GAL x 0.095475	=	0 MME	TU EUI =	(vv)	0.447484992	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	0	×	=	0 MME	nu l			
					ENERG'	Y COST INDE	X (ECI)	
	(uu)	TOTAL ANNUAL BTU'S =		3797.3576 MME	πU ECI≔	Annual E	nergy Costs	\$/Sq.Ft./Yr.
					- 1	Building (	Gross Sq. Ft.	
					ECI =	(nn)	28681,37838	
*Do not include water costs						(a)	8486	
** Electricity is metered by t					- 1			
	e metered at the Utilities Depa				EGI =	(ww)	3.379846616	\$/Sq.Ft/Yr.
and estimated by buildings	by using its gross square foot value	ie.						

D	D	=	11	84	1	NI.	۸	D	v	w	۸	7	: 6	•	٨	N	ъ	=	N	=	0	^	v	٨	 п	ı	7

PUA3

TEXAS TECH UNIVERSITY	FISHERIES	& WILDLIFE	8486	
Facility Name	Building Na	me(s)	Building Siz	e(s) (GSF)
	COMMENDED ENER			
	CONSERVATION ME			
Provide the following recommendation		spection of building(s):		
Scheduled preventive maintenance				
In Existence X Yes		XYesNo		
Provide a general estimate, expres			ngs	
which could result from implemen				
System Changes Ventilation System Operations	% Cost Savings	System Changes	% Cost Sav	ings
Reduced ventilation		Water Systems Operation	ons	
Variable ventilation		Repair all leaks Reduction of wate		_
Unoccupied area ventilati		Reduction of water		
Repair of caulking & weat		Increase chilled w		
Maintenance & repair or c		Increase chilled w	Subtotal	0
Wallice a repair of c	Subtotal 0		Subtotal	
	- Cubiciai - C	1		
Heating & Cooling System Operations		Utility Plant & Distribution	n System On	er
Change in thermostat cor		Equipment cleaning		٠
Provide locking thermosta		Adjustment of air/f		
X Reset of air & water temp	eratures	Combustion monit		ol İ
Unoccupied reset or shut	down of system	Adjustment of driv	es, fans, moto	ors, etc.
Shut down non-critical ex	haust systems	Steam Trap maint	enance	ļ.
	Subtotal 57	Pipe insulation rep	air	
		Subtota	I Subtotal	0
Lighting Systems Operations		Other Measures (includi	ng water use)	)
X Reduce illumination level:	s	*** Noisy chiller area.		l
Maximize use of daylight		Ear protection highy reco	mmended.	l
X Install high efficiency lam				
Reduce or delete evening				
	Subtotal 837	1	Subtotal	0
		1	Totals	894.0
		1		

	ECH UNIVERSITY			FISHERIES & WILL	DLIFE	8486	
Institution	Name		_	Building Name		Building Size (GSF)	
	ENERG	YAND	WATER CONSERV	ATION MEASU	JRE RETROFIT RI	ECOMMENDATIONS	
1.0	Basic Building Data	1.1	Annual Energy Use	0.447485		BTU/Sq.Ft/Yr,	
		1.2	Annual Energy Cost	3.3798466		\$/Sq.Ft./Yr.	
	1.3 Describe physical c	ondition o	f building envelope:	Regular condition	<del></del>		
	1.4 Describe physical c	ondition o	f building energy and water-u	sing systems:	Good condition		
2.0	Based on 1.1 - 1.4 above Briefly outline recommen	, indicate	the need and potential for en				
	Lighting retrofit						
	Reset schedule						
	Economizer						
3.0	Based on auditor evaluat	ion, indic	ate whether or not the building	conditions and/or site	characteristics present an	opportunity to apply solar heating	
	and/or cooling systems, o	or solar do	mestic hot water heating sys	tems.	_X_ Yes		
	ENI	RGY	AND WATER CONS	ERVATION MEA	ASURE RETROFIT	ASSESSMENT	
1.0	Describe proposed energ	v consen	vation measures:				
			l) existing lighting system				
	Adjust AHU's reset sched						
	Adjust AHU's economize						
2.0	Estimate of installed cost	of above	measures: \$5,164:15				
3.0	Estimate of annual energ	y and wat	er cost savings for above me	asures:	\$894.00		
4.0	Projected simple payback	period fo	or above measures in years:	5.8	<u> </u>		
Form PI1A	14						

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, coerating how, and building confluentations.

		leremy Dicks			_		Te				/ 806 742 1696 11/22/2005
,		e of Energy A						Organiz	ation and Ph	one Numbe	
		H UNIVERS	!TY				KTXT TV				Texas Tech university/Lubbock, Tx
	Faci	lity Name					Building Nan	ne(s)			Building/Campus Address
						as Tech Uni					
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building					TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	d: Hrs/Occup						
875	Days	(c) [	Daylight		(d) E	vening		(e)	Night		
		ì					1 1		1		Central Bidg, Panel
-	M-F	12 Hrs	20	5%	0	0	0%	0	0	0%	(f) Yes X No
Date (b)				1					1		•
Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS
1982	1										(g) Yes X No
	SUN	6 Hrs	0	0%	0	0	0%	0	. 0	0%	
II. MAJO	RENERO	SYUSINO	SYSTE	MS							
Primary	Primary		Space		Space		Domestic	: -	Interior		Special Building
Heat	Cooling		Termina	1	Termina	1	Hot Wate	er.	Lighting	ı	Systems & Facilities
Source (h)	Source	(i)	Heat (j	)	Cooling (	k)	Source (I	)	System (	m)	(n)
Steam	Centrifuga	d Chillers	Fan a	nd Coil	Fan ar	d Coil	Heat Exc	hanger	Fluore	scent	
Boiler					l				1		
					1		}		1		
					ļ				i		
							-				<u> </u>
IL UNIQ	UEBUIL	DINGCH	ARACTE	RISTICS		-					
		per day opera				No_X		5 List yea	r and type of	major build	ding modifications and additions.
	per year ope				Yes X			o. Liot you	and type of	major Guno	and meaners and statements.
	Program Us				Yes X	No	-				
		floodlighting			Yes X		-				
		griung			·		-				

Building Nam	ne(s)	KTXT TV					(a) Building	Size(s) (Gr	oss Sq. Ft.)	875				
ENERGY US	SE AND COST			For Year En	ding:	8/31/2005		" Metered	X Best	Estimate	X			
		CTRICITY			URAL GAS			WATER		P	URCHASED T	HERMAL		TOTAL
	KWH	COST	\$/KWH	MCF	COST	\$/MCF	MGAL.	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$	1		\$			\$	l	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
		2428.806	\$0.07	0.87	\$5.54	\$6.40	2.01	\$5.37	\$2.67	2.33	\$25.85	458.35	\$61.43	\$2,526.99
	880.000	54.769	\$0.06	1.00	\$5.61	\$5.64	1.08	\$3.27	\$3.03	3.90	\$44.49	387.02	\$53.67	\$161.81
November		665.980	\$0.06	1.45	\$10.72	\$7.42	0.85	\$2.80	\$3.28	5.75	\$80.68	246.17	\$40.30	\$800.49
December	12960.000	786.872	\$0.06	1.95	\$13.52	\$6.94	0.81	\$2.95	\$3.62	7.05	\$83.07	216.40	\$31.52	\$917.93
January	15120.000	927.536	\$0.06	2.23	\$14.36	\$6.44	0.70	\$2.62	\$3.76	7.07	\$81.42	231.53	\$30.77	\$1,056.70
February	15520.000	909.772	\$0.06	1.92	\$12.58	\$6.55	0.42	\$1.68	\$3.98	6.47	\$70.79	259.72	\$29.32	\$1,024.14
March	16960.000	1053.446	\$0.06	1.70	\$11.23	\$6.59	0.51	\$2.08	\$4.09	5.78	\$72.04	269.81	\$39.46	\$1,178.25
April	18800.000	1209.218	\$0.06	1.47	\$11.02	\$7.52	0.86	\$2.86	\$3.33	3.88	\$49.82	326.92	\$47.35	\$1,320.26
May	19440.000	1440.778	\$0.07	1.08	\$7.25	\$6.69	1.62	\$4.99	\$3.08	3.33	\$20.87	374.09	\$76.18	\$1,550.07
	20720.000	1594.002	\$0.08	0.89	\$6.02	\$6.77	1.62	\$5.01	\$3.08	2.43	\$0.95	507.45	\$101.93	\$1,707.91
	24240.000	1582.666	\$0.07	0.87	\$6.59	\$7.57	3.03	\$7.82	\$2.58	2.52	\$23.93	587.43	\$80.77	\$1,701,77
August	21200.000	1622.727	\$0.08	0.80	\$6.19	\$7.78	5.43	\$12.06	\$2.22	2.24	\$26.21	601.03	\$99.93	\$1,767.12
	$\circ$		Avg.	0		Avg.	3)		Avg.	4)		5)		
Annual	214,800	\$14,277	\$0.07	16.21	\$110.62	\$6.86	18.95	\$53.51	\$3.23	52.77	\$580.11	4,465.94	\$692.63	\$15,713.45
Totals										1				

ANNUAL ENERGY CONSU	JMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)	
oo) Electricity	214800	KWH x 0.0116	=	2491.68	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.FL/Yr.
pp) Nat. Gas	16.2142602	MCF x 1.03	=	16.700688	MMBTU	i	Building Gross Sq. Ft.	
qq1) Steam/Hot Water	52.7676356	MMBTU x 1.0	=	52.767636	MMBTU	EUI =	(uu) 2614.7396	
qq2) Steam	0	LBS x 0.001390	=	0	MMBTU		(a) 875	
rr) Chilled Water	4465.93969	TON HRS x 0.012	=	53.591276	MMBTU	1		
ss) Propane or Butane	0	GAL x 0.095475		. 0	MMBTU	EUI =	(vv) 2.986273828	MMBTU/Sq.Ft./Yr.
tt) Other Fuel	0	x	=	0	MMBTU	1		
		•			-	ENERGY	COST INDEX (ECI)	
	•	(uu) TOTAL ANNUAL BTU'S =		2614.7396	MMBTU	ECI ≈	Annual Energy Costs Building Gross Sq. Ft.	\$/Sq.FL/Yr.
•						ECI =	(nn) 15713.44636	
Do not include water costs						1	(a) 875	
<ul> <li>Electricity is metered by t</li> </ul>						1	7.7	
The remaining values are	e metered at the Utilities D	epartment				ECI =	(ww) 17.95822441	\$/Sq.Ft/Yr.
nd estimated by buildings	by using its gross square foo	t value.				I		*

	AND ENER	OT AUDIT		FUAS
TEXAS TECH UNIVERSITY	KTXT TV		875	
Facility Name	Building Na	me(s)	Building Size(s)	(GSF)
	MMENDED ENER			
	INSERVATION ME			
Provide the following recommendations b	ased on an on-site in	spection of building(s):		
<ol> <li>Scheduled preventive maintenance pl</li> </ol>				
In Existence X Yes No;		Yes No		
<ol><li>Provide a general estimate, expresse</li></ol>	d as a range, of annu	al energy and water savi	ngs	
which could result from implementing	the following conser	vation measures.		İ
System Changes % 0	Cost Savings	System Changes	% Cost Savings	5
Ventilation System Operations		Water Systems Operation	ons	
Reduced ventilation		Repair all leaks		
Variable ventilation		Reduction of water	consumption	1
Unoccupied area ventilation :	shut down	Reduce hot water		
Repair of caulking & weather	stripping	increase chilled wa		
Maintenance & repair or oper	rating controls		Subtotal	0
Si	ubtotal 0			
Heating & Cooling System Operations		Utility Plant & Distribution	n System Oner	
X Change in thermostat control	set points	Equipment cleanin		
Provide locking thermostat co		Adjustment of air/fi		
Reset of air & water temperal		Combustion monitor		
Unoccupied reset or shut dov	vn of system	Adjustment of drive		etc
Shut down non-critical exhau		Steam Trap mainte		-10.
	Subtotal 31	Pipe insulation rep		
			Subtotal	0
		-		<u> </u>
Lighting Systems Operations		Other Measures (including	na water use\	- 1
Reduce illumination levels		*** Noisy chiller area.	ig water accy	
Maximize use of daylight		Ear protection high reco	mmended	
Install high efficiency lamps		proceduringly 1600	silueu.	
Reduce or delete evening cle	aning hours			
	ubtotal 0		Subtotal	0
				31.0
			-	51.0

## PRELIMINARY WATER AND ENERGY AUDIT ΡΠΔΔ TEXAS TECH UNIVERSITY KTXT TV 875 Institution Name Building Name Building Size (GSF) ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS Basic Building Data 1.1 Annual Energy Use 2.9882738 BTU/Sa.Ft./Yr. 12 Annual Energy Cost 17.958224 \$/Sq.Ft./Yr. 1.3 Describe physical condition of building envelope: Fair condition 1.4 Describe physical condition of building energy and water-using systems: Fair condition 2.0 Based on 1.1 - 1.4 above, indicate the need and potential for energy and water conservation measure retrofit implementation. Briefly outline recommended retrofit options: Reset schodule 3.0 Based on auditor evaluation, indicate whether or not the building conditions and/or site characteristics present an opportunity to apply solar heating and/or cooling systems, or solar domestic hot water heating systems. "X Yes No ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT 10 Describe proposed energy conservation measures: Adjust AHU's reset schedule 20 Estimate of installed cost of above measures: \$98.00

\$31.00

3.2

4.0 Form PUA 4

3.0

Estimate of annual energy and water cost savings for above measures:

Projected simple payback period for above measures in years:

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. If uther certify that this ave in financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		leremy Dicks			_		Te	exas Tech U	niversity-Phy:	sical Plant /	/ 806 742 1696 f 1/22/2005
		e of Energy A						Organiz	ation and Ph	one Numbe	er of Auditor Date
	TEXAS TEC	CH UNIVERS	TY				LIBRARY				Texas Tech university/Lubbock, Tx
1	Faci	lity Name					<b>Building Na</b>	me(s)		•	Building/Campus Address
1											• •
					Tex	as Tech Univ	versity				
					Name	and Address	of Owner				***
	BUILDI	NG DATA									
Building				OPERA	TING SCHEE	ULE					BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup	ants/% GSF					7
303150	Days	(c) E	aylight		(d) E	vening		(e)	Night		
											Central Bldg, Panet
	M-F	12 Hrs	4345	43%	4 Hrs	202	2%	2 Hrs	101	1%	(f) Yes X_No
Date (b)										i -	<b>-</b>
Occupied	SAT	12 Hrs	505	5%	4 Hrs	202	2%	2 Hrs	101	1%	EMS
1962											(g) Yes X No
	SUN	12 Hrs	505	5%	4 Hrs	202	2%	2 Hrs	101	1%	
		SYUSING	SYSTE	MS							
Primary	Primary		Space		Space		Domesti	ic	Interior		Special Building
Heat	Cooling		Termina	i	Termina		Hot Wat	er	Lighting		Systems & Facilities
Source (h)	Source		Heat (i)		Cooling (	k)	Source (	(1)	System (	m)	(n)
Steam	Centrifuga	l Chillers	Fan ar	d Coil	Fan ar	id Coil	Heat Ex	changer	Fluore	scent	
Boiler	1				1				ĺ		
l	l						ŀ		1		
					1						
		DING CH		RISTICS							
		per day opera	tion			No _X_					ing modifications and additions.
	per year ope				Yes X	No		Recommiss	ioning - FY00		
	Program Us				Yes X	No					
4. Building	has exterior	floodlighting			Yes X	No					
L											V

Building Na	me(s)	LIBRARY					(a) Building	Size(s) (Gross S	a Ft)	303150				
ENERGY L	SE AND COS	T DATA		For Year En	ding	8/31/2005		** Metered X	Best Estin	nate X				
1		TRICITY			TURAL GAS			WATER		F	URCHASED TH	ERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	OT WATER	CHILLED WA	TER	ENERGY
MONTH	1	\$			\$			\$		MMBTU	COST	TON HRS	COST	costs*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	544,080 00		\$ 0.07	299.78		\$ 6.40	696.67		\$ 2.67	808.61	\$ 8,954.55	158,798.79	\$ 21,283.77	\$ 69,388.10
October	470,760,00			344.96		\$ 5.64	374.09	\$ 1,133.71	\$ 3.03	1,351.48	\$ 15,413.32	134,085.79	\$ 18,594.94	\$ 66,385.24
November	464,840.00	\$ 26,687.45		500.82	\$ 3,714.12	\$ 742	296.06	\$ 971.20	\$ 3.28	1,992.04	\$ 27,951.77	85,289.06	\$ 13,963.21	\$ 73,287.75
December	438,160.00			674.96	\$ 4,685.37	\$ 6.94	282.23	\$ 1,020.82	\$ 3.62	2,442.54	\$ 28,779.48	74,974.84	\$ 10,919.61	\$ 72,008.35
January	548,520.00	\$ 33,648.96		772.08	\$ 4,973.64	\$ 6.44	241.39	\$ 908.38	\$ 3.76	2,449.15		80,216.42	\$ 10,660.66	\$ 78,399.22
February	452,080.00			666.16	\$ 4,360.15	\$ 6.55	146,11	\$ 581.16	\$ 3.98	2,241.06	\$ 24,525.84	89,981.81	\$ 10,157.99	\$ 66,125.76
March	464,960.00			590.55	\$ 3,889.64	\$ 6.59	176.29	\$ 720.87	\$ 4.09	2,000.93	\$ 24,959.94	93,476.84	\$ 13,669.72	\$ 72,120.48
April	592,120.00			507,81	\$ 3,817.19		297.39	\$ 990.14	\$ 3.33	1,345.49	\$ 17,259.57	113,265.13	\$ 16,404.54	\$ 76,556.67
May	492,440.00	\$ 36,496.76		375.23	\$ 2,510.85	\$ 6.69	561.29	\$ 1,730.02	\$ 3.08	1,155.29	\$ 7,229.29	129,607.32	\$ 26,394.11	\$ 74,361.02
June	486,280 00		\$ 0.08	308.08	\$ 2,085.66	\$ 6.77	562.81	\$ 1,734.66	\$ 3.08	843.61	\$ 330.78	175,808.88	\$ 35,314.53	\$ 76,875.44
July	555,760.00		\$ 0.07	301.50	\$ 2,281.62	\$ 7.57	1,049.47		\$ 2.58	874.63	\$ 8,289.34	203,519.87	\$ 27,982.99	\$ 77,551.17
August	500,600.00	\$ 38,317.79		80.69	\$ 627.78	\$ 7.78	1,882.52	\$ 4,179.29	\$ 2.22	776.89	\$ 9,080.88	208,231.96	\$ 34,619.85	\$ 86,825,59
1	$\mathcal{O}$			စ		Avg.	3)		Avg.	4)		٥		
Annual	6,010,600	\$ 393,587.00	\$ 0.07	5,423	\$ 36,810.00	\$ 6.86	6,566	\$ 18,540.00	\$ 3.23	18,282	\$ 200,982.00	1,547,257	\$ 239,966.00	\$ 889,885.00
Totals												'		
Totals														

ANN	UAL ENERGY CONSU	JMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)		
(00)		6,010,600.00	KWH x 0.0116	=	69,722.96	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft./Yr.	
(pp)	Nat. Gas	5,423.00	MMBTU x 1.0	=	5,423,00	MMBTU	1	Building Gross Sq. Ft.		- 1
(qq1)	Steam/Hot Water	18,282.00	MMBTU x 1.0	=	18,282.00	MMBTU	EUI =	(uu) 111,995.04		-
(qq2)	Steam		LBS x 0.001390	-	-	MMBTU	1	(a) 303,150.00		- 1
(m)	Chilled Water	1,547,257.00	TON HRS x 0.012	=	18,567.08	MMBTU		**		l
	Propane or Butane		GAL x 0.095475	=	-	MMBTU	EUI =	(vv) 0.369437717	MMBTU/Sq.FL/Yr.	ł
(tt)	Other Fuel		x	=		MMBTU				- 1
1							ENERGY	COST INDEX (ECI)		- 1
1			(uu) TOTAL ANNUAL BTU'S =		111,995.04	MMBTU	ECI =	Annual Energy Costs	\$/Sq.Ft./Yr.	. !
							1	Building Gross Sq. Ft.		
1							ECI =	(nn) 889,885.00		
	not include water costs							(a) 303,150.00		
" Ek	ectricity is metered by b	building.					1			
		e metered at the Utilities I					ECI =	(ww) 2.935460993	\$/Sq.Ft/Yr.	
and e	estimated by buildings t	by using its gross square foo	t value.				1			- 1
Form	PUA 2									

	K AND CHEN		AUDII		PUAS
TEXAS TECH UNIVERSITY	LIBRARY			303150	
Facility Name	Building Na	ame(s)		Building Siz	ze(s) (GSF)
DEC.	OLIVENDED EVED				
	OMMENDED ENER				
	CONSERVATION ME				
Provide the following recommendations		nspect	ion of building(s):		
Scheduled preventive maintenance     Scheduled preventive maintenance					
In Existence X Yes N					
<ol><li>Provide a general estimate, expres</li></ol>				ngs	
which could result from implement					
	Cost Savings		m Changes	% Cost Say	/ings
Ventilation System Operations		Wate	r Systems Operation	ns	
Reduced ventilation		_	Repair all leaks		
Variable ventilation			Reduction of water		
Unoccupied area ventilation		_	Reduce hot water i	emperature	
Repair of caulking & weath		_	Increase chilled wa	iter tempera	ture
Maintenance & repair or or				Subtotal	0
	Subtotal 0				
Heating & Cooling System Operations		Utility	Plant & Distribution		oer.
X Change in thermostat cont		_	Equipment cleanin		
Provide locking thermostat			Adjustment of air/fu		
X Reset of air & water tempe			Combustion monitor		
Unoccupied reset or shut of		<u></u>	Adjustment of drive		ors, etc.
Shut down non-critical exh	aust systems	_	Steam Trap mainte	nance	
	Subtotal 1780		Pipe insulation rep	air	
			Subtotal	Subtotal	0
		1			
Lighting Systems Operations			Measures (includir	ng water use	)
Reduce illumination levels		_X_	Lighting Controls		
Maximize use of daylight		<u></u>			
Install high efficiency lamp	s	<u></u>			
Reduce or delete evening	cleaning hours				
	Subtotal 0			Subtotal	78431
		1		Totals	80211.0

TEXAS T	ECH UNIVERSITY			LIBRARY		303150	
Institution	Name		<del></del>	Building Name		Building Size (GSF)	
	ENER	GY ANI	WATER CONSE	RVATION MEAS	URE RETROFIT R	ECOMMENDATIONS	
1.0	Basic Building Data	1.1	Annual Energy Use	0.3694377		BTU/Sq.Ft./Yr.	
		1.2	Annual Energy Cost	2.935461		\$/Sq.Ft./Yr.	
	1.3 Describe physical c	ondition of	building envelope:	Good condition			
	1.4 Describe physical c	ondition of	building energy and water-	using systems:	Good condition	·	
2.0	Based on 1.1 - 1.4 above Briefly outline recommen Reset schedule				ration measure retrofit imple		
	Time of day schedule on	timization					
	Economizer						
3.0	Based on auditor evalua	ion, indicat	te whether or not the building	o conditions and/or site	characteristics present an o	pportunity to apply solar heating	
	and/or cooling systems,	or solar do	nestic hot water heating sy	stems.	X Yes		
	E	NERGY	AND WATER CON	ISERVATION ME	ASURE RETROFI	T ASSESSMENT	
1.0	Describe proposed energy Adjust AHU's reset sche	dule/Econo	mizer operation setpoint		· · · · · · · · · · · · · · · · · · ·		
	Update building utilities of						
2.0	Install Lighting controls of Estimate of installed cost			33			
3.0	Estimate of annual energ	y and wate	er cost savings for above m	easures:	\$80,211.00		
4.0	Projected simple paybac	k period for	above measures in years.	1.3			
Form PITA	4		·····				

Energy Auditor Certification: I hereby certify that 1, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		Jeremy Dicks			_		Te				/ 806 742 1696 11/22/2005
		e of Energy A						Organiz	ration and Pho	one Numbe	er of Auditor Date
<b></b>		CH UNIVERS	ITY				LAW.				Texas Tech university/Lubbock, Tx
	Faci	lity Name					Building Nan	ne(s)			Building/Campus Address
						as Tech Uni					
-					Name	and Address	s of Owner				
	BUILDE	NG DATA									
Building		r			TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Perior	d: Hrs/Occup						
129043	Days -	(c) f	Daylight		(d) E	vening		(e)	Night		
i		l			1						Central Bidg. Panel
5	M-F	12 Hrs	2882	67%	0	86	2%	0	0	0%	(f) Yes X No
Date (b) Occupied									1 1		7
1969	SAT	0 Hrs	215	5%	0	0	0%	00	0	0%	EMS
1969	SUN								1 1		(g) Yes X No
<u> </u>	SUN	0 Hrs	86	2%	0	0	0%	0	0	0%	
IL MAJO	O CALCO	YUSING									
Primary	Primary			M S							
Heat	Cooling		Space Termina		Space		Domestic		Interior		Special Building
Source (h)					Terminal		Hot Wate		Lighting		Systems & Facilities
Steam	Centrifuga		Heat (i)		Cooling (		Source (I		System (r		(n)
Boiler	Centinuga	Cimers	ranar	a Coll	Fan an	a Coil	Heat Exc	changer	Fluores	scent	
- Colle					l		1		l		
1 1			l		i		l .		1		
			L		<b></b>		L		L		
III. UNIQ	IIE DIIII	DINCCH	ADACTE	DICTIO							
Year rou	nd 24 hours	per day opera	Minn Line	NIO II G		No_X_					
	per year ope		10011					o. Listyea	r and type of n	najor build	ing modifications and additions.
	Program Us					No No	1	neconmiss	ioning - FY00		
4. Building					Yes X	No.	-				
5110219		gridig			, co _X_	NO	-				
Form PUA 1											

Duilding M	(-)	LAW	-											
Building Na						_	(a) Buildin	g Size(s) (C						
ENERGY	USE AND C			For Year E		8/31/2005		** Metered	X Be	st Estimate	x			
		ELECTRICITY			ATURAL GA			WATER			PURCHAS	ED THERMAL		TOTAL
1	KWH	COST	\$/KWH	MMBTÚ	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-H	OT WATER	CHILLE	WATER	ENERGY
MONTH	l	\$		1	\$	1		\$	1	MMBTU	COST	TON HRS	COST	costs• l
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	228,480.00	\$ 14,853.68	\$0.07	127.61	\$817.04	\$6.40	296.55	\$791.44	\$2.67	344.21	\$3,811.72	67,596.48	\$9,059.94	\$29,333.82
October	207,520.00	\$ 12,915.56	\$0.06	146.84	\$827.63	\$5.64	159.24	\$482.59	\$3.03	575.29	\$6,561.05	57.076.80	\$7,915.38	\$28,702.20
November	206,240.00	\$ 11,840.67	\$0.06	213.19	\$1,581.01	\$7.42	126.03	\$413.42	\$3.28	847.96	\$11,898.34	36,305.31	\$5,943.77	\$31,677.20
December		\$ 11,793.37	\$0.06	287.31	\$1,994.44	\$6.94	120.14	\$434.53	\$3.62	1,039.73	\$12,250.67	31,914.82	\$4,648.19	\$31,121.20
January	215,200.00	\$ 13,201.44	\$0.06	328.65	\$2,117.15	\$6.44	102.75	\$386.67	\$3.76	1,042.54	\$12,007.23	34,146,02	\$4,537.96	\$32,250.46
February	201,920.00	\$ 11,836.41	\$0.06	283.57	\$1,856.00	\$6.55	62.19	\$247.39	\$3.98	953.96	\$10,440.01	38,302,89	\$4,323.99	\$28,703.80
March	203,360.00	\$ 12,631.41	\$0.06	251.38	\$1,655.72	\$6.59	75.04	\$306.86	\$4.09	851.74	\$10,624.79	39,790.64	\$5,818.84	\$31,037.62
April	242,720.00	\$ 15,611.78	\$0.06	216.16	\$1,624.88	\$7.52	126.59	\$421.47	\$3.33	572.74	\$7,346.95	48,214,00	\$6,982.98	\$31,988.06
May	233,600.00	\$ 17,313.06	\$0.07	159.73	\$1,068.80	\$6.69	238.92	\$736.42	\$3.08	491.78	\$3,077.32	55,170.43	\$11,235.28	\$33,430.88
June	173,760.00	\$ 13,367.46	\$0.08	131.14	\$887.81	\$6.77	239.57	\$738.40	\$3.08	359.10	\$140.80	74,837.23	\$15,032.47	\$30,166.94
July	220,160.00	\$ 14,374.58	\$0.07	128.34	\$971.23	\$7.57	446.73	\$1,153.92	\$2.58	372.31	\$3,528.55	86,633.07	\$11,911.63	\$31,939,90
August	209,280.00	\$ 16,019.07	\$0.08	61.10	\$475.38	\$7.78	801.34	\$1,779.01	\$2.22	330.70	\$3,865.49	88,638.88	\$14,736.76	\$36.875.72
1 1	D		Avg.	(a)		Avg.	3		Avg.	(4)		5)		
Annual	2,536,480	\$165,759	\$0.07	2,335	\$15,877	\$6.86	2,795	\$7,892	\$3,23	7,782	\$85,553	658,627	\$102,147	\$377,228
Totals	l			1									*******	

ANN	IAL ENERGY CON	SUMPTION IN B.TU'S:					ENERGY	UTILIZATIO	N INDEX (EUI)	
(00)	Electricity	2,536,480.00	KWH x 0.0116	=	29,423.17	MMBTU	EUI =	Total Annu	at BTU's	MMBTU/Sq.Ft./Yr
(pp)	Nat. Gas	2,335.00	MMBTU x 1.0	=	2,335.00	MMBTU		Building G	ross Sq. Ft.	
(qq1)	Steam/Hot Water	7,782.00	MMBTU x 1.0	=	7,782.00	MMBTU	EUI =	(uu)	47,443.69	
	Steam	-	LBS x 0.001390	=	-	MMBTU	l .	(a)	129,043.00	
(rr)	Chilled Water	658,627.00	TON HRS x 0.012	=	7,903.52	MMBTU				
	Propane or Butane		GAL x 0.095475	=	•	MMBTU	EUI =	(vv)	0.36765801	MMBTU/Sq.Ft./Yr.
(tt)	Other Fuel		x	. =	-	MMBTU	1			
						-	ENERGY	COST INDE	X (ECI)	
			(uu) TOTAL ANNUAL BTU'S =		47,443.69	MMBTU	ECI =	Annual En	ergy Costs	\$/Sq.Ft./Yr.
								Building Gr	oss Sq. Ft.	
							ECI =	(nn)	377,228.00	
	ot include water cos							(a)	129,043.00	
	ctricity is metered by						i			
		metered at the Utilities I					ECI ≃	(ww)	2.92327364	\$/Sq.Ft./Yr.
and e	stimated by building	s by using its gross squa	are foot value,				1			

TEXAS TEC	CH UNIVERSITY	LAW		, , , ,	129043	PUAS
Facility Nam		Building Name	/e)		Building Siz	0/0\/CCE\
		Delianing Harris	(3)		building 512	(3) (63F)
	RECOMM	ENDED ENERG	Υ			
i	AND WATER CONSE	RVATION MEAS	SURFS			
Provide the	following recommendations based			building(s):		
1. Schedul	ed preventive maintenance plan.					
		ecommendedX	(_Yes	No		
2. Provide	a general estimate, expressed as a	range, of annual	energy a	and water savings		
which c	ould result from implementing the fo	ollowing conservat	ion mea	sures.		
System Cha	inges % Cost S	avings	System	Changes	% Cost Sav	ings
Ventilation S	System Operations		Water	Systems Operation	ns	
<u>X</u>	Reduced ventilation		R	epair all leaks		
_X_	Variable ventilation		R	eduction of water	consumption	n
	Unoccupied area ventilation shut d		R	educe hot water t	emperature	
	Repair of caulking & weatherstripp		in	crease chilled wa	iter temperat	ure
	Maintenance & repair or operating		1		Subtotal	0
	Subtota	\$39,689.000	1			
						i
	ooling System Operations			fant & Distribution		er.
	Change in thermostat control set p Provide locking thermostat covers	oints		quipment cleanin		
	Reset of air & water temperatures			djustment of air/fu		.
	Unoccupied reset or shut down of :			ombustion monito		
	Shut down non-critical exhaust sys			djustment of drive		ors, etc.
	Subto			team Trap mainte ipe insulation rep		1
	3000	7.54	FI	pe insulation repi Subtotal		0
				Subtotal	Subtotal	
Lighting Sys	tems Operations		Other M	leasures (includir	a water use)	
	Reduce illumination levels		Other IV	reasurea (motuan	ig water use,	'
	Maximize use of daylight		_			I
	Install high efficiency lamps					
	Reduce or delete evening cleaning	hours				ĺ
	Subtota	12687			Subtotal	0
			1		Totals	53130.0
,			l			

	CH UNIVERSITY			LAW		129043	PUA
nstitution	Name			Building Name		Building Size (GSF)	-
	ENERG	Y AND WAT	ER CONSERV	ATION MEASURE	RETROFIT REC	OMMENDATIONS	
1.0							
1.0	Basic Building Data		al Energy Use	0.367658		BTU/Sq.Ft./Yr.	
		1.2 Annu	al Energy Cost	2.9232736		\$/Sq.Ft./Yr.	
	1.3 Describe physical co	ondition of building	envelope:	Good condition			_
	1.4 Describe physical co	ondition of building	energy and water-us	ing systems:	Good condition		-
2.0	Briefly outline recommen Reset schedule	ded retrofit options	and potential for ene		n measure retrofit impleme	ntation.	-
	Time of day schedule opt Economizer	timization					-
							-
3.0	VFD installation on AHUs						-
5.0	and/or cooling systems, o	or solar domestic h	er or not the building ot water heating syste	conditions and/or site char ms.	racteristics present an oppo XYes No	rtunity to apply solar heating	
	ENE	RGY AND W	ATER CONSE	RVATION MEASL	JRE RETROFIT AS	SSESSMENT	
1.0	Describe proposed energ Adjust AHU's reset sched	dule/Economizer op		Retrofit (efficiency/illumir	nation level) existing lighting	system	
	Update building utilities o						
	Install VFDs on AHU's far						
2.0	Estimate of installed cost	of above measures	\$146,961.33				
3.0	Estimate of annual energ	y and water cost sa	vings for above mea	sures:	\$53,130.00		
			-		4,		

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or resiltional buildings. I further certify that it have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		Jeremy Dicks			_		Te				/ 806 742 1696 11/22/2005
		e of Energy A						Organiz	ation and Pho	one Numbe	er of Auditor Date
<b>—</b>		CH UNIVERS	ITY	_			LIVESTOCK		MEAT LAB		Texas Tech university/Lubbock, Tx
	Fac	lity Name					Building Nar	ne(s)			Building/Campus Address
									•		g p
					Tex	as Tech Un	iversity				
					Name	and Addres	s of Owner				
	BUILDI	NG DATA									
Building				OPERA	TING SCHEE	ULE					BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup	ants/% GS	F				
43931	Days	(c) [	Daylight		(d) E	vening		(e)	Night		
									1		Central Bidg. Panel
	M-F	12 Hrs	?	87%	4 Hrs	?	0%	0	0	0%	(f) Yes _X_ No
Date (b)							1	-			-
Occupied	SAT	6 Hrs	?	0%	0	0	0%	0	0	0%	EMS
1978											(g) Yes X No
1 1	SUN	6 Hrs	?	0%	0	0	0%	0	0	0%	(9) 103 X 10
OLAM .II	RENERO	SYUSING	SYSTE	мs				-			
Primary	Primary		Space		Space		Domestic		Interior		Special Building
Heat	Cooling		Termina	1	Terminal		Hot Wate	NF.	Lighting		Systems & Facilities
Source (h)	Source	(i)	Heat (i		Cooling (	k)	Source (I	0	System (		(n)
Steam	Centrifuga	1 Chillers	Fan at		Fan an		Heat Exc		Fluores		100
Boiler							Ticut La	a rungu	i idole	SCC11(	
1 1							1		ļ		
i I							1				
								·	L		
III. UNIQ	JE BUIL	DINGCH	ARACTE	PISTICS							
1. Year rous	nd. 24 hour	per day opera	tion			No _X_		6 (i=4=			ing modifications and additions.
	per year ope					No		o. List year	and type of f	riajui Dulla	my modifications and additions.
	Program Us					No	-				
4. Building I					Yes X	No	-				
		griurig			.00 <u>x</u>		-				
Form PUA 1											

			·											
Building Nar		LIVESTOCK	ARENA & M				(a) Building			43931				
ENERGY U	SE AND COS			For Year En		8/31/2005		** Metered_	_X Best	Estimate	<u></u>			
1	ELEC	CTRICITY		NAT	URAL GAS			WATER		P	URCHASED TH	HERMAL.		TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$			\$	l	l	\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(fi)	(mm)	(nn)
September	69,600	\$4,525	\$0.07	43.44	\$278.15	\$6.40	100.96	\$269.44	\$2.67	117.18	\$1,297.65	23,012.34	\$3,084.34	\$9,454.33
October	56,880	\$3,540	\$0.06	49.99	\$281.75	\$5.64	54.21	\$164.29	\$3.03	195.85	\$2,233.62	19,431.05	\$2,694.69	\$8,914.43
November	50,880	\$2,921	\$0.06	72.58	\$538.23	\$7.42	42.90	\$140.74	\$3.28	288.68	\$4,050.63	12,359.67	\$2,023.48	\$9,674.21
December	43,440	\$2,637	\$0.06	97.81	\$678.98	\$6.94	40.90	\$147.93	\$3.62	353.96	\$4,170.58	10,864.98	\$1,582.42	\$9,217.39
January	43,440	\$2,665	\$0.06	111.89	\$720.75	\$6.44	34.98	\$131.64	\$3.76	354.92	\$4,087.70	11,624.57	\$1,544.89	\$9,149.81
February	39,120	\$2,293	\$0.06	96.54	\$631.85	\$6.55	21.17	\$84.22	\$3.98	324.76	\$3,554.16	13,039.72	\$1,472.05	\$8,035.47
March	41,760	\$2,594	\$0.06	85.58	\$563.67	\$6.59	25.55	\$104.46	\$4.09	289.97	\$3,617.07	13,546.20	\$1,980.95	\$8,860.01
April	52,800	\$3,396	\$0.06	73.59	\$553.17	\$7.52	43.10	\$143.49	\$3.33	194.98	\$2,501.17	16,413.82	\$2,377.27	\$8,971.19
May	47,760	\$3,540	\$0.07	54.38	\$363.86	\$6.69	81.34	\$250.71	\$3.08	167.42	\$1,047.63	18,782.05	\$3,824.90	\$9,026.79
June	51,840	\$3,988	\$0.08	44.65	\$302.24	\$6.77	81.56	\$251.38	\$3.08	122.25	\$47.93	25,477.35	\$5,117.61	\$9,707.25
July	62,400	\$4,074	\$0.07	43.69	\$330.64	\$7.57	152.08	\$392.84	\$2.58	126.75	\$1,201.25	29,493.09	\$4,055.16	\$10,054.07
August	49,200	\$3,766	* \$0.08	22.06	\$171.64	\$7.78	272.81	\$605.64	\$2.22	112.58	\$1,315.96	30,175.95	\$5,016.94	\$10,876.12
	p		Avg.	2)		Avg.	3		Avg.	<b>(</b>		5)		
Annual	609,120	\$39,939	\$0.07	796.19	\$5,414.94	\$6.86	951.56	\$2,686.77	\$3.23	2,649.30	\$29,125.37	224,220.80	\$34,774.68	\$111,941.09
Totals	L			l			L	L		l				

	KWH x 0.0116 MMBTU x 1.0 MMBTU x 1.0 LBS x 0.001390	= =	7065.792 796.18626 2649.2971		EUI =	Total Annual E Building Gross		MMBTU/Sq.Ft./Yr.		
49.29714 0	MMBTU x 1.0	=			ı	Building Gross	Ca El			
0		=	2649.2971				o oy. ru			
0	LBS x 0.001390			MMBTU -	EUI =	(uu)	13201.92496			
4220 706		=	0	MMBTU		(a)	43931			
4220,790	TON HRS x 0.012	=	2690,6496	MMBTU	l					
0	GAL x 0.095475	2	0	MMBTU	EUI =	(vv)	0.300515011	MMBTU/Sq.Ft./Yr.		
0	. x	10	0	MMBTU	i					
				-	ENERGY	COST INDEX (E	CI)			
(uu) TOTAL	. ANNUAL BTU'S =		13201.925	MMBTU	ECI =	Annual Energy	/ Costs	\$/Sq.Ft./Yr.		
					ł	Building Gross	Sq. Ft.			
					ECI =	(nn)	111941.089			
L.					1	(a)	43931			
ing.					1					
The remaining values are metered at the Utilities Department ECI = (ww) 2.548111561										
sing its gross square foot value.					1					
iii	0 (uu) TOTAL	O GAL x 0.095475  O X  (uu) TOTAL ANNUAL BTU'S =	O GAL x 0.095475 = X (uu) TOTAL ANNUAL BTU'S =  ng. ltered at the Utilities Department	0	0 GAL x 0.095475 = 0 MMBTU 0 x = 0 MMBTU  (uu) TOTAL ANNUAL BTU'S = 13201.925 MMBTU  ng.	0	0	0 GAL x 0.995475 = 0 MMBTU 0 x 0 MMBTU (uu) TOTAL ANNUAL BTU'S = 13201.925 MMBTU  (uu) TOTAL ANNUAL BTU'S = 13201.925 MMBTU  ECI = (un) 111941.089 (n) 43931  rg.  rg.  retered at the Utilities Department		

PRF	: I I M I	NARV	WATER	AND	ENER	C V V	דומוו

PUA:

	AND LINER		AUDII		FUAS
TEXAS TECH UNIVERSITY			NA & MEAT LAB		
Facility Name	Building Na	me(s)		Building Size	(s) (GSF)
	MENDED ENER				
AND WATER COM					1
Provide the following recommendations ba		rspect	ion of building(s):		-
<ol> <li>Scheduled preventive maintenance pla</li> </ol>					
In Existence X Yes No;					
2. Provide a general estimate, expressed				avings	
which could result from implementing t					
	ost Savings		em Changes	% Cost Savir	ngs
Ventilation System Operations		Wate	er Systems Opera	ations	
Reduced ventilation			Repair all leaks		1
Variable ventilation		_		ter consumption	
Unoccupied area ventilation st			Reduce hot water		
Repair of caulking & weathers		<u> </u>	increase chilled	water temperatu	re
Maintenance & repair or opera				Subtotal _	0
Su	btotal 560	1			
·					
Heating & Cooling System Operations		Utilit	y Plant & Distribu		r.
Change in thermostat control :		<u></u>	Equipment clear		- 1
Provide locking thermostat co	/ers	_	Adjustment of ai	ir/fuel ration	i
Reset of air & water temperatu	ires		Combustion mo	nitoring & contro	1
Unoccupied reset or shut dow	n of system		Adjustment of di	rives, fans, moto	rs, etc.
Shut down non-critical exhaus	t systems		Steam Trap mai	ntenance	
s	ubtotal 224		Pipe insulation r	epair	
			Subto	tal Subtotal	0
Lighting Systems Operations		Othe	r Measures (inclu	iding water use)	l
Reduce illumination levels		<u> </u>			
Maximize use of daylight		_			ł
Install high efficiency lamps					i
Reduce or delete evening clea	ning hours				
Sul	btotal 0	1		Subtotal	0
		1		Totals	784.0
		Į.		-	

TEXAS TE	CH UNIVERSITY	LIVESTOCK ARENA & MEAT LA	B 43931	
Institution	Name	Building Name	Building Size (GSF)	
	ENERGY AND WATER COM	ISERVATION MEASURE RET	ROFIT RECOMMENDATIONS	
1.0	Basic Building Data 1.1 Annual Energy U 1.2 Annual Energy C		BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.	
	1.3 Describe physical condition of building envelope:	Regular condition		_
	Describe physical condition of building energy and	d water-using systems:		_ `
2.0	Based on 1.1 - 1.4 above, indicate the need and poten Briefly outline recommended retrofit options:	•,	e retrofit implementation.	
3.0	Based on auditor evaluation, indicate whether or not th and/or cooling systems, or solar domestic hot water he		s present an opportunity to apply solar heating Yes No	_
	ENERGY AND WATER	CONSERVATION MEASURE R	ETROFIT ASSESSMENT	
1.0	Describe proposed energy conservation measures:	Retrofit (efficiency/illumination lev	rel) existing lighting system	_
				_
2.0	Estimate of installed cost of above measures:	\$0.00		
3.0	Estimate of annual energy and water cost savings for a	above measures: \$784.	00	
4.0	Projected simple payback period for above measures	in years: 0		_

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or nistitional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	. 4	leremy Dicks	on				Te	xas Tech U	niversity-Phys	ical Plant	/ 806 742 1696 11/22/2005
	Name	e of Energy A	uditor		-			Organiz	ation and Pho	ne Numbe	er of Auditor Date
	TEXAS TEC	HUNIVERS	ITY				MUSEUM				Texas Tech university/Lubbock, Tx
	Faci	lity Name					Building Nar	ne(s)			Building/Campus Address
						xas Tech Uni					<u> </u>
					Name	and Addres	s of Owner				
	BUILDI	NG DATA									
Building					TING SCHE						BASIC HVAC CONTROL DATA
Size (a)	l			Time Period		pants/% GS	F				
158266	Days	(c) E	Daylight		(d)	Evening		(e)	Night		
	1	1			1	1	1		1		Central Bidg, Panel
	M-F	12 Hrs	380	50%	0	0	0%	0	0	0%	(f) Yes <u>X</u> No
Date (b)	l	l l			ł	1					
Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS
1970	ł	1			1	1					(g) Yes X No
	SUN	0 Hrs	. 0	0%	0	0	0%	0	0	0%	
		SY USINC		MS							
Primary	Primary		Space		Space		Domestic		Interior		Special Building
Heat	Cooling		Termina		Termin		Hot Wate		Lighting		Systems & Facilities
Source (h)			Heat (j		Cooling		Source (		System (i		(n)
Steam	Centrifuga	d Chillers	Fan ar	nd Coil	Fana	nd Coil	Heat Ex	changer	Fluore	scent	
Boiler	1				i .		1		l		
					1		ŀ		ŀ		
	L		L		L		J		J		I
		DINGCH		RISTICS							
		per day opera	ation		Yes X	No		<ol><li>List yea</li></ol>	r and type of i	major build	ding modifications and additions.
2. 9 month					Yes	No X					
	Program Us				Yes	No X					
4. Building	has exterior	floodlighting			Yes X	No					

1	<u>·                                      </u>													
Building Na	me(s)	MUSEUM					(a) Building	Size(s) (Gre		158266				
ENERGY L	JSE AND COS	T DATA		For Year En	ding:	8/31/2005		** Metered _	X Best	Estimate	X			
	ELEC	TRICITY	-	NA	URAL GAS			WATER		P	URCHASED T	HERMAL		TOTAL
1	KWH	COST	\$/KWH	MCF	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH	l	\$			s	l	l	\$		MMBTU	COST	TON HRS	COST	COSTS*
1	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	460,240	\$29,921	\$0.07	512.00	\$2,753.30	\$5.38	363.71	\$970.67	\$2.67					\$33,644.57
October	396,400	\$24,671	\$0.06	609.00	\$3,221.48	\$5.29	195.30	\$591.88	\$3.03					\$28,484.36
November	364,080	\$20,903	\$0.06	758.00	\$5,497.32	\$7.25	154.56	\$507.04	\$3.28					\$26,906.96
December	355,840	\$21,605	\$0.06	800.00	\$5,092.09	\$6.37	147.34	\$532.94	\$3.62					\$27,230.02
January	436,480	\$26,776	\$0.06	815.00	\$4,897.66	\$6.01	126.02	\$474.24	\$3.76					\$32,147.76
February	364,640	\$21,375	\$0.06	716.00	\$4,222.16	\$5.90	76.28	\$303.41	\$3.98					\$25,900.52
March	384,960	\$23,911	\$0.06	751.00	\$4,391.94	\$5.85	92.04	\$376.35	\$4.09					\$28,679.52
April	375,920	\$24,179	\$0.06	645.00	\$4,449.77	\$6.90	155.26	\$516.92	\$3.33					\$29,145.91
May	344,480	\$25,531	\$0.07	592.00	\$3,935.88	\$6.65	293.03	\$903.19	\$3.08					* \$30,369.91
June »	362,400	\$27,880	\$0.08	514.00	\$3,100.91	\$6.03	293.83	\$905.62	\$3.08					\$31,886.17
July	458,160	\$29,914	\$0.07	0.00	\$0.00	N/A	547.90	\$1,415.24	\$2.58					\$31,329.19
August	443,040	\$33,912	\$0.08	96.67	\$752.12	\$7.78	982.81	\$2,181.89	\$2.22					\$36,845.94
	D		Avg.	0		Avg.	3		Avg.	<b>(</b>		(5)		
Annual	4,746,640	\$310,577	\$0.07	6,808.67	\$42,314.63	\$6.31	3,428.08	\$9,679.37	\$3.23	0.00	\$0.00	0.00	\$0.00	\$362,570.83
Totals										l		I		L

NNUAL ENERGY CONS	UMPTION IN BTU'S:					ENERGY	UTILIZATION II	NDEX (EUI)	
oo) Electricity	4746640	KWH x 0.0116	=	55061.024	MMBTU	EUI =	Total Annual	BTU's	MMBTU/Sq.Ft./Yr.
pp) Nat. Gas	6999.311886	MMBTU x 1.0	=	6999.3119	MMBTU	1	Building Gros	s Sq. Ft.	
qq1) Steam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU	EUI =	(uu)	62060.33589	
qq2) Steam	0	LBS x 0.001390		0	MMBTU	1	(a)	158266	
rr) Chilled Water	0	TON HRS x 0.012	=	. 0	MMBTU	1			
ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.392126773	MMBTU/Sq.Ft/Yr.
tt) Other Fuel	0	×	=	0	MMBTU	1			
					-	ENERGY	COST INDEX (	ECI)	
		(uu) TOTAL ANNUAL BTU'\$ =		62060.336	MMBTU	ECI =	Annual Energ	y Costs	\$/Sq.Ft./Yr.
					-	1	Building Gros	s Sq. Ft.	
						ECI =	(nn)	362570.8345	
Do not include water costs	(hh).	*					(a)	158266	
* Electricity is metered by	building.					1 .			
The remaining values ar	e metered at the Utilities	Department				ECI =	(ww)	2.290895293	\$/Sq.Ft./Yr.
nd estimated by buildings	by using its gross square for	oot value.							
orm PUA 2									

I	D	Þ	=	1	1	R/I	1	N	٨	D	v	w	. 1	 : 6	,	٨	N	п	=	M	В	0	٠.	,	٨	11	 ١,	

DIIA2

TEXAS TECH UNIVERSITY	MUSEU	И	158266	1 0/10
Facility Name	Building	Name(s)	Building Size(s	(GSF)
	RECOMMENDED EN			.
	R CONSERVATION			
Provide the following recommendat		e inspection of building(	s):	
Scheduled preventive maintena				
in ExistenceXYes		d _X_ Yes No		
Provide a general estimate, exp			savings	
which could result from implem System Changes	% Cost Savings	System Changes	% Cost Savino	
Ventilation System Operations	% Cost Savings	Water Systems Ope		\$
Reduced ventilation		Repair all leak		
X Variable ventilation			ater consumption	
Unoccupied area ventil	ation shut down		ater temperature	1
Repair of caulking & we			d water temperature	,
Maintenance & repair of			Subtotal	0
	Subtotal 2420	.		
Heating & Cooling System Operatio	ns	Utility Plant & Distrib	ution System Oper.	
Change in thermostat of		Equipment cle		
Provide locking thermo	stat covers	Adjustment of	air/fuel ration	
Reset of air & water ter	mperatures	Combustion m	onitoring & control	
Unoccupied reset or sh	ut down of system	Adjustment of	drives, fans, motors	, etc.
Shut down non-critical		Steam Trap m		
	Subtotal 0	Pipe insulation		
		Sub	total Subtotal	0
Lighting Systems Operations		Other Measures (inc		
Reduce illumination lev		*** Noisy chiller area		1
Maximize use of daylig		Ear protection highy	recommended.	
Install high efficiency la				
Reduce or delete even			Culstotal	
	Subtotal 0		Subtotal Totals	0 24207.0
			I Otals	24207.0
		1		

## ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

Describe proposed energy conservation measures:

 Correct current pressure control on chilled-water system

2.0 Estimate of installed cost of above measures: \$28.283.00

Estimate of annual energy and water cost savings for above measures: \$24,207.00

4.0 Projected simple payback period for above measures in years: 1.2

Form PUA 4

3.0

Energy Auditor Certification: I hereby certify that 1. <u>Jeremy Dickson</u> (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, peraintip hours, and building configurations.

	J	eremy Dicks	ion				7	1/806 742 1696 11/22/2005			
		of Energy A							ation and Pho	ne Numbe	
		HUNIVERS	SITY				MECHANIC	AL ENGINE	ERING		Texas Tech university/Lubbock, Tx
	Facility	/ Name					В	uilding Name	r(s)		Building/Campus Address
					_						
						cas Tech Uni					
					Name	and Addres	s of Owner				
	BUILDI	NG DATA	<u> </u>								
Building					TING SCHE						BASIC HVAC CONTROL DATA
Size (a)	_			Time Period		ipants/% GSI	Ι-				
88748	Days	(c) I	Daylight		(d)	Evening	(e)		Night		
1				i			Į.		į.		Central Bldg, Panel
	M - F	12	1800	62%	4 Hrs	90	3%	0 Hrs	0	0%	(f) Yes X No
Date (b)								l			
Occupied	SAT	12	180	6%	0 Hrs	0	0%	0 Hrs	0	0%	EMS
1960		i	1	1		1	i		I		(g) Yes <u>X</u> No
	SUN	12	90	3%	0 Hrs	0	_0%	0 Hrs	0	0%	
			GSYSTE	MS							· · · · · · · · · · · · · · · · · · ·
Primary	Primary		Space		Space		Domest		Interior		Special Building
Heat	Cooling		Termina		Termin		Hot Wa		Lighting		Systems & Facilities
Source (h)			Heat (j		Cooling		Source		System (		(n)
Steam	Centrifuga	il Chillers	Fana	nd Coil	Fana	ind Coil	Heat Ex	changer	Fluore	scent	
Boiler			1		l		1				
			1		1		1				
			L		L				L		1
			ARACTE	RISTICS							
<ol> <li>Year rou</li> </ol>			ation		Yes	No_X		<ol><li>List yea</li></ol>	r and type of	major build	ding modifications and additions.
2. 9 month					Yes_X_	No					
	Program Us				Yes_X_	No					
4. Building	has exterior	floodlighting			Yes_X_	No					
i											

	Building Name(s) MECHANICAL ENGINEERING (a) Building Size(s)(Gross Sq. Ft.); 88,748													
			AL ENGINE	ERING			(a) Building	Size(s)(Gro	ss Sq. Ft.):	88,748				
ENERGY	USE AND C	OST DATA		For Year E	nding	8/31/2005		** Metered	X Best	Estimate _	X			
	E	LECTRICITY		N.	ATURAL G	AS		WATER			PURCHAS	ED THERMA		TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-H	OT WATER	CHILLED	WATER	ENERGY
MONTH		\$			\$	1		\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	71,200.00	\$4,628.77	\$0.07.	87.76	\$561.91	\$6.40	203.95	\$544.31	\$2.67	236.72	\$2,621.47	46,488.78	\$6,230.88	\$14,587.34
October	65,280.00	\$4,062.87	\$0.06	100.99	\$569.19	\$5.64	109.52	\$331.90	\$3.03	395.65	\$4,512.29	39,253.99	\$5,443.72	\$14,919.97
November	62,880.00	\$3,610.07	\$0.06	146.62	\$1,087.32	\$7.42	86.67	\$284.32	\$3.28	583.18	\$8,182.96	24,968,61	\$4,087.77	\$17,252.44
December	65,920,00	\$4,002.36	\$0.06	197.60	\$1,371.65	\$6.94	82.62	\$298.85	\$3.62	715.06	\$8,425.27	21,949.09	\$3,196.74	\$17,294.88
January	66,240.00	\$4,063.49	\$0.06	226.03	\$1,456.05	\$6.44	70.67	\$265.93	\$3.76	716.99	\$8,257.85	23,483.58	\$3,120.94	\$17,164.25
February	65,280.00	\$3,826.67	\$0.06	195.02	\$1,276.45	\$6.55	42.77	\$170.14	\$3.98	656.08	\$7,180.01	26,342.42	\$2,973.78	\$15,427.04
March	65,600.00	\$4,074.65	\$0.06	172.89	\$1,138.70	\$6.59	51.61	\$211.04	\$4.09	585.78	\$7,307.09	27,365.60	\$4,001.85	\$16,733.33
April	76,160.00	\$4,898.62	\$0.06	148.66	\$1,117.49	\$7.52	87.06	\$289.86	\$3.33	393.90	\$5,052.79	33,158.68	\$4,802.47	\$16,161.24
May	63,520.00	\$4,707.73	\$0.07	109.85	\$735.06	\$6.69	164.32	\$506.47	\$3.08	338.21	\$2,116.39	37,942.90	\$7,726.95	\$15,792.60
June	59,360.00	\$4,566.60	\$0.08	90.19	\$610.58	\$6.77	164.76	\$507.83	\$3.08	246.97	\$96.84	51,468.54	\$10,338.43	\$16,120.27
July	67,680.00	\$4,418.93	\$0.07	88.26	\$667.95	\$7.57	307.24	\$793.60	\$2.58	256.05	\$2,426.73	59,581.00	\$8,192.10	\$16,499.30
August	63,840.00	\$4,886.55	\$0.08	63.54	\$494.40	\$7.78	551.11	\$1,223.50	\$2.22	227.44	\$2,658.45	60,960.48	\$10,135.06	\$19,397.96
1 1	) .		Avg.	2)		Avg.	3		Avg.	<b>4</b> )		5)		
Annual	792,960.00	\$51,747.32	\$0.07	1,627.41	########	\$6.86	1,922.30	\$5,427.73	\$3.23	5,352.03	\$58,838.14	452,963.68	\$70,250.69	\$197,350.63
Totals														

ANN	UAL ENERGY CON	SUMPTION IN BTU'S:					ENERGY	UTILIZATIO	INDEX (EUI)			
(00)	Electricity	792,960.00	KWH x 0.0116	_	9,198.34	MMBTU	EUI =	Total Annua	al BTU's	MMBTU/Sq.Ft./Yr.		
(pp)	Nat. Gas	1,627.41	MMBTU x 1,0	=	1,627.41	MMBTU	1	Building Gro	oss Sq. Ft.			
(qq1)	Steam/Hot Water	5,352.03	MMBTU x 1.0	=	5,352.03	MMBTU	EUI ≔	(uu)	21,613.33			
(qq2)	Steam		LBS x 0.001390	=	-	MMBTU	1	(a)	88,748.00			
(rr)	Chilled Water	452,963.68	TON HRS x 0.012	=	5,435.56	MMBTU	l	• •	•			
(ss)	Propane or Butane		GAL x 0.095475	=	-	MMBTU	EUI =	(vv)	0.24353601	MMBTU/Sq.Ft./Yr.		
(tt)	Other Fuel	-	<b>x</b> .	=	-	MMBTU	1					
1	•		-			-	ENERGY	COST INDEX	(ECI)			
1		(uu) TOTA	AL ANNUAL BTU'S =		21,613.33	MMBTU	ECI =	Annual Ene	rgy Costs	\$/Sq.Ft./Yr.		
1						-	l	Building Gro	oss Sq. Ft.			
1							ECI =	(nn)	197,350.63			
*Do n	ot include water cost	ts (hh).					l	(a)	88,748.00			
** Ele	ctricity is metered by	building.					1	. ,				
The r	emaining values are	metered at the Utilities Department					ECI =	(ww)	2.22371915	\$/Sq.Ft./Yr.		
and e	nd estimated by buildings by using its gross square foot value.											
	PUA 2											

EXAS TECH UNIVERSITY	MECHANI	CAL ENGINEERING	88748		
acility Name		Building Name(s)			
RI	ECOMMENDED ENER	RGY			
AND WATER	R CONSERVATION M	EASURES			
Provide the following recommendation	ons based on an on-site i	nspection of building(s):			
<ol> <li>Scheduled preventive maintenan</li> </ol>					
In Existence X Yes	No; Recommended	XYes No			
<ol><li>Provide a general estimate, expre</li></ol>	essed as a range, of ann	ual energy and water sa	vings		
which could result from impleme	nting the following conse	rvation measures.	-		
System Changes	% Cost Savings	System Changes	% Cost Savings		
/entilation System Operations		Water Systems Opera	tions		
Reduced ventilation		Repair all leaks			
X_ Variable ventilation		Reduction of wat	ter consumption		
Unoccupied area ventila	tion shut down	Reduce hot water	r temperature		
Repair of caulking & wea	atherstripping	increase chilled	water temperature		
Maintenance & repair or	operating controls	1	Subtotal 0		
	Subtotal 698	4			
Heating & Cooling System Operation	s	Utility Plant & Distribut	ion System Oper.		
X Change in thermostat co	ontrol set points	Equipment clean	ing		
Provide locking thermos		Adjustment of air	r/fuel ration		
X Reset of air & water tem	peratures	Combustion mor	nitoring & control		
Unoccupied reset or shu	it down of system	Adjustment of dri	ives, fans, motors, etc.		
Shut down non-critical e	xhaust systems	Steam Trap mair	ntenance		
	Subtotal 395	Pipe insulation re	epair		
		Subtot	tal Subtotal0		
ighting Systems Operations		Other Measures (inclu	ding water use)		
V	.1-	1	/		

Subtotal 8713

Subtotal Totals

9806.0

Form PUA 3

Maximize use of daylight Install high efficiency lamps Reduce or delete evening cleaning hours

	CH UNIVERSITY	MECHANICAL ENGINEERING	88,748
Institution N	lame	Building Name	Building Size (GSF)
	ENERGY AND WATER CONSERV	ATION MEASURE RETR	OFIT RECOMMENDATIONS
1.0	Basic Building Data 1.1 Annual Energy Use	0.243536	BTU/Sq.Ft./Yr.
	1.2 Annual Energy Cost	2.2237192	\$/Sq,Ft,/Yr.
	1.3 Describe physical condition of building envelope:	Good condition	
	Describe physical condition of building energy and water	using systems: Good cond	dition
2.0	Based on 1.1 - 1.4 above, indicate the need and potential for Briefly outline recommended retrofit options: Reset schedule	energy and water conservation measur	re retrofit implementation.
	Economizer		
3.0	Based on auditor evaluation, indicate whether or not the build	ing conditions and/or site characteristic	s present an opportunity to apply solar heating
	and/or cooling systems, or solar domestic hot water heating s	ystems	Yes X No
	ENERGY AND WATER CONS	ERVATION MEASURE RE	TROFIT ASSESSMENT
1.0	Describe proposed energy conservation measures: Adjust AHU's reset schedule	Install VFDs on AHUs	
	Adjust AHU's economizer operation setpoint		
2.0	Update building utilities operation schedule Estimate of installed cost of above measures: \$56,747.3		
2.0	Lauriate of installed cost of above measures. 430,747.5		<del></del>
3.0	Estimate of annual energy and water cost savings for above r	neasures: \$9,806.00	)
4.0	Projected simple payback period for above measures in year	s: <u>5.8</u>	,
- DIIA	The state of the s		

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dicks					Te				/ 806 742 1696 11/22/2005	
		e of Energy A							ation and Pho	one Numbo		
		H UNIVERS	ITY				MCLELLAN	MEMORIA	-		Texas Tech university/Lubbock, Tx	
	Façi	lity Name					Building Nar	ne(s)	Building/Campus Address			
						as Tech Uni						
					Name	and Address	of Owner					
	BUILDI	NG DATA										
Building				OPERA	TING SCHE	DULE					BASIC HVAC CONTROL DATA	
Size (a)	Time Period: Hrs/Occupants/% GSF											
14062	Days (c) Daylight (d) Evening (e) Night											
		ļ		1		1					Central Bidg. Panel	
	M - F	12 Hrs	30	57%	0	0	0%	0	0	0%	(f) Yes <u>X</u> No	
Date (b)		ł		1			1			Γ.		
Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS	
1956			i		1				i		(g) Yes X No	
ا ــــــــــــــــــــــــــــــــــــ	SUN	0 Hrs	. 0	0%	0	0	0%	0	0	0%		
							70.00					
		SYUSIN		MS								
Primary	Primary		Space		Space		Domesti		Interior		Special Building	
Heat	Cooling		Termina		Termina		Hot Wate		Lighting		Systems & Facilities	
Source (h)			Heat (i		Cooling		Source (		System (		(n)	
Steam	Centrifuga	I Chilters	Fan a	nd Coil	Fan a	nd Coil	Heat Ex	changer	Fluore	scent		
Boiler			Į.				l		1			
l i			ŀ						1			
L	<u></u>						L		<u> </u>		_L	
III. UNIQ				RISTICS								
		per day oper	ation			No		<ol><li>List yea</li></ol>	r and type of	major build	ding modifications and additions.	
	per year ope					No X						
	Program Us				Yes							
4. Building	has exterior	floodlighting			Yes X	No						

Building Nam	e(s)	MCLELLAN	MEMORIAL				(a) Building	Size(s) (Gr	oss Sq. Ft.)	14062				
ENERGY US	SE AND COST	DATA		For Year En	ding:	8/31/2005		** Metered	X Best	Estimate	x			
	ELEC	CTRICITY		NAT	URAL GAS	IRAL GAS WATER				PURCHASED THERMAL				TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH	l	\$	l		\$		l	\$	1	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	13,200	\$858	\$0.07	13.91	\$89.03	\$6.40	32.32	\$86.24	\$2.67	37.51	\$415.37	7,366.08	\$987.27	\$2,436.06
October	11,400	\$710	\$0.06	16.00	\$90.19	\$5.64	17.35	\$52.59	\$3.03	62.69	\$714.97	6,219.74	\$862.55	\$2,429.80
November	10,080	\$579	\$0.06	23.23	\$172.28	\$7.42	13.73	\$45.05	\$3.28	92.40	\$1,296.58	3,956.24	\$647.70	\$2,740.33
December	10,800	\$656	\$0.06	31.31	\$217.34	\$6.94	13.09	\$47.35	\$3.62	113.30	\$1,334.97	3,477.80	\$506.52	\$2,761.91
January	11,640	-\$714	\$0.06	35.81	\$230.71	\$6.44	11.20	\$42.14	\$3.76	113.61	\$1,308.44	3,720.94	\$494.51	\$2,789.85
February	10,200	\$598	\$0.06	30.90	\$202.25	\$6.55	6.78	\$26.96	\$3.98	103.95	\$1,137.66	4,173.92	\$471.19	\$2,435.98
March	10,800	\$671	\$0.06	27.39	\$180.43	\$6.59	8.18	\$33.44	\$4.09	92.82	\$1,157.80	4,336.04	\$634.09	\$2,676.58
April	12,360	\$795	\$0.06	23.56	\$177.07	\$7.52	13.79	\$45.93	\$3.33	62.41	\$800.61	5,253.95	\$760.95	\$2,579.54
May	10,080	\$747	\$0.07	17.41	\$116.47	\$6.69	26.04	\$80.25	\$3.08	53.59	\$335.34	6,012.00	\$1,224.32	\$2,503.45
June	10,320	\$794	\$0.08	14.29	\$96.75	\$6.77	26.11	\$80.46	\$3.08	39.13	\$15.34	8,155.12	\$1,638.11	\$2,624.59
July	12,000	\$783	\$0.07	13.99	\$105.84	\$7.57	48.68	\$125.74	\$2.58	40.57	\$384.51	9,440.53	\$1,298.03	\$2,697.62
August	11,040	\$845	\$0.08	6.00	\$46.64	\$7.78	87.32	\$193.86	\$2.22	36.04	\$421.23	9,659.11	\$1,605.89	\$3,112.66
	р —		Avg.	0		Avg.	3			<b>4</b> )		5)		
Annual	133,920	\$8,749	\$0.07	253.79	\$1,724.99	\$6.86	304.59	\$860.02	\$3.23	848.02	\$9,322.82	71,771.48	\$11,131.13	\$31,788.38
Totals					L					i				

ANNUAL ENERGY CONS	UMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)	
(oo) Electricity	133920	KWH x 0.0116	=	1553.472	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft./Yr.
(pp) Nat. Gas	253.787325	MMBTU x 1.0	=	253.78733	MMBTU	1	Building Gross Sq. Ft.	
(qq1) Steam/Hot Water	848.021134	MMBTU x 1.0	=	848.02113	MMBTU	EUI =	(uu) 3516.538205	
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU	İ	(a) 14062	
(rr) Chilled Water	71771.4788	TON HRS x 0.012	=	861.25775	MMBTU	1		
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv) 0.250073831	MMBTU/Sq.Ft/Yr.
(tt) Other Fuel	0	x	=	0	MMBTU			
					_	ENERGY	COST INDEX (ECI)	
	(1	iu) TOTAL ANNUAL BTU'S =		3516.5382	2 MMBTU	ECI =	Annual Energy Costs	\$/\$q.Ft./Yr,
			-		_	1	Building Gross Sq. Ft.	
						ECI =	(nn) 31788.37747	
*Do not include water cost:	s (hh).					1	(a) 14062	
** Electricity is metered by	building.					1		
The remaining values as	e metered at the Utilities De	partment				ECI =	(ww) 2.260587219	\$/Sq.Ft/Yr.
and estimated by buildings	by using its gross square foot	value.				1		
Form PUA 2								

## PRELIMINARY WATER AND ENERGY AUDIT

DIIA2

	IN AND ENER			FUAS
TEXAS TECH UNIVERSITY		MEMORIAL	14062	
Facility Name	Building Na	me(s)	Building Size(s) (	GSF)
	COMMENDED ENER			
	CONSERVATION ME			
Provide the following recommendation		spection of building	(s):	
<ol> <li>Scheduled preventive maintenance</li> </ol>				
In ExistenceX YesI	No; Recommended	XYesN	ło	
<ol><li>Provide a general estimate, expres</li></ol>			r savings	
which could result from implement	ting the following conser	rvation measures.		1
System Changes	% Cost Savings	System Changes	% Cost Savings	
Ventilation System Operations		Water Systems Op	erations	
Reduced ventilation		Repair all lea	ks	
Variable ventilation		Reduction of	water consumption	
Unoccupied area ventilati	on shut down	Reduce hot v	vater temperature	İ
Repair of caulking & weat	herstripping	Increase chili	ed water temperature	
Maintenance & repair or of	perating controls		Subtotal	0
	Subtotal 0			
Heating & Cooling System Operations		Utility Plant & Distr	ibution System Oper.	- 1
Change in thermostat con	trol set points	Equipment cl		1
Provide locking thermosta			f air/fuel ration	
X Reset of air & water temp			monitoring & control	
Unoccupied reset or shut			f drives, fans, motors, e	tc.
Shut down non-critical ext		Steam Trap r		
_	Subtotal 64	Pipe insulation		
			btotal Subtotal	0
Lighting Systems Operations		Other Measures (in	cluding water use)	
Reduce illumination levels		(		
Maximize use of daylight	•			
X Install high efficiency lamp	ns			
Reduce or delete evening				1
	Subtotal 1382		Subtotal	0
1	- 1002	1		46.0

TEXA	STE	CH UNIVERSITY		MCLELLAN MEMORIAL	1	14062
Institu	ution N	lame	=	Building Name	E	Building Size (GSF)
		ENERGY AND V	VATER CONSERV	ATION MEASURE	RETROFIT RECOMMENDA	TIONS
1	.0	Basic Building Data 1.1	Annual Energy Use	0.2500738	BTU/Sq.Ft./Y	r.
		1.2	Annual Energy Cost	2.2605872	\$/Sq.Ft./Yr.	
		1.3 Describe physical condition of be	uilding envelope:	Regular condition		
		1.4 Describe physical condition of be	uilding energy and water-us	ing systems:	Regular condition	
2	.0	Based on 1.1 - 1.4 above, indicate the		ergy and water conservation	n measure retrofit implementation.	
		Briefly outline recommended retrofit of Lighting retrofit	options:			
		Reset schedule				
		Economizer				
3	.0	Based on auditor evaluation, indicate	whether or not the building	conditions and/or site char	acteristics present an opportunity to apply	solar heating .
		and/or cooling systems, or solar dome	estic hot water heating syste	ems.	X Yes No	
		ENERGY AT	ND WATER CONSE	RVATION MEASL	RE RETROFIT ASSESSME	NT
1	.0	Describe proposed energy conservati Adjust AHU's reset schedule	ion measures:	Retrofit (efficiency/illumin	nation level) existing lighting system	
		Adjust AHU's economizer operation s	etpoint			
2	.0	Estimate of installed cost of above me	easures: \$8,420.54	****		
-		Estimate of matanea cost of above the	easures. <u>40,420.54</u>		***************************************	
3	.0	Estimate of annual energy and water	cost savings for above mea	asures:	\$1,446.00	
4	.0	Projected simple payback period for a	above measures in years:	5.8		
		1,00				

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or restitional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		Jeremy Dicks			Texas Tech University-Physical Plant / 806 742 1696 11/22/2005								
		e of Energy A						Organiz	ation and Pho	ne Numbe	er of Auditor Date		
<b></b>		CH UNIVERS	ITY				MATHMATI	CAL SCIEN	CES		Texas Tech university/Lubbock, Tx		
	Faci	lity Name					<b>Building Nar</b>	me(s)			Building/Campus Address		
											• • • • • • • • • • • • • • • • • • • •		
<b>-</b>				-		kas Tech Uni							
- DAGIO	D.1111 D.1	NG DATA			Name	and Addres	s of Owner						
Building	BUILDI	NGDATA											
					TING SCHE						BASIC HVAC CONTROL DATA		
Size (a)	_			Time Peno	: Hrs/Occu								
67203	Days	Days (c) Daylight (d) Evening (e) Night											
			l				1				Central Bidg Panel		
_	M - F	12 Hrs	1322	59%	0	67	3%	0	0	0%	(f) Yes X No		
Date (b)		l	l		ł	1	1				7		
Occupied	SAT	0 Hrs	134	6%	0	0	0%	0	0	0%	EMS		
1938			ŧ.		1						(g) Yes X No		
	SUN	0 Hrs	67	3%	0	0	0%	0	. 0	0%			
			SYSTE	MS									
Primary	Primary		Space		Space		Domestic	C	Interior		Special Building		
Heat	Cooling		Termina	!	Termina	al	Hot Wate	er.	Lighting		Systems & Facilities		
Source (h)	Source		Heat (j)		Cooling	(k)	Source (	)	System (r	n)	(n)		
Steam	Centrifuga	l Chillers	Fan ar	d Coil	Fan a	nd Coil	Heat Ex	changer	Fluores	cent			
Boiler			I		l		1						
i i					i		į		1				
I							I		ı				
											·, · · · · · · · · · · · · · · · · · ·		
III. UNIQI	UE BUIL	DINGCH	ARACTE	RISTICS									
		er day opera	ation		Yes	No X		5. List vea	and type of n	naior build	ing modifications and additions.		
	per year ope				Yes X	No			77	,	- 5 The simulation to the desirability.		
	Program Us				Yes X	No							
<ol> <li>Building I</li> </ol>	nas exterior	floodlighting			Yes_X	No							
Form PUA 1													

Building Na		MATHMATIC	AL SCIENC	CES			(a) Buildin	g Size(s) (	Gross Sq. F	67203				
ENERGY		OST DATA		For Year E	nding	8/31/2005		** Metered	XBe	st Estimate	X			
		LECTRICITY			NATURAL GAS WATE				PURCHASED THERMAL					TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-F	OT WATER	CHILLED	WATER	ENERGY
MONTH		\$		1	\$			\$	1	MMBTU	COST	TON HRS	COST	COSTS*
l	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(jj)·	(kk)	(11)	(mm)	(nn)
September	60,480.00	\$ 3,931.86	\$0.07	66.46	\$425.50	\$6.40	154.44	\$412.17	\$2.67	179.26	\$1,985.07	35,202.89	\$4,718.24	\$11,472.82
October		\$ 3,540.08	\$0.06	76.47	\$431.01	\$5.64	82.93	\$251.32	\$3.03	299.60	\$3,416.86	29,724.45	\$4,122.17	\$11,761.44
November	53,120.00	\$ 3,049.73	\$0.06	111.02	\$823.36	\$7.42	65.63	\$215.30	\$3.28	441.60	\$6,196.41	18,907.08	\$3,095.40	\$13,380.20
December	52,160.00	\$ 3,166.92	\$0.06	149.63	\$1,038.66	\$6.94	62.57	\$226.30	\$3.62	541.47	\$6,379.90	16,620.60	\$2,420.68	\$13,232.46
January	52,560.00	\$ 3,224.29	\$0.06	171.16	\$1,102.57	\$6.44	53.51	\$201.37	\$3.76	542.93	\$6,253.12	17,782.56	\$2,363.28	\$13,144.64
February	50,960.00	\$ 2,987.24	\$0.06	147.68	\$966.57	\$6.55	32.39	\$128.83	\$3.98	496.80	\$5,436.94	19,947.38	\$2,251.85	\$11,771.43
March	52,800.00	\$ 3,279.60	\$0.06	130.92	\$862.26	\$6.59	39.08	\$159.80	\$4.09	443.57	\$5,533.18	20,722.16	\$3,030.34	\$12,865.18
April	63,040.00	\$ 4,054.74	\$0.06	112.57	\$846.20	\$7.52	65.93	\$219.50	\$3.33	298.27	\$3,826.14	25,108.88	\$3,636.60	\$12,583.18
May		\$ 3,676.06	\$0.07	83.18	\$556.61	\$6.69	124.43	\$383.52	\$3.08	256.11	\$1,602.61	28,731.65	\$5,851.11	\$12,069.90
June		\$ 3,680.36	\$0.08	68.30	\$462.35	\$6.77	124.76	\$384.54	\$3.08	187.01	\$73.33	38,973.72	\$7,828.61	\$12,429.19
July		\$ 3,426.50	\$0.07	66.84	\$505.80	\$7.57	232.65	\$600.94	\$2.58	193.89	\$1,837.60	45,116.76	\$6,203.33	\$12,574.17
August	47,840.00	\$ 3,661.85	\$0.08	96.76	\$752.86	\$7.78	417.32	\$926.47	\$2.22	172.22	\$2,013.07	46,161.35	\$7,674.61	\$15,028.86
1	$\cup$			(2)			3)			4		5)		
Annual	639,760	\$41,679	\$0.07	1,281	\$8,774	\$6.86	1,456	\$4,110	\$3.23	4,053	\$44,554	342,999	\$53,196	\$152,313
Totals						l								

ANNUAL	ENERGY CON	SUMPTION IN BTU'S:	•				ENERGY	UTILIZATIO	N INDEX (EUI)	
(oo) Ele	ectricity	639,760.00	KWH x 0.0116	=	7,421.22	MMBTU	EUI =	Total Annu	al BTU's	MMBTU/Sq.Ft./Yr.
(pp) Na	t. Gas	1,281.00	MMBTU x 1.0	=	1,281.00	MM8TU		Building G	ross Sq. Ft.	
	eam/Hot Water	4,053.00	MMBTU x 1.0	=	4,053.00	MMBTU	EUI =	(uu)	16,871.20	
(qq2) Ste	am		LBS x 0.001390	=	-	MMBTU	1	(a)	67,203.00	
	illed Water	342,999.00	TON HRS x 0.012	=	4,115.99	MMBTU				
	pane or Butane		GAL x 0.095475	=	-	MMBTU	EUI =	(vv)	0.25104838	MMBTU/Sq.Ft./Yr.
(tt) Othe	er Fuel	-	x	=	-	MMBTU				·
1						_	ENERGY	COST INDE	X (ECI)	
1		(uu)	TOTAL ANNUAL BTU'S =		***************************************	MMBTU	ECI ≔	Annual En	ergy Costs	\$/Sq.Ft./Yr.
1								Building G	ross Sq. Ft.	·
1							ECI =	(nn)	152,313.00	
	iclude water cos						1	(a)	67,203.00	
	ity is metered by						1			
		metered at the Utilities Depart					ECI =	(ww)	2.26646132	\$/Sq.Ft/Yr.
		s by using its gross square foo	t value.							
Form PUA	42							_		

PRELIMINARY WATER AND	ENERGY	AUDIT	PUA3
TEXAS TECH UNIVERSITY	MATHMATICAL	SCIENCES	67203
Facility Name	Building Name(s)		Building Size(s) (GSF)
AND WATER CONSER\ Provide the following recommendations based on 1. Scheduled preventive maintenance plan.	an on-site inspect	ion of building(s): YesNo ergy and water savi	% Cost Savings
Heating & Cooling System Operations  X. Change in thermostat control set poir Provide locking thermostat covers  X. Reset of air & water temperatures Unoccupied reset or shut down of sys Shut down non-critical exhaust syste	stem	y Piant & Distributio Equipment cleanin Adjustment of air/fi Combustion monit Adjustment of drivs Steam Trap mainte Pipe insulation rep Subtotal	g uel ration oring & control es, fans, motors, etc. enance alr
Lighting Systems Operations  Reduce Illumination levels  Maximize use of daylight  Install high efficiency lamps  Reduce or delete evening cleaning h  Subtotal	_	r Measures (includia	ng water use) Subtotal 0

Totals

\$20,152,00

4.0 I

3.0

Estimate of annual energy and water cost savings for above measures:

Projected simple payback period for above measures in years:

Energy Auditor Certification: Thereby certify that It, <u>Jeremy Dickson</u> (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dicks			Texas Tech University-Physical Plant / 806 742 1696 11/22/20								
		of Energy A						Organiz	ation and Pho	one Numbe	er of Auditor Date		
	TEXAS TEC		SITY		-		MASS CO	COMMUNI	CATIONS		Texas Tech university/Lub	bock. Tx	
	Facility	Name					Bi	- Building/Campus Add					
								-			g		
					Te	xas Tech Uni	versity						
					Name	and Address	of Owner						
	BUILDI	IG DATA	· .										
Building				OPERA	TING SCHE	DULE					BASIC HVAC CONTROL DATA		
Size (a)				Time Period	: Hrs/Occu								
78586	Days (c) Daylight (d) Evening (e) Night												
l .						Central Bldg. Panel							
	M-F	12	1600	60%	3	80	3%	0	0	0%	(f) Yes X No		
Date (b)							-						
Occupied	SAT	0	0	0%	0	0	0%	0	0	0%	EMS		
1976			-		ļ						(g) Yes X No		
	SUN	0	0	0%	0	0	0%	0	0	0%			
									,				
	RENERG	YUSIN		MS									
Primary	Primary		Space		Space		Domesti	С	Interior		Special Building		
Heat	Cooling		Termina		Termin		Hot Wate		Lighting		Systems & Facilities		
Source (h)			Heat (j		Cooling		Source (	n _	System (i	m)	(n)		
Steam	Centrifuga	Chillers	Fan ar	nd Coil	Fan a	nd Coil	Heat Exc	hanger	Fluore	scent			
Boiler			1						I				
			l				1						
					l								
	UE BUILI												
<ol> <li>Year rou</li> </ol>			ation		Yes	No_X 5. List year and type of major building modifications and additions.							
	per year ope				Yes_X_	No							
	Program Usi				Yes_X_	No							
4. Building	has exterior f	loodlighting			Yes_X_	No							

Building Na		MASS COMM	UNICATION	1		-	(a) Buildin	g Size(s)(G	ross Sq. Ft.)	78,586				
ENERGY	USE AND C			For Year E	nding	8/31/2005		** Metered		st Estimate	X			
		LECTRICITY		N.	ATURAL G.	AS		WATER			PURCHASI	ED THERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-H	OT WATER	CHILLED W	ATER	ENERGY
MONTH		\$			\$			\$		MMBTU	COST	TON HRS	COST	costs.
L	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	l an	(mm)	(nn)
September	95,200.00	\$6,189.03	\$0.07	77.71	\$497.57	\$6.40	180.60	\$481.98	\$2.67	209.62	\$2,321.30	41,165.63	\$5,517.42	\$15,007.31
October	83,200.00	\$5,178.17	\$0.06	89.43	\$504.02	\$5.64	96.98	\$293.89	\$3.03	350.35	\$3,995.62	34,759.25	\$4,820.39	\$14,792.09
November	83,600.00	\$4,799.65	\$0.06	129.83	\$962.82	\$7.42	76.75	\$251.77	\$3.28	516.40	\$7,245.98	22,109.60	\$3,619,70	\$16,879,92
December	80,400.00	\$4,881.52	\$0.06	174.97	\$1,214.59	\$6.94	73.16	\$264.63	\$3.62	633.18	\$7,460.55	19,435.83	\$2,830.70	\$16,651,99
January	82,400.00	\$5,054.83	\$0.06	200.15	\$1,289.32	\$6.44	62.58	\$235.48	\$3.76	634.90	\$7,312.29	20,794.62	\$2,763.58	\$16,655,50
February	74,400.00	\$4,361.28	\$0.06	172.69	\$1,130.29	\$6.55	37.88	\$150.66	\$3.98	580.95	\$6,357.87	23,326.11	\$2,633.27	\$14,633.36
March	82,000.00	\$5,093.31	\$0.06	153.09	\$1,008.32		45.70	\$186.87	\$4.09	518.70	\$6,470.40	24,232.13	\$3,543.62	\$16,302.52
April	82,800.00	\$5,325.71	\$0.06	131.64	\$989.54	\$7.52	77.09	\$256.67	\$3.33	348.79	\$4,474.22	29,361.88	\$4,252.57	\$15,298.71
May	75,600.00	\$5,603.03	\$0.07	97.27	\$650.89	\$6.69	145.50	\$448.48	\$3.08	299.49	\$1,874.06	33,598.29	\$6,842.18	\$15,418.63
June	78,000.00	\$6,000.59	\$0.08	79.86	\$540.67	\$6.77	145.90	\$449.68	\$3.08	218.69	\$85.75	45,575.18	\$9,154.64	\$16,231.32
July	76,400.00	\$4,988.27	\$0.07	78.16	\$591.47	\$7.57	272.06	\$702.73	\$2.58	226.73	\$2,148.86	52,758.74	\$7,254.07	\$15,685.39
August	70,400.00	\$5,388.68	\$0.08	0.00	\$0.00	N/A	488.01	\$1,083.40	\$2.22	201.40	\$2,354.05	53,980.26	\$8,974.55	\$17,800.68
l 1	P			<b>2</b>		Avg.	3)		Avg.	4		5)		
Annual	964,400.00	\$62,864.07	\$0.07	1384.796	\$9,379.49	\$6.78	1702.193	\$4,806.23	\$3.23	4739.197	\$52,100.93	401097.528	\$62,206.70	\$191,357.43
Totals								L						

ANNUA	L ENERGY CON	SUMPTION IN BTU'S	i:					ENERGY	UTILIZATIO	ON INDEX (EUI)	
	lectricity	964,400.00		KWH x 0.0116	Six	######	MMBTU	EUI =	Total Annu	al BTU's	MMBTU/Sq.Ft./Yr.
	vat. Gas	1,384.80		MMBTU x 1.0	=	1,384.80	MMBTU		Building G	ross Sa. Ft.	
	Steam/Hot Water	4,739.20		MMBTU x 1.0	=	4,739.20	MMBTU	EUI =	(uu)	22,124.20	
	team	-		LBS x 0.001390	=	-	ммвти	1	(a)	78,586.00	-
(m) C	hilled Water	401,097.53		TON HRS x 0.012	=	4,813.17	MMBTU		(-7	,	
	ropane or Butane	-		GAL x 0.095475	=	-	MMBTU	EUI =	(vv)	0.28152856	MMBTU/Sq.Ft./Yr.
(tt) Ot	her Fuel	•		×	=	-	MMBTU	I	-		
1							-	ENERGY	COST INDE	EX (ECI)	
			(uu) TOTA	L ANNUAL BTU'S =		22124.2	MMBTU	ECI =	Annual En	eray Costs	\$/Sq.Ft./Yr.
							-	1	Building G		
								ECI =	(nn)	191,357,43	
	include water cost							i	(a)	78,586.00	
** Electri	icity is metered by	building,						I	. ,	,	
The rem	aining values are	metered at the Utilities	Department					ECI =	(ww)	2.43500655	\$/Sq.Ft./Yr.
and estir	mated by buildings	by using its gross sq	rare foot value.						(1117)	2. 1000000	woq.rc.rr.
Form PL	JA 2										

TEXAS TECH UNIVERSITY	MASS COM	MUN	ICATIO	١	78586		
Facility Name	Building Na	me(s	)		Building Size	(s) (GSF)	
RECO	MMENDED ENER	~V					
	NSERVATION ME		RES				
Provide the following recommendations b				ilding(e)			
Scheduled preventive maintenance pl	an	apec	CON ON DE	iliuli ig(s).			
In Existence X Yes No:		х	Yes	No			
2. Provide a general estimate, expresse		ual en	eray and	water savir	nas		
which could result from implementing	the following conse	rvatio	n measu	res.	.go		
	Cost Savings		em Chai		% Cost Savir	ios	
Ventilation System Operations		Wat	er Syster	ns Operatio		3-	
Reduced ventilation		L_	Repair	all leaks			
_X_ Variable ventilation			Reduct	ion of water	consumption		
Unoccupied area ventilation :					emperature		
Repair of caulking & weather	stripping		Increas	e chilled wa	ter temperatu	re	
Maintenance & repair or oper	ating controls				Subtotal	0	
Si	ubtotal 4931	-			_		
Heating & Cooling System Operations		Utilit	y Plant 8	Distribution	System Ope	r.	
Change in thermostat control	set points			ent cleaning			
Provide locking thermostat co	overs		Adjustn	nent of air/fu	el ration		
Reset of air & water temperal	ures		Combu	stion monito	ring & control		
Unoccupied reset or shut dov	vn of system		Adjustn	ent of drive	s, fans, motor	s, etc.	
Shut down non-critical exhau	st systems		Steam '	Trap mainte	nance		
;	Subtotal383		Pipe ins	ulation repa	air		
				Subtotal	Subtotal _	0	
ighting Systems Operations		Othe	r Measu	res (includin	g water use)		
X Reduce illumination levels							
Maximize use of daylight		_					
X Install high efficiency lamps							

Form PUA 3

Reduce or delete evening cleaning hours

Subtotal 7707

Subtotal

Totals

13021.0

 $\overline{x}$ 

48

Projected simple payback period for above measures in years:

Energy Auditor Certification: I hereby certify that I, \_\_leronv\_Dickson\_ (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building outdoursalors.

		Jeremy Dicks			Texas Tech University-Physical Plant / 806 742 1696 11/22/2005									
		e of Energy A				_	_	Organiz	ation and Ph	one Numb	er of Auditor Date			
		CH UNIVERS	SITY		_			MUSIC			Texas Tech university/Lubbock, Tx			
1	Facilit	y Name						luilding Name	e(s)		Building/Campus Address	_		
1											- State of the sta			
						xas Tech Uni								
1 00016					Name	and Addres	s of Owner							
Building	BUILDI	NG DATA												
					TING SCHE						BASIC HVAC CONTROL DATA			
Size (a) 106430	-			Time Period		pants/% GSI	F							
106430	Days	(c) (	Daylight		(d)	Evening		(e)	Night					
1	M-F		l		i			1	į.		Central Bidg. Panel			
Date (b)	M-F	12 Hrs	1600	45%	4 Hrs	80	2%	0 Hrs	0	0%	(f) Yes <u>X</u> No			
Occupied	SAT	0.11	1 _		l	I	1	ŀ		1				
1951	SAI	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	EMS			
1951	SUN	0 Hrs	_			1	İ	į .	1		(g) Yes X No No			
	SUN	UHrs	0	0%	0 Hrs	. 0	0%	0 Hrs	0	0%		- 1		
II MAIO	DENED	SYUSING	CVCTC											
Primary	Primary		Space	w S	Space		Domest							
Heat	Cooling		Terminal		Termina		Hot Wat		Interior		Special Building			
Source (h)			Heat (i)		Cooling				Lighting		Systems & Facilities			
Steam	Centrifuga		Fan an			nd Coil	Source -		System (		(n)			
Boiler	- compandige	, Olimera	1 """	u Con	Falla	na Con	rieat Exc	znanger	Fluore	escent				
			l .				ı		l					
i I					i									
			L				ــــــ		L					
III. UNIO	UFBUIL	DINGCH	ARACTE	DISTICS										
1. Year rou	nd 24 hour	per day opera	etion		Yes	No_X_		£ 134				_		
2. 9 month	per year ope	eration			Yes X	No		a. List year	and type of	major build	ling modifications and additions.	- 1		
	Program Us				Yes X	No								
		floodlighting				No						_		
					<u>. / _</u>									
Form PIJA 1														

Building Nan	ne(s)	MUSIC	r			-	(a) Buildin	g Size(s)(Gr	nee Sa Et	106430			-	
ENERGY U	SE AND COST			For Year E	nding	8/31/2005		** Metered		st Estimate	<u> </u>			
		ECTRICITY			NATURAL GA	S		WATER		T	PURCHASI	ED THERMAI		TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-H	OT WATER		WATER	ENERGY
MONTH	i i	\$			\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
Ļ	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	67,600	\$4,394.73	\$0.07	105.25	\$673.86	\$6.40	244.59	\$652.75	\$2.67	283.89	\$3,143.77	55,751.13	\$7,472.31	\$16,337.43
October	63,200	\$3,933.42	\$0.06	121.11	\$682.60	\$5.64	131.33	\$398.02	\$3.03	474.48	\$5,411.31	47,074.88	\$6,528.32	\$16,953.67
November	59,600	\$3,421.76	- \$0.06	175.83	\$1,303.96	\$7.42	103.94	\$340.97	\$3.28	699.37	\$9,813.32	29,943.31	\$4,902.21	\$19,782.21
December	59,600	\$3,618.64	\$0.06	236.96	\$1,644.94	\$6.94	99.09	\$358.39	\$3.62	857.53	\$10,103.91	26,322.19	\$3,833.66	\$19,559.54
January	66,800	\$4,097.85	\$0.06	271.06	\$1,746.15	\$6.44	84.75	\$318.91	\$3.76	859.85	\$9,903.13	28,162.41	\$3,742.75	\$19,808.78
February	54,400	\$3,188.89	\$0.06	233.87	\$1,530.76	\$6.55	51.30	\$204.03	\$3.98	786.79	\$8,610.54	31,590.84	\$3,566.27	\$17,100.50
March	59,600	\$3,701.97	\$0.06	207.33	\$1,365.57	\$6.59	61.89	\$253.08	\$4.09	702.49	\$8,762.94	32,817.88	\$4,799.17	\$18,882,74
April	70,400	\$4,528.14	\$0.06	178.28	\$1,340.14	\$7.52	104.41	\$347.62	\$3.33	472.37	\$6,059.50	39,765.16	\$5,759.31	\$18,034,70
May	51,600	\$3,824.29	\$0.07	131.74	\$881.51	\$6.69	197.06	\$607.38	\$3.08	405.60	\$2,538.06	45,502.58	\$9,266.45	\$17,117.69
June	53,200	\$4,092.71	\$0.08	108.16	\$732.23	\$6.77	197.59	\$609.00	\$3.08	296,17	\$116.13	61,723,04	\$12,398,24	\$17,948,31
July	46,000	\$3,003.41	\$0.07	105.85	\$801.03	\$7.57	368.45	\$951.71	\$2.58	307.06	\$2,910.22	71,451.82		\$17,490.65
August	50,400	\$3,857.80	\$0.08	107.78	\$838.55	\$7.78	660.92	\$1,467.27	\$2.22	272.75	\$3,188.12	73,106,14	\$12,154,35	\$21,506.08
1	ρ			2)		Avg.	3)		Avg.	4)		5)	,	
Annual	702,400.00	\$45,663.61	\$0.07	1,983.22	\$13,541.30	\$6.86	2,305.30	\$6,509.14	\$3.23	6,418.35	\$70,560.94	*********	\$84,247,32	******
Totals														

ANNUAL ENERG	GY CONSU	MPTION IN BTU'S:					TENEDO	/ LITH 17 A	TION INDEX (EUI)	
							LINERG	UTILIZA	HOW INDEX (EOI)	
(oo) Electricity		#########	KWH x 0.0116	=	8,147.84	MMBTU	EUI =	Total Ar	nnual BTU's	MMBTU/Sq.Ft./Y
(pp) Nat. Gas		1,983.22	MMBTU x 1.0	=	1,983,22	MMBTU			Gross Sq. Ft.	inimo i oroq.i t.i i
(qq1) Steam/Ho	ot Water	6,418.35	MMBTU x 1.0	=	6,418.35	MMBTU	EUI =	(uu)	23.067.95	
(qq2) Steam		-	LBS x 0.001390	= .	-	MMBTU	T .	(a)	***********	
(rr) Chilled W		********	TON HRS x 0.012	=	6,518.54	MMBTU	ļ	(-)		
(ss) Propane o			GAL x 0.095475	=	-	ммвти	EUI =	(vv)	0.21674297	MMBTU/Sq.Ft./Yi
(tt) Other Fuel	1	-	x	=	-	MMBTU				
						-	ENERGY	COST IN	DEX (ECI)	
			(uu) TOTAL ANNUAL BTU'S =		########	MMBTU	ECI =		Energy Costs	\$/Sq.Ft./Yr.
						-	1	Building	Gross Sq. Ft.	
							ECI =	(nn)	##########	
*Do not include v							1	(a)	***************************************	
** Electricity is m							i			
		etered at the Utilities Dep					ECI =	(ww)	2.07199391	\$/Sq.Ft,/Yr.
	/ buildings b	y using its gross square t	oot value.							
Form PUA 2										

TEXAS TECH UNIVERSITY	MUSIC		106430	
acility Name	Building f	lame(s)	Building Size(s)	(GSF)
	RECOMMENDED ENE	RGY		
. AND WATE	ER CONSERVATION N	MEASURES		
Provide the following recommenda				
. Scheduled preventive maintena				
In Existence X Yes	No; Recommended	XYes No		
. Provide a general estimate, ex	pressed as a range, of an	nual energy and water sa	vings	
which could result from implen	nenting the following cons	ervation measures.	-	
System Changes	% Cost Savings	System Changes	% Cost Savings	
entilation System Operations		Water Systems Opera	tions	
Reduced ventilation		Repair all leaks		
X_ Variable ventilation		Reduction of wat		
Unoccupied area vent		Reduce hot water		
Repair of caulking & w		Increase chilled	water temperature	
Maintenance & repair			Subtotal	0
	Subtotal 22067	4		
eating & Cooling System Operation	ons	Utility Plant & Distribut	ion System Oper.	
Change in thermostat	control set points	Equipment clean		
Provide locking therme	ostat covers	Adjustment of air	r/fuel ration	
Reset of air & water te	mperatures	Combustion mor	nitoring & control	
Unoccupied reset or s		Adjustment of dri	ives, fans, motors,	etc.
Shut down non-critical	exhaust systems	Steam Trap mair		
	Subtotal 441	Pipe insulation re		
		Subtot	tal Subtotal	0
ghting Systems Operations		Other Measures (inclu-	ding water use)	
X Reduce illumination le	vels		•	
Maximize use of daylig	pht			
X Install high efficiency I	amps			
Reduce or delete ever	ing cleaning hours			

Subtotal 10410

Subtotal Totals

32918.0

TEXAS T	ECH UNIVERSITY			MUSIC	106430	1 024
Institution	Name			Building Name	Building Size (GSF)	_
	ENERGY	AND	WATER CONSER	VATION MEASUR	E RETROFIT RECOMMENDATIONS	
1.0	Basic Building Data	1.1 1.2	Annual Energy Use Annual Energy Cost	0.216743 2.0719939	BTU/Sq.Ft/Yr. \$/Sq.Ft/Yr.	
	1.3 Describe physical cor	dition of	building envelope:	Good condition		_
	1.4 Describe physical cor	dition of	building energy and water-	using systems:		<del>-</del>
2.0	Based on 1.1 - 1.4 above, Briefly outline recommende Reset schedules	ndicate t		nergy and water conservation	on measure retrofit implementation.	_
	Time of day schedule optin Economizers Variable Frequency Drives		e fons			
3.0		n, indicat	e whether or not the buildir	ng conditions and/or site cha stems.	racteristics present an opportunity to apply solar heating YesX No	<del>-</del>
-	ENE	RGYA	ND WATER CONS	ERVATION MEAS	URE RETROFIT ASSESSMENT	
1.0	Describe proposed energy Adjust AHU's reset schedu	e		Retrofit (efficiency/illumin	nation level) existing lighting system	
	Adjust AHU's economizer of					
2.0	Install variable frequency d Estimate of installed cost o			5		
3.0	Estimate of annual energy	and wate	r cost savings for above me	easures:	\$66,181.00	
4.0	Projected simple payback p	eriod for	above measures in years:	0.9		
orm PUA	4					

Energy Auditor Certification: 1 hereby certify that I, \_\_leremy Dickson\_\_ (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy nerges, operatine hours, and buildings conflictuations.

	Je	eremy Dicks	on				T-	806 742 1696	1/8/2003			
	Name	of Energy A	uditor					Organiza	ation and Pho	ne Number	r of Auditor	Date
	TEXAS TEC	HUNIVERS	ITY				PETROLEU	M ENGINEE	RING		Texas Tech university/L	ubbock, Tx
	Facility	Name		•			В	uilding Name	(s)		Building/Campus /	Address
						as Tech Univ						
					Name	and Address	of Owner					
	BUILDIN	IG DATA	L								BASIC HVAC CONTROL DATA	
Building					TING SCHEE						BASIC HVAC CONTROL DATA	
Size (a)	_			Time Period	: Hrs/Occup			(-)	******			
69892	Days	(c) I	Daylight		(d) E	vening		(e)	Night		Central Bidg, Panel	
								١	1 .		(f) Yes X No	
1	M-F	12	1700	75%	4 Hrs	80	4% .	0 Hrs	0	0%	(i) res No	
Date (b)	SAT	40	170	8%	0 Hrs	0	0%	0 Hrs	0	0%	EMS	
Occupied 1950	SAI	10	170	6%	UHIS		0%	Unis		076	(g) YesX No	
1950	SUN	10	80	4%	0 Hrs	0	0%	0 Hrs	0	0%	(g) 165X140	
	SUN	10	: 00	470	01115		; 0,6	01115		0.00		
II MAJO	RENERG	YUSING	GSYSTE	МS								
Primary	Primary		Space		Space		Domesti	С	Interior		Special Building	
Heat	Cooling		Terminal		Termina		Hot Wat	er	Lighting		Systems & Facilities	
Source (h)	Source (	i)	Heat (i)		Cooling (	k)	Source (	3)	System (	m)	(n)	
Steam	Centrifugal	Chillers	Fan an	d Coil	Fan ar	nd Coil	Heat Exc	hanger	Fluore	scent		
Boiler							l					
					l		1					
ļ												
							-					
III. UNIQ	UE BUILI	DINGCH	ARACTE	RISTICS								
	nd, 24 hour p		ation		Yes	No_X_		5. List year	and type of r	najor buildi	ing modifications and additions.	
	per year oper					No						
<ol><li>Summer</li></ol>	Program Use	:				No						
<ol> <li>Building</li> </ol>	has exterior f	loodlighting			Yes_X_	No						

Building Na	ame(s)	PETROLEUM E	NGINEERI	NG			(a) Buildin	g Size(s)(Gr						
ENERGY	USE AND COS	T DATA		For Year E		8/31/2005		** Metered_	X Best	t Estimate_	_X			
	E	LECTRICITY		N/	TURAL G	AS		WATER				D THERMAL		TOTAL
1 1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-H	OT WATER	CHILLED	WATER	ENERGY
MONTH		\$	l		\$	1		\$		MMBTU	COST	TON HRS	cost	COSTS*
1 1	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	81,360.00	\$5,289.28	\$0.07	69.11	\$442.52	\$6.40	160:62	\$428.66	\$2.67	186.43	\$2,064.50	36,611.46	\$4,907.03	\$13,131.99
October	78,000.00	\$4,854.54	\$0.06	79.53	\$448.26	\$5.64	86.25	\$261.38	\$3.03	311.59	\$3,553.58	30,913.82	\$4,287.11	\$13,404.86
November	74,640.00	\$4,285.24	\$0.06	115.47	\$856.30	\$7.42	68.26	\$223.91	\$3.28	459.27	\$6,444.35	19,663.61	\$3,219.25	\$15,029.06
December	79,920.00	\$4,852.38	\$0.06	155.61	\$1,080.22	\$6.94	65.07	\$235.35	\$3.62	563.13	\$6,635.18	17,285.64	\$2,517.54	\$15,320.68
January	84,480.00	\$5,182.43	\$0.06	178.01	\$1,146.68	\$6.44	55.65	\$209.43	\$3.76	564.66	\$6,503.33	18,494.10	\$2,457.84	\$15,499.71
February	77,040.00	\$4,516.03	\$0.06	153.58	\$1,005.24	\$6.55	33.69	\$133.99	\$3.98	516.68	\$5,654.49	20,745.53	\$2,341.95	\$13,651.71
March	77,520.00	\$4,815.04	\$0.06	136.15	\$896.77	\$6.59	40.64	\$166.20	\$4.09	461.32	\$5,754.58	21,551.32	\$3,151.59	\$14,784.17
April	88,080.00	\$5,665.32	\$0.06	117.08	\$880.06	\$7.52	68.56	\$228.28	\$3.33	310.21	\$3,979.24	26,113.56	\$3,782.11	\$14,535.00
May	68,400.00	\$5,069.41	\$0.07	86.51	\$578.88	\$6.69	129.41	\$398.86	\$3.08	266.36	\$1,666.73	29,881.29	\$6,085.23	\$13,799.11
June	66,000.00	\$5,077.42	\$0.08	71.03	\$480.85	\$6.77	129.76	\$399.93	\$3.08	194.50	\$76.26	40,533.18	\$8,141.86	\$14,176.32
July	73,680.00	\$4,810.68	\$0.07	69.51	\$526.03	\$7.57	241.96	\$624.98	\$2.58	201.65	\$1,911.13	46,922.02	\$6,451.55	\$14,324.37
August	64,560.00	\$4,941.66	\$0.08	70.86	\$551.35	\$7.78	434.02	\$963.55	\$2.22	179.11	\$2,093.62	48,008.40	\$7,981.69	\$16,531.87
			Avg.	2		Avg.	3			<b>(</b>		5)		
Annual	913,680.00	\$59,359.42	\$0.07	1,302.46	\$8,893.18	\$6.86	1,513.88	\$4,274.52	\$3.23	4,214.90	\$46,336.99	356,723.95	\$55,324.75	\$174,188.86
Totals														

ANNI	JAL ENERGY CONS	UMPTION IN BTU'S:					ENERGY	UTILIZATIO	N INDEX (EUI)	
(00)	Electricity	913,680.00	KWH x 0.0116	=	10,598.69		EUI =	Total Annu		MMBTU/Sq.Ft./Yr.
(pp)	Nat. Gas	1,302.46	MMBTU x 1.0	=	1,302.46	MMBTU	1	Building G	ross Sq. Ft.	
(qq1)	Steam/Hot Water	4,214.90	MMBTU x 1.0	=	4,214.90		EUI =	(uu)	20,396.73	
	Steam	-	LBS x 0.001390	=	-	MMBTU	1	(a)	69,892.00	
(m)	Chilled Water	356,723.95	TON HRS x 0.012	=	4,280.69	MMBTU	1			
(ss)	Propane or Butane	-	GAL x 0.095475	=	-	MMBTU	EUI =	(vv)	0.291832148	MMBTU/Sq.Ft./Yr.
(tt)	Other Fuel		×	=	-	MMBTU	1			
1, ,						-	ENERGY	COST INDE	X (ECI)	
		(uu) T	OTAL ANNUAL BTU'S =		20,396.73	MMBTU	ECI =	Annual En	ergy Costs ross Sq. Ft.	\$/Sq.Ft./Yr.
							ECI =		174,188.86	
*Do n	ot include water cost	s (hh).					ECI -	(nn) (a)	69,892.00	
** Ele	ctricity is metered by	building.					1			
The n	emaining values are i	metered at the Utilities Department					ECI =	(ww)	2.49225744	\$/Sq.Ft./Yr.
and e	stimated by buildings	by using its gross square foot valu	e.				1			
Form	PUA 2									

TEXAS TECH UNIVERSITY	PETROLE	UM ENGINEERING	69892
Facility Name	Building Na	ame(s)	Building Size(s) (GSF)
Provide the following recommer 1. Scheduled preventive maint	enance plan.	EASURES nspection of building(s):	
In ExistenceX_ Yes _		_X_YesNo	
<ol><li>Provide a general estimate,</li></ol>			vings
	lementing the following conse		0/ 0
System Changes Ventilation System Operations	% Cost Savings	System Changes	% Cost Savings
Reduced ventilation	_	Water Systems Opera Repair all leaks	lions
Variable ventilation		Reduction of wat	or apparemetion
	entilation shut down	Reduction of water	
Repair of caulking			water temperature
	air or operating controls	increase crimed	Subtotal 0
	Subtotal0		Cubiciui
Heating & Cooling System Oper	rations	Utility Plant & Distribut	ion System Oper.
	tat control set points	Equipment clean	
Provide locking the		Adjustment of air	
X Reset of air & wate	r temperatures	Combustion mor	nitorina & control
Unoccupied reset of	or shut down of system	Adjustment of dr	ives, fans, motors, etc.
Shut down non-crit	ical exhaust systems	Steam Trap mair	ntenance
	Subtotal 348	Pipe insulation re	epair
		Subtot	al Subtotal 0
Lighting Systems Operations		Other Measures (inclu	ding water use)
X Reduce illumination	n levels		• • • • • • • • • • • • • • • • • • • •
Maximize use of da	aylight		
X Install high efficient	cy lamps		
Reduce or delete e	vening cleaning hours		
	Subtotal 6831		Subtotal 0
	<del></del>		Totals 7179.0

TEXAS TE	CH UNIVERSITY	PETROLEUM ENGINEERING	69,892
Institution	Name	Building Name	Building Size (GSF)
	ENERGY AND WATER CONSERV	ATTON MEASURE RET	ROFII RECOMMENDATIONS
1.0	Basic Building Data 1.1 Annual Energy Use	0.2918321	BTU/Sq.Ft./Yr.
	1.2 Annual Energy Cost	2.4922574	\$/Sq.Ft./Yr.
	1.3 Describe physical condition of building envelope:	Good condition	
1			
	1.4 Describe physical condition of building energy and wate	r-using systems: Good con	dition
2.0	Based on 1.1 - 1.4 above, indicate the need and potential for Briefly outline recommended retrofit options:	energy and water conservation meas	sure retroit implementation.
	Reset schedule		
	Time of day schedule optimization		
	Economizer		
3.0	Based on auditor evaluation, indicate whether or not the build	ing conditions and/or site characteris	tics present an apportunity to apply solar heating
3.0	and/or cooling systems, or solar domestic hot water heating s		Yes X No
	ENERGY AND WATER CONS	ERVATION MEASURE RI	ETROFIT ASSESSMENT
1.0	Describe proposed energy conservation measures:		
1.0	Adjust AHU's reset schedule		
	Adjust AHU's economizer operation setpoint		
	Update building utilities operation schedule		
2.0	Estimate of installed cost of above measures: \$41,025.3	3	
3.0	Estimate of annual energy and water cost savings for above	neasures: \$7,179.0	•
3.0	Estimate of annual energy and water cost savings for above	11easules. 97,175.0	· · · · · · · · · · · · · · · · · · ·
4.0	Projected simple payback period for above measures in year	rs: 5.7	

Energy Auditor Certification: I hereby certify that I. \_\_leremy Dickson\_ (name of auditor), have experience in conducting energy audits for commercial and/or instituous buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dicks					т	/ 806 742 1696 12/17/2002				
		of Energy A							ation and Pho	ne Number		
	TEXAS TEC	HUNIVERS	IΤΥ				PH	YSICAL PLA	NT		Texas Tech university/Lubbock, Tx	
	Facility	Name					В	uilding Name	(s)		Building/Campus Address	
						s Tech Univ					44	
					Name	and Address	of Owner					
	BUILDI	NG DATA										
Building					ING SCHEE						BASIC HVAC CONTROL DATA	
Size (a)				Time Period:								
106326	Days	(c) [	Daylight		(d) E	vening		(e)	Night		_	
										Central Bldg. Panel		
	M-F	11 Hrs	2780	78%	0 Hrs	0	0%	0 Hrs	0	0%	(f) Yes <u>X</u> No	
Date (b)							i	1				
Occupied	SAT	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	EMS	
1961				l					l _	l	(g) Yes <u>X</u> No	
	SUN	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%		_
		YUSING	OVOTE									
			Space	M S	Space		Domesti		Interior		Special Building	
Primary Heat	Primary Cooling		Space Termina	.	Space		Hot Wat		Lighting		Systems & Facilities	
Source (h)			Heat ()		Cooling (		Source		System (		(n)	
Steam	Centrifuga	Chillers	Fan ar	nd Coil	Fan ar	d Coil	Heat Exc	nanger	Huore	scent		
Boiler												
	L		L				L				L	
HI (1811.0	U.E. D.(1111	DANC CU	ADACTE	RISTICS		-						
		er day opera			Yes X	No		f Heteron		and an invital	ing modifications and additions.	
2. 9 month			IIOII			No X		o. List year	and type of	najor bullul	ing incumcations and additions.	
	Program Us				Yes	No_X_				-		_
4. Building						No						_
r. building	HOS OXIGITOR	roomgnung				140						

	iding Name(s) PHYSICAL PLANT (a) Building Size(s)(Gross Sq. Ft.) 106326																	
Building Na			YSICAL PLA	<u> INI</u>														
ENERGY U	ISE AND COST	DA	TA			For Year E	nding	8	/31/2005		** Me	etered_	X_ Bes	st Estimate_	X			
	EI	EC	TRICITY			N	ATURAL GA	١S			WA	TER		PURCHASED THERI			L	TOTAL
	KWH		COST	\$	/KWH	MMBTU	COST	\$/1	MBTU	MGAL	CC	OST	\$/MGAL	STEAM-F	OT WATER	CHILLE	D WATER	ENERGY
MONTH			\$	1			\$			1	ľ	\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)		(bb)		(cc)	(dd)	(ee)		(ff)	(gg)	(+	nh)	(ii)	(ii)	(kk)	(H)	(mm)	(nn)
September	131,860.00	\$	8,572.33	\$	0.07	105.14	\$ 673.21	4	6.40	244.35	\$ 6	52.11	\$ 2.67	283.61	\$ 3,140.70	55,696.65	\$ 7,465.01	\$ 20,503.36
October	109,880.00	\$	6,838.67	\$	0.06	120.99	\$ 681.93	4	5.64	131.21	\$ 3	97.63	\$ 3.03	474.02	\$ 5,406.03	47,028.88	\$ 6,521.94	\$ 19,846.20
November	108,780.00	\$	6,245.29	\$	0.06	175.66	\$1,302.68	\$	7.42	103.84	\$ 3	40.64	\$ 3.28	698.68	\$ 9,803.73	29,914.05	\$ 4,897.42	\$ 22,589.75
December	109,360.00	\$	6,639.84	\$	0.06	236.73	\$1,643.33	\$	6.94	98.99	\$ 3	58.04	\$ 3.62	856.69	\$10,094.04	26,296.47	\$ 3,829.91	\$ 22,565.16
January	123,680.00	\$	7,587.15	\$	0.06	270.80	\$1,744.44	\$	6.44	84,66	\$ 3	18.60	\$ 3.76	859.01	\$ 9,893.45	28,134.89	\$ 3,739.09	\$ 23,282.73
February	113,820.00	\$	6,672.05	\$	0.06	233.65	\$1,529.27	\$	6.55	51.25	\$ 2	03.84	\$ 3.98	786.02	\$ 8,602.12	31,559.97	\$ 3,562.79	\$ 20,570.06
March	108,320.00	\$	6,728.14	\$	0.06	207.13	\$1,364.24	\$	6.59	61.83		52.84	\$ 4.09	701.80	\$ 8,754.38	32,785.81	\$ 4,794.48	\$ 21,894.08
April	123,880.00	\$	7,967.98	\$	0.06	178.11	\$1,338.83	5	7.52	104.30	\$ 3	47.28	\$ 3.33	471.91	\$ 6,053.58	39,726.30	\$ 5,753.68	\$ 21,461.34
May	107,280.00	\$	7,950.96	\$	0.07	131.61	\$ 880.65	\$	6.69	196.86	\$ 6	06.78	\$ 3.08	405.20	\$ 2,535.58	45,458.11	\$ 9,257.40	\$ 21,231.37
June	116,760.00	\$	8,982.42	\$	0.08	108.05	\$ 731.52	\$	6.77	197.40	\$ 6	08.41	\$ 3.08	295.88	\$ 116.02	61,662.72	\$12,386.12	\$ 22,824.48
July	133,000.00	\$	8,683.77	\$	0.07	105.75	\$ 800.25	\$	7.57	368.09	\$ 9	50.78	\$ 2.58	306.76	\$ 2,907.38	71,382.00	\$ 9,814.68	\$ 23,156.86
August	129,980.00	\$	9,949.15	\$	0.08	118.69	\$ 923.45	\$	7.78	660.27	\$1,4	65.83	\$ 2.22	272.49	\$ 3,185.00	73,034.71	\$12,142.47	\$ 27,665.91
	D			Αv	g.	2		A۱	g.	3			Avg.	(4)		5)		
Annual	1,416,600.00	\$	92,817.76	\$	0.07	1,992.30	********	\$	6.86	2,303.05	\$6,5	02.78	\$ 3.23	6,412.08	\$70,492.00	542,680.58	\$84,164.99	\$267,591.31
Totals										<u></u>				<u> </u>				

ANNUAL ENERGY	CONSUMPTION IN BTU'S:					ENERGY	UTILIZATI	ON INDEX (EUI)	
(oo) Electricity	1,416,600.00	KWH x 0.0116	=	16,432.56	MMBTU	EUI =	Total Ann	ual BTU's	MMBTU/Sq.Ft./Yr.
(pp) Nat. Gas	1,992.30	MMBTU x 1.0	=	1,992.30	MMBTU		Building G	Gross Sq. Ft.	
(qq1) Steam/Hot \	Water 6,412.08	MMBTU x 1.0	=	6,412.08	MMBTU	EUI =	(uu)	31,349.11	
(qq2) Steam		LBS x 0.001390	=	-	MMBTU		(a)	106,326.00	
(rr) Chilled Wate	er 542,680.58	TON HRS x 0.012	=	6,512.17	MMBTU				
(ss) Propage or E	Butane -	GAL x 0.095475	=	-	MMBTU	EUI =	(vv)	0.29483957	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	-	x	=	-	MMBTU				
1					-	ENERGY	COST IND	EX (ECI)	
ĺ		(uu) TOTAL ANNUAL BTU'S =		31,349.11	MMBTU	ECI =	Annual Er	nergy Costs	\$/Sq.Ft./Yr.
ŀ					-		Building G	Gross Sq. Ft.	
i						ECI =	(nn)	267,591.31	
*Do not include wa	ter costs (hh).						(a)	106,326.00	
** Electricity is met	ered by building.								
The remaining valu	es are metered at the Utilities Dep	artment				ECI =	(ww)	2.51670629	\$/Sq.Ft./Yr.
and estimated by b	uildings by using its gross square t	foot value,							•
Form PUA 2							_		

LKELIMINAKI MAIE	KANDENEK	. U i	AUDII		PUAS
TEXAS TECH UNIVERSITY	PHYSICAL	PLAN	IT.	106326	
Facility Name	Building Na	me(s)		Building Size(	s) (GSF)
REC	COMMENDED ENER	GY			
AND WATER (	CONSERVATION ME	ASU	RES		
Provide the following recommendation	s based on an on-site in	spect	ion of building(s):		
1. Scheduled preventive maintenance					
In Existence X Yes	No; Recommended .	X	Yes No		
2. Provide a general estimate, expres	sed as a range, of annu	ıal en	ergy and water savi	ings	
which could result from implement	ing the following conser	vatior	n measures.		
System Changes	% Cost Savings	Syst	em Changes	% Cost Saving	gs
Ventilation System Operations		Wate	er Systems Operation	ons	
Reduced ventilation			Repair all leaks		
Variable ventilation		_	Reduction of wate	r consumption	
Unoccupied area ventilation	on shut down		Reduce hot water	temperature	
Repair of caulking & weat	herstripping	_	Increase chilled w	ater temperatur	e i
Maintenance & repair or o	perating controls			Subtotal	0
	Subtotal 0				
Heating & Cooling System Operations		Utilit	y Plant & Distribution		:
_X Change in thermostat con		<u> </u>	Equipment cleaning		
Provide locking thermosta		<u></u>	Adjustment of air/f		i
X Reset of air & water temp		_	Combustion monit		
Unoccupied reset or shut			Adjustment of driv		s, etc.
Shut down non-critical exh		<u> </u>	Steam Trap maint		
	Subtotal 535		Pipe insulation rep		
			Subtota	l Subtotal _	0
Lighting Systems Operations		Othe	er Measures (includi	ing water use)	
X Reduce illumination levels	;	_			
Maximize use of daylight		<u> </u>			
X Install high efficiency lamp		<u></u>			
Reduce or delete evening		<u> </u>			
	Subtotal 10481	1		Subtotal _	0
				Totals	11016.0
		ĺ		_	

TEXAS TE	CH UNIVERSITY	PHYSICAL PLANT	106326
Institution N	lame	Building Name	Building Size (GSF)
	ENERGY AND WATER CONSE	RVATION MEASURE F	RETROFIT RECOMMENDATIONS
1.0	Basic Building Data 1.1 Annual Energy Use	0.2948396	BTU/Sq.Ft./Yr.
	1.2 Annual Energy Cost	2.5167063	\$/Sq.Ft./Yr.
	1.3 Describe physical condition of building envelope:	Good condition	
	Describe physical condition of building energy and water	r-using systems: Goo	d condition
2.0	Based on 1.1 - 1.4 above, indicate the need and potential for		easure retrofit implementation.
		ency lighting	<u> </u>
	Adjust AHU's reset schedule		
	Adjust AHU's economizer operation setpoint		
	Update building utilities operation schedule		
3.0	Based on auditor evaluation, indicate whether or not the build and/or cooling systems, or solar domestic hot water heating		eristics present an opportunity to apply solar heating Yes No
	ENERGY AND WATER CON	SERVATION MEASUR	E RETROFIT ASSESSMENT
1.0	Describe proposed energy conservation measures: Adjust AHU's reset schedule	Retrofit (efficiency/illumination	n level) existing lighting system
	Adjust AHU's economizer operation setpoint		
	Update building utilities operation schedule		
2.0	Estimate of installed cost of above measures: \$62,302	.71	
3.0	Estimate of annual energy and water cost savings for above	measures: \$11	,016.00
4.0	Projected simple payback period for above measures in year	rs: 5.7	

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	Jeremy Dickson							xas Tech Ur	niversity-Phys	ical Plant /	806 742 1696	4/14/2003
	Name	of Energy A	uditor		-			Organiz	ation and Pho	ne Numbe	r of Auditor	Date
	TEXAS TEC	H UNIVERS	ITY				PSYCHOLO	GY			Texas Tech universit	y/Lubbock, Tx
	Faci	ity Name		•			<b>Building Nar</b>	ne(s)		•	Building/Campus Add	dress
						s Tech Univ						
<u> </u>					Name :	and Address	of Owner					
	BUILDI	NG DATA										
Building					TING SCHED						BASIC HVAC CONTROL DA	ATA
Size (a)		L		Time Period	: Hrs/Occup							
39221	Days	(c) [	Daylight		(d) E	vening	,	(e)	Night		<b>-</b>	
				i	4 Hrs 7 2%				1 -		Central Bldg. Panel	
	M-F	12 Hrs	190	57%	4 Hrs		2%	0	0	0%	(f) Yes X No	
Date (b)	SAT	6 Hrs	17	5%	。	0	0%	۰	0	0%	EMS	
Occupied 1964	SAI	6 nis	- ''	3%		0 0% 0			-	076	(g) Yes X No	
1964	SUN	6 Hrs	7	2%	ا ه	0	0%	0	0	0%	(g) 1es NO	
	SUN	D HIS	<u> </u>	: 276			: 0%		. 0	. 0%	<u> </u>	
U MA IO	DENED	YUSING	SVSTE	MS		-						
Primary	Primary		Space	0	Space		Domesti		Interior		Special Building	
Heat	Cooling		Termina	ı	Terminal		Hot Wale	er .	Lighting		Systems & Facilities	
Source (h)	Source		Heat (i	,	Cooling (	c)	Source (	1)	System (		(n)	
Steam	Centrifuga	l Chillers	Fan ar	nd Coil	Fan an	d Coil	Heat Ex	changer	Fluore	scent	1	
Boiler			1					-	ļ			
			1						Į.			
					l		I		l			
III. UNIQ	UEBUIL	DINGCH	ARACTE	RISTICS					-			
1. Year rou	nd, 24 hour p	er day opera	tion		Yes	No X		5. List yea	r and type of r	najor buildi	ing modifications and additions.	
	per year ope					No						
3. Summer	Program Us	e			Yes X	No						· ·
4. Building	has exterior	Roodlighting		Yes X	No							

Building Nam	ne(s)	PSYCHOLO	GY				(a) Building	Size(s) (G	ross Sq. Ft.)	39221				
ENERGY US	SE AND COST	DATA		For Year En	ding:	8/31/2005		** Metered	X Best	Estimate	X			
	ELE	CTRICITY		NA.	TURAL GAS	WATER				F	TOTAL			
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$		1	\$		l	s	l	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	60,960	\$3,963	\$0.07	38.78	\$248.33	\$6.40	90.13	\$240.55	\$2.67	104.62	\$1,158.52	20,545.10	\$2,753.66	\$8,364.12
October	62,760	\$3,906	\$0.06	44.63	\$251.55	\$5.64	48.40	\$146.68	\$3.03	174.85	\$1,994.15	17,347.78	\$2,405.78	\$8,704.19
November	63,240	\$3,631	\$0.06	64.80	\$480.53	\$7.42	38.30	\$125.65	\$3.28	257.73	\$3,616.35	11,034.54	\$1,806.54	\$9,659.81
December	58,560	\$3,555	\$0.06	87.32	\$606.18	\$6.94	36.51	\$132.07	\$3.62	316.01	\$3,723.44	9,700.11	\$1,412.76	\$9,429.95
January	61,800	\$3,791	\$0.06	99.89	\$643.48	\$6.44	31.23	\$117.52	\$3.76	316.87	\$3,649.45	10,378.26	\$1,379.26	\$9,580.83
February	60,960	\$3,573	\$0.06	86.19	\$564.11	\$6.55	18.90	\$75.19	\$3.98	289.94	\$3,173.11	11,641.68	\$1,314.22	\$8,700.06
March	56,520	\$3,511	\$0.06	76.40	\$503.23	\$6.59	22.81	\$93.26	\$4.09	258.88	\$3,229.27	12,093.87	\$1,768.56	\$9,104.99
April	76,200	\$4,901	\$0.06	65.70	\$493.86	\$7.52	38.48	\$128.10	\$3.33	174.08	\$2,233.01	14,654.04	\$2,122.39	\$9,878.56
May	56,280	\$4,171	\$0.07	48.55	\$324.85	\$6.69	72.62	\$223.83	\$3.08	149.47	\$935.31	16,768.36	\$3,414.82	\$9,069.95
June	55,320	\$4,256	\$0.08	39.86	\$269.84	\$6.77	72.81	\$224.43	\$3.08	109.14	\$42.80	22,745.84	\$4,568.93	\$9,361.79
July	58,440	\$3,816	\$0.07	39.01	\$295.19	\$7.57	135.78	\$350.72	\$2.58	113.16	\$1,072.46	26,331.03	\$3,620.39	\$9,154.40
August	52,680	\$4,032	\$0.08	19.69	\$153.20	\$7.78	243.56	\$540.71	\$2.22	100.51	\$1,174.87	26,940.67	\$4,479.05	\$10,380.15
	0		Avg.	(a)		Avg.	3			<b>(4)</b>		5)		i
Annual	723,720	\$47,107	\$0.07	710.82	\$4,834.35	\$6.86	849.54	\$2,398.71	\$3.23	2,365.26	\$26,002.73	200,181.28	\$31,046.36	\$111,388.79
Totals														ı

NNUAL ENERGY	CONSUMPTION IN BTU'S:	·				ENERGY	UTILIZATIO	N INDEX (EUI)	
oo) Electricity	723720	KWH x 0.0116	=	8395.152	ммвти	EUI ≈	Total Ann		MMBTU/Sq.Ft/Yr.
pp) Nat. Gas	710.819214	MMBTU x 1.0	=	710.81921	MMBTU		Building G	Gross Sq. Ft.	
qq1) Steam/Hot V	Vater 2365.2565	MMBTU x 1.0	=	2365.2565	MMBTU	EUI =	(uu)	13873.40308	
qq2) Steam	0	LBS x 0.001390	=	0	MMBTU		(a)	39221	
rr) Chilled Wate	r 200181.281	TON HRS x 0.012	=	2402.1754	MMBTU				
ss) Propane or B	utane 0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv)	0.353723849	MMBTU/Sq.Ft./Yr.
tt) Other Fuel	0	x	=	0	MMBTU				
					_	ENERGY	COST INDE	X (ECI)	
	(	uu) TOTAL ANNUAL BTU'S =		13873.403	MMBTU	ECI =	Annual Er	nergy Costs	\$/Sq.Ft./Yr.
					-		Building G	iross Sq. Ft.	
						ECI =	(nn)	111388.794	
Do not include wat	er costs (hh).						(a)	39221	
* Electricity is mete	ered by building.								
The remaining val	ues are metered at the Utilities D	epartment				ECI =	(ww)	2.840029422	\$/Sq.Ft./Yr.
and estimated by b	uildings by using its gross square fo	ot value.				1			

PRELIMINARI WATER			AUDII		PUAS
TEXAS TECH UNIVERSITY	PSYCHOLO			39221	
Facility Name	Building Na	me(s)		Building Size	(s) (GSF)
AND WATER Of Provide the following recommendations I 1. Scheduled preventive maintenance p In ExistenceX Yes No 2. Provide a general estimate, expresse which could result from implementin	olan. ; Recommended _ ed as a range, of annu	ASUF ispection X ial energy vation System	ion of building(s): YesNo ergy and water sav	% Cost Savir	
Unoccupied area ventilation Repair of caulking & weathe Maintenance & repair or ope	rstripping		Reduce hot water Increase chilled w		ore O
Heating & Cooling System Operations Change in thermostat contr Provide locking thermostat X. Reset of air & water temper Unoccupied reset or shut de Shut down non-critical exha	covers atures own of system	Utility	Plant & Distributic Equipment cleanin Adjustment of air/fi Combustion monit Adjustment of driv Steam Trap maint Pipe insulation rep	ng fuel ration toring & control res, fans, motol tenance pair	ı
Lighting Systems Operations  X Reduce Illumination levels Maximize use of daylight X Install high efficiency lamps Reduce or delete evening of	leaning hours Subtotal <u>3841</u>	*** N	r Measures (includ oisy chiller area. protection higly reco	,	0 8346.0

TEXAS TE	CH UNIVERSITY	PS PS	SYCHOLOGY		39221	
Institution I	Name	Bu	uilding Name		Building Size (GSF)	
	ENERGY AND W	ATER CONSERVAT	ION MEASURE	RETROFIT REC	OMMENDATIONS	
1.0			.3537238		BTU/Sq.Ft./Yr. \$/Sa.Ft./Yr.	
	1.2 A	ninual Energy Cost	.0400294		\$/\$q.rt./11.	
	1.3 Describe physical condition of buil	lding envelope: Go	ood condition			
	1.4 Describe physical condition of buil	lding energy and water-using	systems: C	Good condition		
2.0	Based on 1.1 - 1.4 above, indicate the	need and potential for energy	and water conservation	measure retrofit impleme	entation.	
	Briefly outline recommended retrofit op	tions:				
	Lighting retrofit					
	VFD installation on AHUs					
	Reset schedule					
	Economizer					
3.0	Based on auditor evaluation, indicate w					
	and/or cooling systems, or solar domes	stic hot water heating systems	s	_X Yes No		
	ENERGY AN	D WATER CONSER	VATION MEASU	RE RETROFIT A	SSESSMENT	
1.0	Describe proposed energy conservatio	n measures: Re	etrofit (efficiency/illumina	tion level) existing lighting	g system	
	Install VFDs on AHU's fan motors					
	Adjust AHU's reset schedule					
	Adjust AHU's economizer operation set Estimate of installed cost of above mea					
2.0	Estimate of installed cost of above mea	sures: \$32,403.39				
3.0	Estimate of annual energy and water or	ost savings for above measur	res:	\$8,346.00		
4.0	Projected simple payback period for ab	ove measures in years:	3.9			

	Jeremy Dickson Texas Tech University-Physica										
	Nam	e of Energy A	uditor						ation and Pho	ne Numbe	
	TEXAS TE	CH UNIVERS	ΠY					SCIENCE			Texas Tech university/Lubbock, Tx
	Facilit	y Name			-		8	uilding Name	(s)		Building/Campus Address
						as Tech Univ					<del></del>
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building	L				TING SCHE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	i: Hrs/Occup				Night		
118544	Days	(c) [	Daylight		(d) E						
l .		1			Central Bidg. Panel						
	M-F	12 Hrs	2300	58%	4 Hrs	(f) Yes <u>X</u> No					
Date (b)	l	1			l						
Occupied	SAT	12 Hrs	230	6%	0 Hrs	0	0%	0 Hrs	0	0%	EMS
1951			120	3%	0 Hrs		0%	0 Hrs	0	0%	(g) Yes <u>X</u> No
	SUN	12 Hrs	120	3%	UHrs	i <u>U</u>	0%	UHIS	1 0	. 0%	
	D. F. N. C. D.	GYUSINO	OVETE	M.C.							
Primary	Priman		Space	M S	Space		Domesti	ic	Interior		Special Building
Heat	Cooling		Termina		Termina		Hot Wat		Lighting		Systems & Facilities
Source (h)			Heat (i		Cooling		Source		System (		(n)
Steam	Centrifuga		Fan a			nd Coil	Heat Exc		Fluore		
Boiler	Committee	ai Ormiloi G	"		1				1		
Done									1		
1	l								1		
										-	
III UNIO	UEBUIL	DINGCH	ARACTE	RISTICS							
		per day opera			Yes	No_X		5. List year	and type of r	najor build	ing modifications and additions.
	per year ope				Yes X	No		Recommiss	ioning - FY00		
	Program Us				Yes X	No					
4. Building					Yes_X	No			_		
ı						_					

Building Na	ame(s)	SCIENCE					(a) Buildin	g Size(s)(Gr	oss Sq. Ft.)	118544				
ENERGY	USE AND COST	DATA		For Year E	nding	8/31/2005	-	** Metered	X Bes	t Estimate_	X			
	EL	ECTRICITY		NATURAL GAS			WATER					ED THERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL		OT WATER	CHILLE		ENERGY
MONTH		\$			\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
Septembe	123,440.00	\$ 8,024.94	\$ 0.07	117.23	\$ 750.56	\$ 6.40	272.43	\$ 727.05		316.20	\$ 3,501.60	62,096.80		\$21,326.97
October	110,800.00	\$ 6,895.93	\$ 0.06	134.89	\$ 760.29	\$ 5.64	146.28	\$ 443.33	\$ 3.03	528.49	\$ 6,027.24	52,433.01		\$21,398.16
November	102,320.00	\$ 5,874.41	\$ 0.06	195.84	\$ 1,452.37	\$ 7.42	115.77	\$ 379.78	\$ 3.28	778.97	\$10,930.28			
December	108,720.00	\$ 6,600.98	\$ 0.06	263.94	\$ 1,832.17	\$ 6.94	110.36	\$ 399.18	\$ 3.62	955.13	\$11,253.95			
January	125,600.00	\$ 7,704.93	\$ 0.06	301.91	\$ 1,944.89	\$ 6.44	94.39	\$ 355.21	\$ 3.76	957,72	\$11,030.32	31,367.89		
February	106,880.00	\$ 6,265.23	\$ 0.06	260.49	\$ 1,705.00	\$ 6.55	57.13	\$ 227.26	\$ 3.98	876.34	\$ 9,590.60	35,186.55		
March	106,320.00	\$ 6,603.91		230.93	\$ 1,521.01	\$ 6.59	68.94	\$ 281.89	\$ 4.09	782.45	\$ 9,760.35			
April	120,960.00	\$ 7,780.16	\$ 0.06	198.57	\$ 1,492.68	\$ 7.52	116.29	\$ 387.18		526.14	\$ 6,749.20	44,291.28		
May	104,640.00	\$ 7,755.30	\$ 0.07	146.73	\$ 981.84	\$ 6.69	219.49	\$ 676.51	\$ 3.08	451.77	\$ 2,826.95	50,681.74		
June	106,080.00	\$ 8,160.80	\$ 0.08	120.47	\$ 815.58	\$ 6.77	220.08	\$ 678.32		329.88	\$ 129.35	68,748.43		
July	112,720.00	\$ 7,359.66		117.90	\$ 892.21	\$ 7.57	410.39	\$1,060.04		342.01	\$ 3,241.47	79,584.56		
August	101,920.00	\$ 7,801.34	\$ 0.08	76.05	\$ 591.72	\$ 7.78	736.14	\$1,634.27	\$ 2.22	303.80	\$ 3,550.99	81,427.18	\$13,537.77	\$27,116.09
	p -		Avg.	2		Avg.	(3)			(4)		5.00		
Annual	1,330,400.00	\$ 86,827.60	\$ 0.07	2,164.96	\$14,740.32	\$ 6.86	2,567.69	\$7,250.02	\$ 3.23	7,148.90	\$78,592.28	605,040.41	\$93,836.45	\$281,246.67
Totals	I						L			l				

Total				1			1	L			
ANNI	JAL ENERGY CONS	UMPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)		
(00) (pp) (qq1)	Electricity Nat. Gas Steam/Hot Water	1,330,400.00 2,164.96 7,148.90	KWH x 0.0116 MMBTU x 1.0 MMBTU x 1.0 LBS x 0.001390	=======================================	15,432.64 2,164.96 7,148.90	MMBTU	EUI = EUI =	Total Annual Building Gro (uu)		. ммв	FU/Sq.Ft./Y
(qq2) (rr) (ss) (tt)	Steam Chilled Water Propane or Butane Other Fuel	605,040.41	TON HRS x 0.012  GAL x 0.095475  x	=	7,260.48	MMBTU	EUI =	(vv)	0.270000915	ммв	ΓU/Sq.Ft./\
			(uu) TOTAL ANNUAL BTU'S =		32,006.99	MMBTU	ECI =	Annual Ener Building Gro	gy Costs ss Sq. Ft.	\$/Sq.	Ft./Yr.
	not include water costs						ECI =	(nn) (a)	281,246.67 118,544.00		
The r	emaining values are r	netered at the Utilities Depa by using its gross square for					ECI =	(ww)	2.372508691	\$/Sq.	Ft./Yr.

TEXAS TECH UNIVERSITY	SCIENCE			118544	
Facility Name	Building Na	me(s)		Building Siz	e(s) (GSF)
	MMENDED ENERG				
	DNSERVATION ME				
Provide the following recommendations I		spection o	of building(s):		
<ol> <li>Scheduled preventive maintenance p</li> </ol>					
In Existence X Yes N					
<ol><li>Provide a general estimate, expresse</li></ol>				gs	
which could result from implementin		vation me			
	Cost Savings	System C		% Cost Sav	ings
Ventilation System Operations			stems Operation	IS	
X Reduced ventilation X Variable ventilation			oair all leaks		
			duction of water		
Unoccupied area ventilation			duce hot water te		
Repair of caulking & weather		Incr	rease chilled wat		
Maintenance & repair or ope				Subtotal	0
	Subtotal 16446				
Heating & Cooling System Operations		LIMITA - DI-	- 4 0 Di-4-II	04 0	
	al act points		int & Distribution Jipment cleaning		er.
X Change in thermostat control Provide locking thermostat of			ustment of air/fu		
X Reset of air & water temper			ustment of air/lu mbustion monitor		
Unoccupied reset or shut do			ustment of drives		
Shut down non-critical exha			am Trap mainter		JIS, etc.
Shut down non-critical exha	Subtotal 562		pe insulation rep		
	Subtotal 502			Subtotal	0
			Subiolai	Subiolai	
Lighting Systems Operations		Óther Me	asures (includin	n water use	۱ I
X Reduce illumination levels			addico (moladini	g water abo	' l
Maximize use of daylight					
X Install high efficiency lamps		_			
Reduce or delete evening c		_			
	Subtotal 11640			Subtotal	0
		1		Totals	28648.0
		1			

TEXAS TE	CH UNIVERSITY	SCIENCE	118544
Institution I	lame	Building Name	Building Size (GSF)
	ENERGY AND WATER CONSERV	ATION MEASURE RETROFIT F	ECOMMENDATIONS
1.0	Basic Building Data 1.1 Annual Energy Use	0.2700009	BTU/Sq.Ft./Yr.
	1.2 Annual Energy Cost	2.3725087	\$/Sq.Ft./Yr.
	1.3 Describe physical condition of building envelope:	Fair	
	1.4 Describe physical condition of building energy and water-us	sing systems: Fair	
	1.4 Describe physical condition of ballang energy and water-us	ang systems.	
2.0	Based on 1.1 - 1.4 above, indicate the need and potential for ene	ergy and water conservation measure retrofit imp	plementation.
	Briefly outline recommended retrofit options: High efficiency		
	Reset schedules/Economizer setpoint		
	Time of day schedule optimization		
	Vessel thermal insulation		
	Service room cooling system		
3.0	Based on auditor evaluation, indicate whether or not the building		
	and/or cooling systems, or solar domestic hot water heating syst	lems Yes	X No
	ENERGY AND WATER CONSE	RVATION MEASURE RETROF	TASSESSMENT
١		Det State in State in the Desire in	
1.0	Describe proposed energy conservation measures: Adjust AHU's reset schedule/Adjust AHU's economizer operation	Retrofit (efficiency/illumination level) existing li	gnting system
	Recover condensate receiver vessel	Install VFDs on AHU motors	
	Decentralize AHU's by using service room cooling system	Install VPDs off Arto filotors	
2.0	Estimate of installed cost of above measures: \$79,438.03		
2.0	Estimate of installed cost of above fileasures.		
3.0	Estimate of annual energy and water cost savings for above mea	asures: \$65.808.00	
] 3.0	Estimate of distance strong, and water cook surings for above more	400,000.00	
4.0	Projected simple payback period for above measures in years:	1.2	
,,,,			

Energy Auditor Certification: I heraby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy orders, centeral for the control expenses, and building conflicurations.

	J	eremy Dickso	on				Te	xas Tech Ur	806 742 1696 12/17/2002		
	Name	of Energy A	uditor		•			Organiz	ation and Phor	ne Number	r of Auditor Date
		HUNIVERS				SOUTHWE	ST COLLECT	IONS			Texas Tech university/Lubbock, Tx
	Faci	ity Name					Building Nan	ne(s)			Building/Campus Address
1											
						as Tech Univ					
					Name	and Address	of Owner				
	BUILDI	NG DATA									
Building					TING SCHEE						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occur						
77943	Days	(c) E	Daylight		(d) E	vening		(e)	Night		
			l			į .					Central Bidg. Panel
	M-F	.12 Hrs	1845	71%	0	0	0%	0	0	0%	(f) Yes X No
Date (b)											
Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS
1996			1		į.	į .			1 1		(g) Yes X No
	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	
			SYSTE	M S					r		
Primary	Primary		Space		Space		Domestic		Interior		Special Building
Heat	Cooling		Terminal		Termina		Hot Wate		Lighting		Systems & Facilities
Source (h)	Source		Heat (j)		Cooling		Source (I		System (r		(n)
Steam	Centrifuga	1 Chillers	Fan an	d Coil	Fan ar	nd Coil	Heat Ex	changer	Fluores	scent	
Boiler							1				
							1		l		
	Ĺ		L		1		ь		1		<u> </u>
III. UNIQ				RISTICS							Mar. 4 4 Mar.
		er day opera	tion			No				najor buildi	ing modifications and additions.
	per year ope				Yes	No X		Recommiss	ioning - FY00		
	Program Us				Yes	No X					
4. Building	has exterior	loodlighting			Yes X	No				-	
i											

Building Na	ame(s)	SOUTHWEST C	OLLECTIO	NS	(a) Building Size(s) (Gross Sq. Ft. 77943									
ENERGY	USE AND COS	T DATA		For Year E	nding:	8/31/2005		** Metered	X Bes	t Estimate	Χ			
	E	LECTRICITY			NATURAL GAS	3		WATER		PURCHASED THERMAL				TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL.	COST	\$/MGAL		HOT WATER		WATER	ENERGY
MONTH		\$			\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
1	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(li)	(mm)	(nn)
September	111,040.00	\$ 7,218.81	\$ 0.07	77.08	\$ 493.50	\$ 6.40	179.12	\$ 478.04	\$ 2.67	207.90	\$2,302.31	40,828.81	\$ 5,472.28	\$15,964.93
October	96,560.00	\$ 6,009.67	\$ 0.06	88.69	\$ 499.89	\$ 5.64	96.18	\$ 291.49	\$ 3.03	347.48	\$3,962.92	34,474.84	\$ 4,780.95	\$15,544.92
November	90,400.00	\$ 5,190.05	\$ 0.06	128.77	\$ 954.94	\$ 7.42	76.12	\$ 249.71	\$ 3.28	512.17	\$7,186.69	21,928.70	\$ 3,590.09	\$17,171.48
December	95,680.00	\$ 5,809.25	\$ 0.06	173.54	\$ 1,204.66	\$ 6.94	72.56	\$ 262.46	\$ 3.62	628.00	\$7,399.50	19,276.81	\$ 2,807.54	\$17,483.42
January	108,000.00	\$ 6,625.26	\$ 0.06	198.51	\$ 1,278.77	\$ 6.44	62.06	\$ 233.55	\$ 3.76	629.70	\$7,252.46	20,624.47	\$ 2,740.97	\$18,131.01
February	89,360.00	\$ 5,238.22	\$ 0.06	171.28	\$ 1,121.04	\$ 6.55	37.57	\$ 149.42	\$ 3.98	576.20	\$6,305.85	23,135.25	\$ 2,611.72	\$15,426.26
March	92,880.00	\$ 5,769.11	\$ 0.06	151.84	\$ 1,000.07	\$ 6.59	45.33	\$ 185.34	\$ 4.09	514.46	\$ 6,417.46	24,033.86	\$ 3,514.63	\$16,886.60
April	110,400.00	\$ 7,100.94	\$_0.06	130.56	\$ 981.44	\$ 7.52	76.46	\$ 254.57	\$ 3.33	345.94	\$ 4,437.62	29,121.64	\$ 4,217.78	\$16,992.35
May	98,480.00	\$ 7,298.76	\$ 0.07	96.48	\$ 645.56	\$ 6.69	144.31	\$ 444.81	\$ 3.08	297.04	\$ 1,858.72	33,323.38	\$ 6,786.20	\$17,034.05
June	101,360.00	\$ 7,797.69	\$ 0.08	79.21	\$ 536.24	\$ 6.77	144.70	\$ 446.00	\$ 3.08	216.90	\$ 85.05	45,202.28	\$ 9,079.73	\$17,944.71
July	104,800.00	\$ 6,842.55	\$ 0.07	77.52	\$ 586.63	\$ 7.57	269.83	\$ 696.98	\$ 2.58	224.88	\$ 2,131.27	52,327.06	\$ 7,194.72	\$17,452.15
August	97,520.00	\$ 7,464.54	\$ 0.08	22.91	\$ 178.29	\$ 7.78	484.02	\$1,074.54	\$ 2.22	199.75	\$ 2,334.79	53,538.59	\$ 8,901.12	\$19,953.28
	Ç		Avg.	(2)		Avg.	3)	1	Avg.	<b>(4)</b>		5)		
Annual	1,196,480.00	\$ 78,365.00	\$ 0.07	1,396	\$ 9,481.00	\$ 6.86	1,688	\$4,767.00	\$ 3.23	4,700	\$51,675.00	397,816	\$61,698.00	#########
Totals											l			

ANNUAL ENERGY CONSI	UMPTION IN BTU'S:					ENERGY	UTILIZATIO	N INDEX (EUI)	
(oo) Electricity	1,196,480.00	KWH x 0.0116	=	13,879.17	MMBTU	EUI =	Total Annua	al BTU's	MMBTU/Sq.Ft./Yr.
(pp) Nat. Gas	1,396.00	MMBTU x 1.0	=	1,396.00	MMBTU		Building Gr	oss Sq. Ft.	
(qq1) Steam/Hot Water	4,700.00	MMBTU x 1.0	=	4,700.00	MMBTU	EUI =	(uu)	24,748.96	
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU	1	(a)	77,943.00	
(rr) Chilled Water	397,816.00	TON HRS x 0.012	=	4,773.79	MMBTU				
(ss) Propane or Butane	-	GAL x 0.095475	=		MMBTU	EUI =	(vv)	0.3175264	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	-	x	-	-	MMBTU				
ľ ′					-	ENERGY	COST INDE	X (ECI)	
	(uu	) TOTAL ANNUAL BTU'S =		24,748.96	MMBTU	ECI =	Annual Ene	ergy Costs	\$/Sq.Ft./Yr.
					-		Building Gr	oss Sq. Ft.	
1						ECI =	(nn)	205,985.00	
*Do not include water costs	s (hh).					ŀ	(a)	77,943.00	
** Electricity is metered by	building.								
The remaining values are n	netered at the Utilities Departmen	nt .				ECI =	(ww)	2.64276458	\$/Sq.Ft./Yr.
and estimated by buildings	by using its gross square foot va	lue.							
Form PUA 2			_		_				

PRELIMINARI WATER	ANDENER	G I A	1011		PUAS
TEXAS TECH UNIVERSITY	SOUTHWE	ST COLLEC	TIONS	77943	
Facility Name	Building Na	me(s)		Building Siz	e(s) (GSF)
	MMENDED ENER				
AND WATER CO					
Provide the following recommendations be		spection of	building(s):		
Scheduled preventive maintenance plant					
In Existence X Yes No;					
<ol><li>Provide a general estimate, expressed</li></ol>				/ings	
which could result from implementing					
	ost Savings	System Cl		% Cost Say	rings
Ventilation System Operations			tems Operat	ions	
Reduced ventilation			air all leaks		
Variable ventilation				er consumptio	
Unoccupied area ventilation s				r temperature	
Repair of caulking & weathers		incre	ase chilled v	vater tempera	ture 0
Maintenance & repair or oper	ating controls ubtotal 0			Subtotal	
31	ibiolai	4			
Heating & Cooling System Operations		Litility Diar	st & Dietributi	on System Op	oor
X Change in thermostat control	set noints		pment cleani		iei.
Provide locking thermostat co			stment of air		
X Reset of air & water temperat				itoring & contr	rol
Unoccupied reset or shut dov				ves, fans, mot	
Shut down non-critical exhau			m Trap main		
	Subtotal 412		insulation re		
	***************************************	1	Subtot		0
Lighting Systems Operations		Other Mea	sures (includ	ding water use	e)
Reduce illumination levels					
Maximize use of daylight					
Install high efficiency lamps					
Reduce or delete evening cle	aning hours	<u></u>			
Su	ubtotal 0	1		Subtotal	0
		1		Totals	412.0

	MITHART WATER AND ENERG		
TEXAS TE	CH UNIVERSITY	SOUTHWEST COLLECTION	
Institution	Name	Building Name	Building Size (GSF)
	ENERGY AND WATER C	ONSERVATION MEASURE	RETROFIT RECOMMENDATIONS
1.0	Basic Building Data 1.1 Annual Energ	y Use 0.3175264	BTU/Sq.Ft./Yr.
	1.2 Annual Energ	y Cost 2.6427646	\$/Sq.Ft./Yr.
	1.3 Describe physical condition of building enveloped	pe: Good condition	
	1.4 Describe physical condition of building energy	and water-using systems: Ge	ood condition
2.0	Based on 1.1 - 1.4 above, indicate the need and po	•••	· · · · · · · · · · · · · · · · · · ·
	Briefly outline recommended retrofit options:		
	Reset schedule		
	Time of day schedule optimization		
	Economizer		
3.0			cteristics present an opportunity to apply solar heating
	and/or cooling systems, or solar domestic hot water	r heating systems.	_X Yes No
	ENERGY AND WATE	D CONCEDVATION MEASUR	RE RETROFIT ASSESSMENT
	ENERGY AND WATE	R CONSERVATION MEASUR	RE RETROPTI ASSESSMENT
1.0	Describe proposed energy conservation measures		
1.0	Adjust AHU's reset schedule/Economizer operation		
	Update building utilities operation schedule	эсфоли	
	opuate building utilities operation schedule		<del></del>
2.0	Estimate of installed cost of above measures:	\$208.33	
1 2.0	Edition of industrial cost of above filedaules.	<b>\$20.00</b>	
3.0	Estimate of annual energy and water cost savings	or above measures:	\$412.00
3.0	Estimate of armost energy and water cost savings		V.12.00
4.0	Projected simple payback period for above measur	es in vears: 0.5	
I0	r rojected annipre payout k period for above measur	0.0	

Energy Auditor Certification: 1 hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

Primary Primary Space Space Domestic Interior Spacial Ruiling Space Cooling Terminal Hot Water Lighting Systems & Facilities Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) Source (f) System (from (f)) Source (f) Source (f) System (from (f)) Source (f) Source (f) System (from (f)) Source (f) Source (f) Source (f) Source (f) System (from (f)) Source (f) S		J	leremy Dickso									806 742 1696 4/10/2003	
TEXAS TECH UNIVERSITY		Name	of Energy A	uditor		•		ne Number					
Texna Tech University   Name and Address of Owner								SPORT STU	DIES CENT	ER		Texas Tech university/Lubbock, Tx	
SASIC BUILDING DATA		Faci	lity Name					Building Nar	ne(s)			Building/Campus Address	
SASIC BUILDING DATA													
BASIC BUILDING DATA													
Building						Name a	and Address	of Owner					
Size (a)   Time Period: Hrsi/Occupants/% GSF   Central Bdg. Panel (b)   Days   (c) Daysght   (d) Evening   (e) Night   Central Bdg. Panel (f) Yes_X_No		BUILDI	NG DATA									T	
24264												BASIC HVAC CONTROL DATA	
M F   12 km   310   78%   4 km   8   2%   0   0   0%   Central Bldg, Panel (f) Yes \( \times \) No   Cectoried SAT   6 km   20   5%   0   0   0%   0   0   0%   EMS   (g) Yes \( \times \) No   EMS   (g) Yes \( \times \) No     EMS   (g) Yes \( \times \) No					Time Period								
Date (b)   Date (b)	24264	Days	(c) E	Daylight		(d) E	vening	,	(e)	Night			
Date (t)   Cocupied   SAT   G Hrs   20   5%   0   0   0%   0   0   0   0%   EMS				į	1					1 . 1			
Cocupied   SAT   6 Hrs   20   5%   0   0   0%   0   0   0%   0   0   0%   (g) Yes \( \times \) No   No   No   No   No   No   No   No		M-F	12 Hrs	310	78%	4 Hrs	8	2%	0	0	0%	(f) Yes <u>X</u> No	
II. MAJOR ENERGY USING SYSTEMS   Domestic   Interior   Space   Terminal   T													
II. MAJOR ENERGY USING SYSTEMS   Space   Space   Terminal Cooling (t)   Cooling (t)		SAT	6 Hrs	20	5%	0	0	0%	0	- 0	0%		
III. MAJOR ENERGY USING SYSTEMS Primary Primar	1961											(g) Yes <u>X</u> No	
Primary Primary Space Space Space Coding Feminal Howard Lighting Systems & Facilities Source (I) Source (I) Source (I) Heat (I) Cooling (I) Source (I) System (II) (II) (II) Source (II) Source (II) Source (II) Source (III) Source (III) Source (III) Source (III) Source (III) System (III) (III) (III) Steam Contritugal Chillers Fan and Coil Fan and Coil Heat Exchanger Fluorescent III. UNIQUE BUILDING CHARACTERISTICS  1. Year orund, 24 hour per day operation Yes X No X Summer Program Use Ves X No Summer Pr		SUN	6 Hrs	8	2%			0%		_ 0	0%		
Primary Primar													
Heat Cooling Terminal Terminal Source (t) Source (t) Heat (t) Cooling (t) Source (t) System & Facilities  Source (t) Source (t) System (the total Source (t) System (t) System (the total Source (t) System (the total Source (t) System (the total Source (t) System (t) System (the total Source (t) System (the total Source (t) System (the total Source (t) System (t) System (the total Source (t) System					мѕ							To the second	
Source (I) Source (I) Heat (I) Cooling (Is) Source (I) System (m) (n)  Steam Gentrifugal Chillers Fan and Coil Fan and Coil Heat Exchanger Fluorescent  Boiler III. UNIQUE BUILDING CHARACTERISTICS  11. Vear round, 24 hour per day operation Yes X No. 2. 9 month per year operation Yes X No. 3. Summer Program Use Yes X No.													
Steam Centrifugal Chillers Fan and Coil Fan and Coil Heat Exchanger Fluorescent  Boiler   Heat Exchanger   Fluorescent													
Boiler  III. UNTQUE BUILDING CHARACTERISTICS  III. UNTQUE BUILDING CHARACTERISTICS  III. Year round, 24 hour per day operation  Yes No X. 5. List year and type of major building modifications and additions.  2. 9 month per year operation  Yes X. No												(n)	
III. UNIQUE BUILDING CHARACTERISTICS  1. Year round, 24 hour per day operation Yes No X. 2. 9 month per year operation Yes X. No.  3. Summer Program Use Yes X. No.		Centrifuga	I Chillers	Fan ar	id Coll	⊢an an	d Coil	Heat Ex	changer	Fluores	scent		
1. Year round, 24 hour per day operation         Yes         No         X         5. List year and type of major building modifications and additions.           2. 9 month per year operation         Yes         X.         No	Boiler									l			
1. Year round, 24 hour per day operation         Yes         No         X         5. List year and type of major building modifications and additions.           2. 9 month per year operation         Yes         X.         No										l			
1. Year round, 24 hour per day operation         Yes         No         X         5. List year and type of major building modifications and additions.           2. 9 month per year operation         Yes         X.         No						I						_L	
1. Year round, 24 hour per day operation         Yes         No         X         5. List year and type of major building modifications and additions.           2. 9 month per year operation         Yes         X.         No			D.I.I.O. O.I.		D. I.O. T. I.O. O								
2. 9 month per year operation         Yes X         No					RISTICS		No. V		6 Lintuna	and time of a	nning hulldi	ing modifications and additions	
3. Summer Program Use Yes X No				luon					o. List yea	and type of n	najur bullar	ing mounications and additions.	
4. Building has exterior floodlighting Yes X No													
4. Billiding usa exterior ubordishring						Voc. V	No.			_			
	4. Building	nas extenor	noodiighting			165							

Building Na	ma/e)	SPORT STU	DIES CENTI	=D			(a) Building	Size(s) (Gr	nes Sa Et )	24264				
	ISE AND COS		DIEG OLIVII	For Year En	dina:	8/31/2005		** Metered		Estimate	x			
LINE KOT C		CTRICITY			TURAL GAS	GONZOO		WATER	7. 0001		URCHASED T	HERMAL		TOTAL
	KWH	COST	\$/KWH	MMBTU	COST	S/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC		CHILLED WA	TER	ENERGY
MONTH		\$			\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	15,480	\$1,006	\$0.07	23.99	\$153.63	\$6.40	55.76	\$148.82	\$2.67	64.72	\$716.72	12,710.19	\$1,703.54	\$3,729.07
October	14,400	\$896	\$0.06	27.61	\$155.62	\$5.64	29.94	\$90.74	\$3.03	108.17	\$1,233.68	10,732.17	\$1,488.33	\$3,864.59
November	14,160	\$813	\$0.06	40.09	\$297.28	\$7.42	23.70	\$77.73	\$3.28	159.44	\$2,237.25	6,826.50	\$1,117.61	\$4,542.82
December	12,360	\$750	\$0.06	54.02	\$375.01	\$6.94	22.59	\$81.71	\$3.62	195.50	\$2,303.50	6,000.96	\$874.00	\$4,384.66
January	14,280	\$876	\$0.06	61.80	\$398.09	\$6.44	19.32	\$72.71	\$3.76	196.03	\$2,257.72	6,420.49	\$853.27	\$4,457.80
February	13,800	\$809	\$0.06	53.32	\$348.98	\$6.55	11.69	\$46.52	\$3.98	179.37	\$1,963.04	7,202.11	\$813.04	\$3,980.53
March	11,640	\$723	\$0.06	47.27	\$311.32	\$6.59	14.11	\$57.70	\$4.09	160.15	\$1,997.78	7,481.85	\$1,094.12	\$4,183.93
April	15,000	\$965	\$0.06	40.64	\$305.53	\$7.52	23.80	\$79.25	\$3.33	107.69	\$1,381.45	9,065.69	\$1,313.01	\$4,044.04
May	10,560	\$783	\$0.07	30.03	\$200.97	\$6.69	44.93	\$138.47	\$3.08	92.47	\$578.63	10,373.72	\$2,112.57	\$3,813.29
June	10,800	\$831	\$0.08	24.66	\$166.94	\$6.77	45.05	\$138.84	\$3.08	67.52	\$26.48	14,071.67	\$2,826.56	\$3,989.66
July	14,280	\$932	\$0.07	24.13	\$182.62	\$7.57	84.00	\$216.97	\$2.58	70.00	\$663.47	16,289.65	\$2,239.75	\$4,235.18
August	13,560	\$1,038	\$0.08	82.74	\$643.71	\$7.78	150.68	\$334.51	\$2.22	62.18	\$726.83	16,666.80	\$2,770.96	\$5,513.94
	p			D D			<b>3</b>			<b>4</b> )		(5)		ł
Annual	160,320	\$10,423	\$0.07	510.30	\$3,539.69	\$6.86	525.56	\$1,483.96	\$3.23	1,463.26	\$16,086.54	123,841.78	\$19,206.77	\$50,739.51
Totals	1								l					

ANNUAL ENERGY CONS	SUMPTION IN BTU'S:				ENERGY	UTILIZATION INDEX (EUI)	
(oo) Electricity	160320	KWH x 0.0116	=	1859.712 MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft./Yr.
(pp) Nat. Gas	510.300901	MMBTU x 1.0	=	510.3009 MMBTU		Building Gross Sq. Ft.	
(qq1) Steam/Hot Water	1463.26161	MMBTU x 1.0	=	1463.2616 MMBTU	EUI =	(uu) 5319.375917	
(qq2) Steam	0	LBS x 0.001390	=	0 MMBTU		(a) 24264	
(rr) Chilled Water	123841.784	TON HRS x 0.012	=	1486,1014 MMBTU			
(ss) Propane or Butane	0	GAL x 0.095475	=	0 MMBTU	EUI =	(vv) 0.219229143	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel	0	x	=	0 MMBTU			
					ENERGY	COST INDEX (ECI)	
		(uu) TOTAL ANNUAL BTU'S =		5319.3759 MMBTU	ECI =	Annual Energy Costs	\$/Sq.Ft./Yr.
						Building Gross Sq. Ft.	
					ECI =	(nn) 50739.5059	
*Do not include water cos	ts (hh).					(a) 24264	
** Electricity is metered by	/ building.				I		
The remaining values a	re metered at the Utilitie	s Department		ECI =	(ww) 2.0911435	\$/Sq.Ft./Yr.	
and estimated by building	s by using its gross square	e foot value.			1		

TREETMINART WATERANDENE	1011
	TUDIES CENTER 24264
Facility Name Building N	lame(s) Building Size(s) (GSF)
RECOMMENDED ENER	
AND WATER CONSERVATION M	
Provide the following recommendations based on an on-site	inspection of building(s):
<ol> <li>Scheduled preventive maintenance plan.</li> </ol>	
In Existence X Yes No; Recommended	_X_ Yes No
2. Provide a general estimate, expressed as a range, of ani	nual energy and water savings
which could result from implementing the following cons-	ervation measures.
System Changes % Cost Savings	System Changes % Cost Savings
Ventilation System Operations	Water Systems Operations
Reduced ventilation	Repair all leaks
Variable ventilation	Reduction of water consumption
Unoccupied area ventilation shut down	Reduce hot water temperature
Repair of caulking & weatherstripping	Increase chilled water temperature
Maintenance & repair or operating controls	Subtotal 0
Subtotal 0	
	7
Heating & Cooling System Operations	Utility Plant & Distribution System Oper.
Change in thermostat control set points	Equipment cleaning
Provide locking thermostat covers	Adjustment of air/fuel ration
X Reset of air & water temperatures	Combustion monitoring & control
Unoccupied reset or shut down of system	Adjustment of drives, fans, motors, etc.
Shut down non-critical exhaust systems	Steam Trap maintenance
Subtotal 101	Pipe insulation repair
	Subtotal Subtotal 0
Lighting Systems Operations	Other Measures (including water use)
Reduce illumination levels	
Maximize use of daylight	_
Install high efficiency lamps	
Reduce or delete evening cleaning hours	_
Subtotal 0	Subtotal 0
Gustotai	Totals 101.0
	101.0

TEXAS TE	CH UNIVERSITY		SPORT STUDIES CENT	rer	24264	_
Institution N	Name		Building Name		Building Size (GSF)	
	ENERGY AND W	ATER CONSERV	ATION MEASUR	E RETROFIT	RECOMMENDATIONS	
1.0		nnual Energy Use nnual Energy Cost	0.2192291 2.0911435		BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.	
	1.3 Describe physical condition of buil	ding envelope:	Regular condition			- -
	1.4 Describe physical condition of bui	ding energy and water-u	sing systems:	Regular condition		_
2.0	Based on 1.1 - 1.4 above, indicate the Briefly outline recommended retrofit op Reset schedule Economizer		ergy and water conservation		•	 
3.0	Based on auditor evaluation, indicate w and/or cooling systems, or solar domes			aracteristics present a		_
	ENERGY AN	WATER CONS	ERVATION MEAS	URE RETROF	IT ASSESSMENT	
1.0	Describe proposed energy conservation Adjust AHU's reset schedule Adjust AHU's economizer operation se					_
	Adjust Ai lo s economizer operation se	politi				_
2.0	Estimate of installed cost of above mea	sures: \$208.33				_
3.0	Estimate of annual energy and water or	ost savings for above me	asures:	\$101.00		_
4.0	Projected simple payback period for ab	ove measures in years:	2.1			_

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

	J	eremy Dickso	on n				Te	cas Tech U	niversity-Physi	ical Plant / t	806 742 1696 12/13/2002
	Name	of Energy A	uditor		-			Organiz	ation and Pho	ne Number	r of Auditor Date
	TEXAS TEC	H UNIVERS	TY				STUDENT R	EC. CENTE	R		Texas Tech university/Lubbock, Tx
	Facil	ity Name					Building Nan	e(s)			Building/Campus Address
						as Tech Univ					
					Name	and Address	of Owner				
	BUILDII	IG DATA									
Building					TING SCHED						BASIC HVAC CONTROL DATA
Size (a)				Time Period	: Hrs/Occup						
130546	Days	(c) E	Daylight		(d) Evening (e) Night				Night		
										Central Bldg. Panel	
	M-F	12 Hrs	2611	60%	0	2611	60%	0	0	0%	(f) Yes <u>X</u> No
Date (b)											
Occupied	SAT	0 Hrs	2611	60%	0	2611	60%	0	0	0%	EMS
1980		i									(g) Yes <u>X</u> No
	SUN	0 Hrs	1305	30%	0	1305	30%	0	0	0%	
			SYSTE	ws							
Primary	Primary		Space		Space		Domestic		Interior		Special Building
Heat	Cooling		Terminal		Termina		Hot Wate		Lighting		Systems & Facilities
Source (h)	Source		Heat (j)		Cooling (		Source (I		System (r		(n)
Steam	Centrifuga	Chillers	Fan an	d Coil	Fan ar	nd Coil	Heat Ex	changer	Fluores	scent	
Boiler					1						
					1				1		
							L				1
			ARACTÉ	RISTICS							
		er day opera	tion			No X		<ol><li>List yea</li></ol>	r and type of n	najor buildir	ng modifications and additions.
2. 9 month						No					
	Program Us				Yes X						
4. Building	has exterior t	loodlighting			Yes X	No					
l											

Building Name	e(s)	STUDENT REC.	CENTER				(a) Buildir	ng Size(s) (C						
<b>ENERGY US</b>	E AND COST D	ATA		For Year E	nding:	8/31/2005		** Metered	X Be:	st Estimate				
	E	LECTRICITY			NATŪRAL GA	S		WATER			PURCHAS	SED THERMA	L .	TOTAL
i .	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-	HOT WATER	CHILLE	D WATER	ENERGY
MONTH		\$	l	1	\$			\$	l	MMBTU	COST	TON HRS	COST	COSTS*
i .	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	327,360	\$ 21,281.95	\$ 0.07	129.09	\$ 826.55	\$ 6.40	300.01	\$ 800.66	\$ 2.67	348.21	\$3,856.12	68,383.79	\$ 9,165.47	\$ 35,930.75
October	292,080	\$ 18,178.38	\$ 0.06	148.55	\$ 837.27	\$ 5.64	161.09	\$ 488.21	\$ 3.03	581.99	\$6,637.46	57,741.59	\$ 8,007.57	\$ 34,148.89
November	316,800	\$ 18,188.16	\$ 0.06	215.67	\$ 1,599.42	\$ 7.42	127.49	\$ 418.23	\$ 3.28	857.84	\$12,036.92	36,728.17	\$ 6,013.00	\$ 38,255.73
December	277,920	\$ 16,874.04	\$ 0.06	290.66	\$ 2,017.67	\$ 6.94	121.54	\$ 439.60	\$ 3.62	1,051.84	\$12,393.36	32,286.54	\$ 4,702.33	
January	345,840	\$ 21,215.55	\$ 0.06	332.48	\$ 2,141.81	\$ 6.44	103.95	\$ 391.18	\$ 3.76	1,054.68	\$12,147.08	34,543.73	\$ 4,590.82	\$ 40,486.43
February	321,600	\$ 18,851.97	\$ 0.06	286.87	\$ 1,877.62	\$ 6.55	62.92	\$ 250.27	\$ 3.98	965.07	\$10,561.60	38,749.02	\$ 4,374.35	
March	300,000	\$ 18,634.07	\$ 0.06	254.31	\$ 1,675.00	\$ 6.59	75.92	\$ 310.43	\$ 4.09	861.66	\$10,748.54	40,254.09	\$ 5,886.62	\$ 37,254.65
April	368,400	\$ 23,695.53	\$ 0.06	218.68	\$ 1,643.80	\$ 7.52	128.06	\$ 426.38	\$ 3.33	579.41	\$7,432.52	48,775.56	\$ 7,064.32	
May	273,120	\$ 20,242.05	\$ 0.07	161.59	\$ 1,081.25	\$ 6.69	241.71	\$ 745.00	\$ 3.08	497.51	\$3,113.16	55,813.02	\$ 11,366.14	\$ 36,547.60
June	262,320	\$ 20,180.43	\$ 0.08	132.67	\$ 898.15	\$ 6.77	242.36	\$ 747.00	\$ 3.08	363.28	\$142.44	75,708.88	\$ 15,207.56	
July	294,720	\$ 19,242.71	\$ 0.07	129.84	\$ 982.54	\$ 7.57	451.94	\$1,167.36	\$ 2.58	376.64	\$3,569.65	87,642.11	\$ 12,050.36	
August	275,520	\$ 21,089.33	\$ 0.08	24.30	\$ 189.05	\$ 7.78	810.67	\$1,799.73	\$ 2.22	334.56	\$3,910.52	89,671.28	\$ 14,908.40	\$ 41,897.03
	D .		Avg.	<b>2</b>		Avg.	3)		Avg.	<b>(4</b> )		(5)		
Annual	3,655,680	\$ 237,674.00	\$ 0.07	2,325	\$ 15,770.00	\$ 6.86	2,828	\$7,984.00	\$ 3.23	7,873.00	\$86,549.00	666,298	\$103,337.00	\$451,315.00
Totals										1				

ANNUAL ENERGY CONSUM	PTION IN BTU'S:					ENER	GΥι	JTILIZATIO	N INDEX (EUI)	
(oo) Electricity	3,655,680	KWH x 0.0116	-	42,406_ MM		EUI =		Total Annu		MMBTU/Sq.Ft./Yr.
pp) Nat. Gas	2,325	MMBTU x 1.0	=	2,325 MM		l		<b>Building Gr</b>	ross Sq. Ft.	
qq1) Steam/Hot Water	7,873	MMBTU x 1.0	=	7,873 MM	<b>IBTU</b>	EUI =		(uu)	60,599	
qq2) Steam		LBS x 0.001390	=	- MN		l		(a)	130,546	
r) Chilled Water	666,298	TON HRS x 0.012	_	7,996 MM	<b>IBTU</b>	l				
ss) Propane or Butane		GAL x 0.095475	-	MM		EUI =		(vv)	0.46420008	MMBTU/Sq.Ft./Yr.
tt) Other Fuel		x	=	- MM	/BTU	l				
*						ENER	GY (	COST INDE	X (ECI)	
	(1	iu) TOTAL ANNUAL BTU'S =		60,599 MM	<b>IBTU</b>	ECI =		Annual En	ergy Costs	\$/Sq.Ft./Yr.
	·	•				l		Building Gr	ross Sq. Ft.	
						ECI =		(nn)	451,315	
Do not include water costs (h	h).							(a)	130,546	
* Electricity is metered by bui	lding.					l				
	ered at the Utilities Department					ECI =		(ww)	3.45713388	\$/Sq.Ft./Yr.
nd estimated by buildings by	using its gross square foot value	t.				l				
and estimated by buildings by Form PUA 2	using its gross square loot value	<u> </u>	_	-		L	_			

PRELIMINARY WATER	ANDENER	GY AUDII	PUA3
TEXAS TECH UNIVERSITY	STUDENT	REC. CENTER	130546
Facility Name	Building Na	me(s)	Building Size(s) (GSF)
	MMENDED ENER		
AND WATER COI			
Provide the following recommendations ba		ispection of building(s):	
Scheduled preventive maintenance plants		V V N-	
In Existence X Yes No;	Recommended		
Provide a general estimate, expressed			ings
which could result from implementing			0/ 0
	ost Savings	System Changes	% Cost Savings
Ventilation System Operations  Reduced ventilation		Water Systems Operati Repair all leaks	ons
X_ Variable ventilation		Reduction of water	
Unoccupied area ventilation s	de la de la com	Reduce hot water	
Repair of caulking & weathers		Increase chilled w	
Maintenance & repair or open		Ilici ease clilled w	Subtotal 0
	ibtotal 12708		Subtotal
	12/00	1	
Heating & Cooling System Operations		Utility Plant & Distribution	on System Oper
X Change in thermostat control	set points	Equipment cleaning	
Provide locking thermostat co		Adjustment of air/	
X Reset of air & water temperat		Combustion moni	
Unoccupied reset or shut dow	n of system		es, fans, motors, etc.
Shut down non-critical exhaus	st systems	Steam Trap maint	tenance
s	Subtotal 903	Pipe insulation re	pair
		Subtota	al Subtotal0
Lighting Systems Operations		Other Measures (includ	ing water use)
Reduce illumination levels		<del> </del> -	
Maximize use of daylight		_	
Install high efficiency lamps		_	
Reduce or delete evening cle	aning nours ibtotal 0	_	Subtotal 0
Su	DiOtali U	4	Totals 13611.0
			10011.0

TEXAS TE	CH UNIVERSITY		STUDENT REC. CENTER	130546	
Institution	Name	<del></del>	Building Name	Building Size (GSF)	
	ENERGY A	ND WATER CONSER	VATION MEASURE RET	ROFIT RECOMMENDATIONS	_
1.0		I.1 Annual Energy Use I.2 Annual Energy Cost	0.4642001 3.4571339	BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.	
	1.3 Describe physical condition	on of building envelope:	Good condition	11.	
	1.4 Describe physical conditi	on of building energy and water	-using systems: Good cor	ndition	
2.0	Briefly outline recommended re Reset schedule	etrofit options:	energy and water conservation measur	e retrofit implementation.	
	Time of day schedule optimiza	ation			
	Economizer				
3.0		ndicate whether or not the build ar domestic hot water heating s		es present an opportunity to apply solar heating Yes No	
	ENERG	Y AND WATER CON	SERVATION MEASURE R	ETROFIT ASSESSMENT	
1.0	Describe proposed energy cor Adjust AHU's reset schedule/E Update building utilities operat Install VFDs on AHU motors	conomizer operation setpoint	_		
2.0	Estimate of installed cost of at	oove measures: \$15,190.3	3		
3.0	Estimate of annual energy and	d water cost savings for above r	neasures: \$13,611.	00	
4.0	Projected simple payback peri	iod for above measures in year	s: <u>1.1</u>		

Energy Auditor Certification: 1 hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		eremy Dickso	n				Te		Fech University-Physical Plant / 806 742 1696 4/					
		of Energy A							ation and Pho	ne Number				
	TEXAS TEC	HUNIVERS	TY				UNIVERSIT	Y GREENHO	OUSE		Texas Tech university/Lubbock, Tx			
	Faci	lity Name		-			Building Nar	ne(s)			Building/Campus Address			
						as Tech Univ								
					Name	and Address	of Owner							
	BUILDI	NGDATA												
Building					TING SCHEE						BASIC HVAC CONTROL DATA			
Size (a)				Time Period	: Hrs/Occup									
21464	Days	(c) E	aylight		(d) E	vening		(e)	Night					
									1		Central Bidg. Panel			
	M-F	12 Hrs	80	89%	0 Hrs	0	0%	0	0	0%	(f) Yes <u>X</u> No			
Date (b)								l	1					
Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS			
1973				1		l		l	1		(g) Yes <u>X</u> No			
	SUN	0 Hrs	0	0%	0	0	0%	0	<u> </u>	0%				
		SYUSING												
Primary	Primary		Space		Space		Domesti		Interior Lighting		Special Building			
Heat	Cooling	I	Termina		Termina			Hot Water			Systems & Facilities			
Source (h)	Source		Heat (		Cooling (		Source (		System (i		(n)			
Steam	Centrifuga	l Chillers	Fan a	nd Coil	Fan ar	nd Coil	Heat Ex	changer	Fluores	scent				
Boiler					l		l		1					
					l		l .		1					
					L		<u> </u>		1					
L														
		DINGCH		RISTICS										
		oer day opera	tion		Yes	No X		<ol><li>List year</li></ol>	and type of r	najor buildi	ing modifications and additions.			
	per year ope				Yes X	No								
	Program Us				Yes X	No								
4. Building	has exterior	floodlighting			Yes X	No								
1														

			_											
<b>Building Nan</b>		UNIVERSIT	Y GREENHO	USE				Size(s) (G						
ENERGY US	SE AND COST	DATA		For Year En	ding:	8/31/2005	** MeteredX_ Best EstimateX_							
	ELE	CTRICITY		NA <sup>-</sup>	TURAL GAS			WATER		F	TOTAL			
	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$	1		\$	l	İ	\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	w)	(kk)	(11)	(mm)	(nn)
September	38,280	\$2,489	\$0.07	21.23	\$135.90	\$6.40	49.33	\$131.64	\$2.67	57.25	\$634.01	11,243.47	\$1,506.96	\$4,897.13
October	29,340	\$1,826	\$0.06	24.42	\$137.66	\$5.64	26.49	\$80.27	\$3.03	95.69	\$1,091.31	9,493.71	\$1,316.58	\$4,451.88
November	39,000	\$2,239	\$0.06	35.46	\$262.97	\$7.42	20.96	\$68.76	\$3.28	141.04	\$1,979.08	6,038.74	\$988.64	\$5,538.52
December	40,560	\$2,463	\$0.06	47.79	\$331.74	\$6.94	19.98	\$72.28	\$3.62	172.94	\$2,037.68	5,308.46	\$773.14	\$5,677.46
January	40,560	\$2,488	\$0.06	54.67	\$352.15	\$6.44	17.09	\$64.32	\$3.76	173.41	\$1,997.19	5,679.58	\$754.81	\$5,656.62
February	29,040	\$1,702	\$0.06	47.17	\$308.71	\$6.55	10.34	\$41.15	\$3.98	158.67	\$1,736.51	6,371.00	\$719.22	\$4,507.89
March	29,940	\$1,860	\$0.06	41.81	\$275.40	\$6.59	12.48	\$51.04	\$4.09	141.67	\$1,767.24	6,618.46	\$967.86	\$4,921.22
April	34,500	\$2,219	\$0.06	35.95	\$270.27	\$7.52	21.06	\$70.10	\$3.33	95.26	\$1,222.03	8,019.54	\$1,161.49	\$4,942.95
May	25,500	\$1,890	\$0.07	26.57	\$177.78	\$6.69	39.74	\$122.49	\$3.08	81.80	\$511.86	9,176.62	\$1,868.79	\$4,570.82
June	37,800	\$2,908	\$0.08	21.81	\$147.67	\$6.77	39.85	\$122.82	\$3.08	59.73	\$23.42	12,447.84	\$2,500.38	\$5,702.27
July	40,020	\$2,613	\$0.07	21.35	\$161.55	\$7.57	74.31	\$191.93	\$2.58	61.93	\$586.91	14,409.86	\$1,981.29	\$5,534.64
August	27,360	\$2,094	\$0.08	7.72	\$60.03	\$7.78	133.29	\$295.91	\$2.22	55.01	\$642.96	14,743.50	\$2,451.20	\$5,544.32
	$\overline{\mathcal{O}}$		Avg.	0		Avg.	3		Avg.	4)		5)		
Annual	411,900	\$26,791	\$0.07	385.94	\$2,621.82	\$6.86	464.92	\$1,312.71	\$3.23	1,294.41	\$14,230.20	109,550.78	\$16,990.36	\$61,945.73
Totals	l						<u> </u>	L						

ANNUAL ENERGY CONSU	JMPTION IN BTU'S:					ENERGY	UTILIZATION INDEX (EUI)				
(oo) Electricity	411900	KWH x 0.0116	=	4778.04	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft./Yr.			
(pp) Nat. Gas	385.941136	MMBTU x 1.0	=	385.94114	MMBTU	1	Building Gross Sq. Ft.				
(qq1) Steam/Hot Water	1294.40518	MMBTU x 1.0	=	1294.4052	MMBTU	EUI =	(uu) 7772.995634				
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU	1	(a) 21464				
(rr) Chilled Water	109550.777	TON HRS x 0.012	=	1314.6093	MMBTU						
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU	EUI =	(vv) 0.362141056	MMBTU/Sq.Ft./Yr.			
(tt) Other Fuel	0	×	=	0	MMBTU						
.,					•	ENERGY	ENERGY COST INDEX (ECI)				
	(uu) T	OTAL ANNUAL BTU'S =		7772.9956	MMBTU	ECI =	ECI = Annual Energy Costs \$/Sq.Ft/Yr.				
					•	Building Gross Sq. Ft.					
						ECI =	(nn) 61945.73158				
*Do not include water costs	(hh).					1	(a) 21464				
** Electricity is metered by						i					
	metered at the Utilities Depart	ment				ECI =	(ww) 2.886029239	\$/Sq.Ft./Yr.			
	by using its gross square foot val										
Form PUA 2	, , , , , , , , , , , , , , , , , , , ,										

Facility Name  RECOMMENDED ENERGY  AND WATER CONSERVATION MEASURES  Provide the following recommendations based on an on-site inspection of building(s):  1. Scheduled preventive maintenance plan.  In Existence X Yes No: Recommended X Yes No  2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings  Water System Operations
AND WATER CONSERVATION MEASURES  Provide the following recommendations based on an on-site inspection of building(s):  1. Scheduled preventive maintenance plan.  In Existence X Yes No:  2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings
AND WATER CONSERVATION MEASURES  Provide the following recommendations based on an on-site inspection of building(s):  1. Scheduled preventive maintenance plan.  In Existence X Yes No:  2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings
Provide the following recommendations based on an on-site inspection of building(s):  1. Scheduled preventive maintenance plan.  In Existence X_YesNo:  2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings
Scheduled preventive maintenance plan.     In Existence _ X _ Yes No; Recommended _ X _ Yes No     Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes
In Existence X Yes No; Recommended X Yes No 2. Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings
Provide a general estimate, expressed as a range, of annual energy and water savings which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings
which could result from implementing the following conservation measures.  System Changes % Cost Savings System Changes % Cost Savings
System Changes % Cost Savings System Changes % Cost Savings
Ventilation System Operations   Water Systems Operations
Reduced ventilation Repair all leaks
Variable ventilation Reduction of water consumption
Unoccupied area ventilation shut down Reduce hot water temperature
Repair of caulking & weatherstripping Increase chilled water temperature
Maintenance & repair or operating controls Subtotal 0
Subtotal 0
Heating & Cooling System Operations Utility Plant & Distribution System Oper.
Change in thermostat control set points Equipment cleaning
Provide locking thermostat covers  Adjustment of air/fuel ration
Reset of air & water temperatures Combustion monitoring & control
Unoccupied reset or shut down of system Adjustment of drives, fans, motors, etc.
Shut down non-critical exhaust systems Steam Trap maintenance
Subtotal Pipe insulation repair
Subtotal Subtotal 0
Uinhiin Burton Onestina
Lighting Systems Operations Other Measures (including water use)  Reduce illumination levels *** Noisy chiller area.
Maximize use of daylight Ear protection highly recommended.
Reduce or delete evening cleaning hours
Subtotal 0 Subtotal 0
Totals 0.0
Totals

TEXAS TE	CH UNIVERSITY	UNIVERSITY GREENHOUSE	21464
nstitution !	Name	Building Name	Building Size (GSF)
	ENERGY AND WATER CONSER	VATION MEASURE RETR	OFIT RECOMMENDATIONS
1.0	Basic Building Data 1.1 Annual Energy Use 1.2 Annual Energy Cost	0.3621411 2.8860292	BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.
	1.3 Describe physical condition of building envelope:	Regular condition	
	Describe physical condition of building energy and water-	using systems: Regular co	ndition
2.0	Based on 1.1 - 1.4 above, indicate the need and potential for e Briefly outline recommended retrofit options:	nergy and water conservation measure	
3.0	Based on auditor evaluation, indicate whether or not the buildin and/or cooling systems, or solar domestic hot water heating sy		present an opportunity to apply solar heating
	ENERGY AND WATER CONS	ERVATION MEASURE RE	TROFIT ASSESSMENT
1.0	Describe proposed energy conservation measures:		
2.0	Estimate of installed cost of above measures: \$0.00		
3.0	Estimate of annual energy and water cost savings for above m	easures: \$0.00	
4.0	Projected simple payback period for above measures in years	#DIV/0!	

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy micros. coertain for horizon and buildings configurations.

	J	leremy Dicks	on				Te	806 742 1696 4/28/2003							
	Name	of Energy A	uditor		-			of Auditor Date							
		HUNIVERS					UNIVERSITY	Y POLICE			Texas Tech university/Lubbock, Tx				
	Facil	lity Name		-			<b>Building Nan</b>	ne(s)		Building/Campus Address					
		•													
						as Tech Univ									
			_		Name	and Address	of Owner								
	BUILDII	NG DATA									<u> </u>				
Building					TING SCHEE						BASIC HVAC CONTROL DATA				
Size (a)				Time Period	: Hrs/Occup										
32709	Days	(c) [	)aylight		(d) E	vening		(e)	Night		4				
i		1	l	l		İ					Central Bldg. Panel				
	M-F	12 Hrs	?	64%	4 Hrs	?	0%	0.	0	0%	(f) Yes <u>X</u> No				
Date (b)															
Occupied	SAT	6 Hrs	?	0%	0	?	0%	0	0	0%	EMS				
									1		(g) Yes <u>X</u> No				
	SUN	6 Hrs	?	0%	0	?	0%	0	0	0%					
		SYUSINO		мs											
Primary	Primary		Space			Space Domes			Interior		Special Building				
Heat	Cooling		Termina	1	Termina		Hot Wate	ater Lighting			Systems & Facilities				
Source (h)	Source		Heat (j		Cooling (		Source (I		System (r		(n)				
Steam	Centrifuga	l Chillers	Fan ar	nd Coil	Fan ar	nd Coil	Heat Ex	changer	Fluores	scent					
Boiler							1								
1	1						i								
L			<u> </u>							_					
III. UNIQ	UEBUIL	DINGCH	ARACTE	RISTICS											
<ol> <li>Year rou</li> </ol>	nd, 24 hour p	er day opera	tion		Yes X	No				najor buildi	ng modifications and additions.				
2. 9 month	per year ope	ration			Yes	No X		Recommiss	ioning FY-03						
<ol><li>Summer</li></ol>	Program Us	e			Yes	No X									
4. Building	has exterior t	floodlighting			Yes X	No									
1															

Energy Auditor Certification: 1 hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating house, and building configurations.

Jeremy Dickson								exas Tech Ur	uversity-Phys	806 742 1696 4/28/2003				
	Name	e of Energy A	uditor						ation and Pho	r of Auditor Date				
	TEXAS TEC	H UNIVERS	ITY				UNIVERSIT	YPOLICE			Texas Tech university/Lubbock, Tx			
	Faci	lity Name		-			Building Nar	ne(s)		•	Building/Campus Address			
1														
L						as Tech Uni								
l					Name	and Address	s of Owner							
	BUILDI	NG DATA												
Building					TING SCHE						BASIC HVAC CONTROL DATA			
Size (a)				Time Period		pants/% GSF								
32709	Days	(c) I	Daylight		(d) E	vening		(e)	Night		<del>-</del>			
							1		1	l	Central Bidg. Panel			
	M-F	12 Hrs	?	64%	4 Hrs	7	0%	0	0	0%	(f) Yes <u>X</u> No			
Date (b)					1		1		1 .					
Occupied	SAT	6 Hrs	7	0%	0	?	0%	0	0	0%	EMS			
											(g) Yes <u>X</u> No			
	SUN	6 Hrs	?	0%	0	7	0%	0	0	0%				
			SYSTE	MS			T							
Primary	Primary		Space		Space		Domesti		Interior		Special Building			
Heat	Cooling		Termina		Termina		Hot Wat				Systems & Facilities			
Source (h)	Source		Heat (j		Cooling		Source (		System (		(n)			
Steam	Centrifuga	l Chillers	Fan a	nd Coil	Fan a	nd Coil	Heat Ex	changer	Fluore	scent				
Boiler			1											
1			l						1					
	L		L		L						I			
III. UNIQ				RISTICS										
		er day opera	tion		Yes X	No				major buildii	ing modifications and additions.			
	per year ope				Yes	No X		Recommiss	ioning FY-03					
	Program Us				Yes	No X								
4. Building	has exterior	floodlighting			Yes X	No								
1														

l														
Building Nan		UNIVERSIT	Y POLICE						ross Sq. Ft.)					
ENERGY US	SE AND COST	DATA		For Year Er	iding:	8/31/2005	** Metered X Best Estimate X							
	ELE	CTRICITY		NATURAL GAS				WATER		F	PURCHASED T	THERMAL		TOTAL
	KWH	COST	\$/KWH	MCF	COST	\$/MCF	MGAL	COST	\$/MGAL	STEAM-HO	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$		l	s	l		\$		MMBTU	COST	TON HRS	COST	COSTS*
1	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	26,400	\$1,716	\$0.07			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$1,716.29
October	19,480	\$1,212	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$1,212.39
November	16,440	\$944	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$943.86
December	15,640	\$950	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$949.59
January	19,120	\$1,173	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$1,172.92
February	16,640	\$975	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$975.43
March	17,720	\$1,101	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$1,100.65
April	21,800	\$1,402	\$0.06			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$1,402.18
May	22,800	\$1,690	\$0.07			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$1,689.80
June	25,440	\$1,957	\$0.08			N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$1,957.11
July	33,440	\$2,183	\$0.07	1		N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$2,183.35
August	27,600	\$2,113	\$0.08	_		N/A			N/A	0.00	\$0.00	0.00	\$0.00	\$2,112.61
	p	:	Avg.	(a)		Avg.	3	1	Avg.	<b>(</b>		<b>(5)</b>	-	\$0.00
Annual	262,520	\$17,416	\$0.07	0.00	\$0.00	N/A	0.00	\$0.00	N/A	0.00	\$0.00	0.00	\$0.00	\$17,416.16
Totals				1			1					1		

ANNUAL E	ENERGY CONSU	MPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)			
(oo) Elec	ectricity	262520	KWH x 0.0116	=	3045.232	MMBTU	EUI =	Total Annual	BTU's	MMBTU/\$q.Ft./Yr.		
(pp) Nat	at. Gas	0.00	MMBTU x 1.03	=	0	MMBTU		Building Gro	ss Sq. Ft.			
(qq1) Ste	eam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU	EUI =	(uu)	3045.232			
(qq2) Stea	eam	0	LBS x 0.001390	=	0	MMBTU	1	(a)	32709			
(rr) Chil	illed Water	0	TON HRS x 0.012	=	0	MMBTU	1					
(ss) Prop	pane or Butane	0	GAL x 0.095475	=	Ō	MMBTU	EUI =	(vv)	0.093100737	MMBTU/Sq.Ft./Yr.		
(tt) Othe	er Fuel	0	. x	=	0	MMBTU	1					
							ENERGY COST INDEX (ECI)					
i		(uu) TOTA	L ANNUAL BTU'S =		3045.232	MMBTU	ECI =	<ul> <li>Annual Energy Costs \$/Sq.Ft./Yr.</li> </ul>				
						•	1	Building Gro	ss Sq. Ft.			
l							ECI =	(nn)	17416.16476			
*Do not inc	nclude water costs	(hh).					1	(a)	32709			
** Electrici	ity is metered by b	uilding.					1					
The rema	aining values are	metered at the Utilities Departmen	ECt =	(ww)	0.532457879	\$/Sq.Ft./Yr.						
and estima	nated by buildings b	y using its gross square foot value.					1					
Form PUA	A 2									·		

TEXAS TECH UNIVERSITY	UNIVERSIT	TY POLICE	32709
Facility Name	Building Na	me(s)	Building Size(s) (GSF)
RECON AND WATER COI AND WATER COI Provide the following recommendations be 1. Scheduled preventive maintenance pit In Existence X Yes No; 2. Provide a general estimate, expressed which could result from implementing	ised on an on-site in an. Recommended as a range, of ann	ASURES aspection of building(s):  X Yes No ual energy and water sa	
	ost Savings	System Changes	% Cost Savings
Ventilation System Operations Reduced ventilation Variable ventilation Unoccupied area ventilation s Repair of caulking & weathers Maintenance & repair ope	stripping	Water Systems Opera Repair all leaks Reduction of wat Reduce hot wate	ter consumption
Heating & Cooling System Operations Change in thermostat control Provide locking thermostat co Reset of air & water temperat Unoccupied reset or shut dow Shut down non-critical exhaut	vers ures vn of system	Utility Plant & Distribut Equipment clean Adjustment of ali Combustion mor Adjustment of dr Steam Trap mair Pipe insulation re Subtol	ing r/fuel ration nitoring & control ives, fans, motors, etc. ntenance epair
Lighting Systems Operations Reduce illumination levels Maximize use of daylight Install high efficiency lamps Reduce or delete evening cle	aning hours	Other Measures (inclu *** Noisy chiller area. Ear protection higly re-	,
Su	btotal 0	-	Subtotal 0 Totals 0.0

Form PUA 3

#### PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TE	CH UNIVERSITY	UN	IVERSITY POLICE		32709	
Institution I	Vame	Bui	Iding Name		Building Size (GSF)	
	ENERGY AND W	ATER CONSERVATI	ON MEASURE	RETROFIT RECO	MMENDATIONS	_
1.0			931007 324579		TU/Sq.Ft./Yr. /Sq.Ft./Yr.	
	1.3 Describe physical condition of bu	ilding envelope: <u>Go</u>	od condition			
	1.4 Describe physical condition of bu	ilding energy and water-using s	systems:	Good condition		
2.0	Based on 1.1 - 1.4 above, indicate the Briefly outline recommended retrofit of			n measure retrofit implemen		
3.0	Based on auditor evaluation, indicate and/or cooling systems, or solar dome			acteristics present an oppor X Yes No	tunity to apply solar heating	
	ENERGY AN	D WATER CONSERV	ATION MEASI	IRE RETROFIT AS	SESSMENT	-
1.0	Describe proposed energy conservation			THE RETROTT AS		
2.0	Estimate of installed cost of above me	asures: \$0.00				
3.0	Estimate of annual energy and water of	cost savings for above measure	es:	\$0.00		
4.0	Projected simple payback period for a	bove measures in years:	#DIV/0!			

#### PRELIMINARY WATER AND ENERGY AUDIT

Energy Auditor Certification: 1 hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		Jeremy Dickso			_		Te				806 742 1696 12/13/2002
	Nam	e of Energy A	uditor					Organiz	ation and Pho	ne Numbe	
	TEXAS TEC	CH UNIVERSI	ΤΥ				WEST HALL				Texas Tech university/Lubbock, Tx
	Faci	lity Name		-			<b>Building Nan</b>	ne(s)			Building/Campus Address
		-									
						as Tech Univ					<del></del>
					Name	and Address	of Owner				
I. BASIC	BUILDI	NG DATA									
Building				OPERA	TING SCHEE	ULE					BASIC HVAC CONTROL DATA
Size (a)				Time Period	i: Hrs/Occup	ants/% GSF					
74388	Days	(c) E	aylight		(d) E	vening		(e)	Night		
1									T		Central Bidg. Panel
l .	M-F	12 Hrs	0	1	0	0	0%	0	0	0%	(f) Yes X No
Date (b)											
Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS
1938						-					(g) Yes X No
	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	
		1									
II. MAJO	RENER	SYUSINO	SYSTE	MS		-					
Primary	Primary	,	Space		Space		Domestic	:	Interior		Special Building
Heat	Cooling		Termina	4	Termina	ı	Hot Wate	er	Lighting	1	Systems & Facilities
Source (h)	Source	0)	Heat (i	)	Cooling (	k)	Source (I	)	System (	m)	(n)
Steam	Centrifuga	l Chillers	Fan a	nd Coil	Fan ar	nd Coil	Heat Ex	changer	Fluore	scent	
Boiler								-			
	1						1				
	l .				1				1		
	1							-	-		<u> </u>
III IINIO	HE BUIL	DING CH	ARACTE	RISTICS							
		per day opera				No		5 List vas	r and tune of r	major buildi	ing modifications and additions.
2. 9 month					Yes	No X				,	
	Program Us				Yes	No X					
4. Building						No					
4. building	nas extenor	nooungnung			160	140					

Form PUA 1

Building Nar	ne(s)	WEST HALL					(a) Building	JSize(s) (Gro	oss Sq. Ft.)	74388				
ENERGY U	SE AND COS	T DATA		For Year Er	iding:	8/31/2005		** Metered_	X Best E	stimate	<u> </u>			
	E	LECTRICITY		1	ATURAL GA	S		WATER			PURCHAS	ED THERMAL		TOTAL
1	KWH	COST	\$/KWH	MMBTU	COST	\$/MMBTU	MGAL	COST	\$/MGAL	STEAM-	HOT WATER	CHILLE	WATER	ENERGY
MONTH		\$	1		\$			\$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(ii)	(kk)	(II)	(mm)	(nn)
September	84,160.00	\$ 5,471.31	\$0.07	82.72	\$529.63	\$6.40	192.24	\$513.04	\$2.67	223.13	\$2,470.88	43,818.30	\$5,872.96	\$14,857.83
October	81,280.00	\$ 5,058.68	\$0.06	95.19	\$536.50	\$5.64	103.22	\$312.83	\$3.03	372.92	\$4,253.09	36,999.10	\$5,131.01	\$15,292.11
November	73,760.00	\$ 4,234.72	\$0.06	138.19	\$1,024.86	\$7.42	81.69	\$267.99	\$3.28	549.68	\$7,712.90	23,534.32	\$3,852.95	\$17,093.42
December	74,560.00	\$ 4,526.94	\$0.06	186.24	\$1,292.86	\$6.94	77.88	\$281.68	\$3.62	673.99	\$7,941.30	20,688.26	\$3,013.11	\$17,055.89
January	83,360.00	\$ 5,113.72	\$0.06	213.04	\$1,372.41	\$6.44	66.61	\$250.65	\$3.76	675.81	\$7,783.49	22,134.60	\$2,941.66	\$17,461.93
February	72,320.00	\$ 4,239.35	\$0.06	183.82	\$1,203.12	\$6.55	40.32	\$160.36	\$3.98	618.39	\$6,767.56	24,829.22	\$2,802.96	\$15,173.35
March	74,400.00	\$ 4,621.25	\$0.06	162.95	\$1,073.29	\$6.59	48.64	\$198.91	\$4.09	552.13	\$6,887.34	25,793.63	\$3,771.97	\$16,552.77
April	88,320.00	\$ 5,680.75	\$0.06	140.12	\$1,053.30	\$7.52	82.06	\$273.21	\$3.33	371.27	\$4,762.54	31,253.93	\$4,526.60	\$16,296.41
May	73,280.00	\$ 5,431.08	\$0.07	103.54	\$692.83	\$6.69	154.88	\$477.38	\$3.08	318.79	\$1,994.82	35,763.33	\$7,283.09	\$15,879.20
June	79,520.00	\$ 6,117.52	\$0.08	85.01	\$575.51	\$6.77	155.30	\$478.65	\$3.08	232.78	\$91.27	48,512.00	\$9,744.55	\$17,007.51
July	86,880.00	\$ 5,672.53	\$0.07	83.19	\$629.58	\$7.57	289.59	\$748.01	\$2.58	241.34	\$2,287.33	56,158.46	\$7,721.51	\$17,058.96
August	_ 80,160.00	\$ 6,135.75	\$0.08	39.91	\$310.55	\$7.78	519.46	\$1,153.22	\$2.22	214.37	\$2,505.74	57,458.69	\$9,552.86	\$19,658.12
	9		Avg.	2)		Avg.	3)			<b>4</b> )		5		
Annual	952,000	\$62,304	\$0.07	1,514	\$10,294	\$6.86	1,812	\$5,116	\$3.23	5,045	\$55,458	426,944	\$66,215	\$199,387
Totals														

ANNUAL ENERGY CON	SUMPTION IN BTU'S:			-		ENERGY	UTILIZATION INDEX (EUI)	
(oo) Electricity	952,000.00	KWH x 0.0116	=	11,043.20	MMBTU	EUI =	Total Annual BTU's	MMBTU/Sq.Ft./Yr.
(pp) Nat. Gas	1,514.00	MMBTU x 1.0	00	1,514.00	MMBTU	1	Building Gross Sq. Ft.	
(qq1) Steam/Hot Water	5,045.00	MMBTU x 1.0	=	5,045.00	MMBTU	EUI =	(uu) 22,725.53	
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU		(a) 74,388.00	
(rr) Chilled Water	426,944.00	TON HRS x 0.012	=	5,123.33	MMBTU	ļ.		
(ss) Propane or Butane		GAL x 0.095475	=		MMBTU	EUI =	(vv) 0.305499919	MMBTU/Sq.Ft./Yr.
(tt) Other Fuel		х х	=	-	MMBTU			
						ENERGY	COST INDEX (ECI)	
	(uu) 1	TOTAL ANNUAL BTU'S =		22,725.53	MMBTU	ECI =	Annual Energy Costs	\$/Sq.Ft./Yr.
							Building Gross Sq. Ft.	
						EC1 =	(nn) 199,387.00	
*Do not include water co	sts (hh).						(a) 74,388.00	
** Electricity is metered I	by building.							
The remaining values	are metered at the Utilities Depart	ment				ECI =	(ww) 2.680365113	\$/Sq.Ft./Yr.
and estimated by buildin	gs by using its gross square foot val	ue.						

Form PUA 2

PRELIMINARY WATER AND ENER	
TEXAS TECH UNIVERSITY WEST HAL	74388
Facility Name Building Na	me(s) Building Size(s) (GSF)
RECOMMENDED ENER AND WATER CONSERVATION ME Provide the following recommendations based on an on-site in	ASURES
Scheduled preventive maintenance plan.	
In Existence X Yes No; Recommended	No
Provide a general estimate, expressed as a range, of annu- which could result from implementing the following conser-	vation measures.
System Changes % Cost Savings Ventilation System Operations	System Changes % Cost Savings Water Systems Operations
Reduced ventilation Variable ventilation Unoccupied area ventilation shut down Repair of caulking & weatherstripping Maintenance & repair or operating controls Subtotal 0	Repair all leaks Reduction of water consumption Reduce hot water temperature Increase chilied water temperature Subtotal 0
Heating & Cooling System Operations  X Change in thermostat control set points Provide locking thermostat covers  X Reset of air & water temperatures Unoccupied reset or shut down of system Shut down non-critical exhaust systems Subtotal 399	Utility Plant & Distribution System Oper.  Equipment cleaning Adjustment of air/fuel ration  Combustion monitoring & control Adjustment of drives, fans, motors, etc. Steam Trap maintenance Pipe insulation repair Subtotal
Lighting Systems Operations  X Reduce illumination levels	Other Measures (including water use)

Subtotal 7324

Subtotal Totals

7723.0

Form PUA 3

Maximize use of daylight Install high efficiency lamps Reduce or delete evening cleaning hours

TEXAS TE	CH UNIVERSITY			WEST HALL	74388	
Institution I	Name		_	Building Name	Building Size (GSF)	
	ENERGY	AND	WATER CONSER	VATION MEASUR	E RETROFIT RECOMMENDATIONS	
1.0	Basic Building Data	1.1 1.2	Annual Energy Use Annual Energy Cost	0.3054999 2.6803651	BTU/Sq.Ft./Yr. \$/Sq.Ft./Yr.	
	1.3 Describe physical co	dition of	building envelope:			_
	1.4 Describe physical con	dition of	building energy and water	-using systems:		_
2.0	Based on 1.1 - 1.4 above, Briefly outline recommend Reset schedule Time of day schedule opting	ed retrofi		energy and water conservat	ion measure retrofit implementation.	_
3.0	Economizer				naracteristics present an opportunity to apply solar heating	
3.0	and/or cooling systems, or				X Yes No	
	ENE	RGY	ND WATER CON	SERVATION MEAS	BURE RETROFIT ASSESSMENT	
1.0	Describe proposed energy Adjust AHU's reset schedu Update building utilities op	le/Econo	mizer operation setpoint			
2.0	Estimate of installed cost	f above	measures: \$43,650.9	2		
3.0	Estimate of annual energy	and wate	er cost savings for above r	neasures:	\$7,723.00	
4.0	Projected simple payback	period fo	r above measures in year	s: <u>5.7</u>		_
Form PUA	.4.					

Energy Auditor Certification: I hereby certify that I, JEREMY DICKSON (name of auditor), have experience in conducting energy audits for commercial and/or institional buildings. I further certify that I have no financial interest in any equipment sales relating to this energy audit. I also certify that this audit reflects the current energy prices, operating hours, and building configurations.

		Jeremy Dicks	ion				To	exas Tech L	Iniversity-Phy	sical Plant.	/ 806 742 1696 11/23/2005	
	Nam	e of Energy A	uditor		-			Organiz	ation and Pho	one Numbe		
	TEXAS TEC	H UNIVERS	ITY				TEXAS TEC	H PLAZA			Texas Tech university/Lubbock, Tx	
	Fac	ality Name					Building Nar	ne(s)		-	Building/Campus Address	
						as Tech Uni						
					Name	and Address	of Owner					
	BUILDI	NG DATA	<u> </u>									
Building					TING SCHEE						BASIC HVAC CONTROL DATA	
Size (a)				Time Perio	d: Hrs/Occup							
75797	Days	(c)	Daylight		(d) E	vening		(е	) Night	_		
		i			1						Central Bidg. Panel	
	M-F	12 Hrs	150	5%	4 Hrs	0	0%	0	0	0%	(f) Yes <u>X</u> No	
Date (b)					1				1	1		
Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS	
2000			i		1						(g) Yes X No	
	SUN	6 Hrs	0	0%	0	0	0%	0	. 0	0%		
		GY USIN										
Primary	Primar		Space		Space		Domesti		Interior		Special Building	
Heat	Cooling		Termina		Termina		Hot Wat		Lighting		Systems & Facilities	
Source (h)			Heat (		Cooling (		Source		System		(n)	
Steam	Centrifuga	al Chillers	Fana	nd Coil	Fan ar	nd Coil	Heat Ex	changer	Fluore	escent		
Boiler			ì				į.		1			
1	1		i						1			
III. UNIQ				RISTIC								
		per day oper	ation			No X		<ol><li>List yea</li></ol>	ar and type of	major build	ding modifications and additions.	
	per year op				Yes X	No						
	Program U				Yes _X_							
4. Building	has exterior	floodlighting			Yes X	No						
L												
Form PUA 1												

t														
Building Nam		TEXAS TECH P	LAZA				(a) Building	Size(s) (Gr		75797				
ENERGY US	SE AND COST	DATA		For Year En	ding:	8/30/2002		" Metered	X Best E	stimateX	<u> </u>			
	ELEC	TRICITY			TURAL GAS			WATER		P	URCHASED	THERMAL		TOTAL
	KWH	COST	\$/KWH	MCF	COST	\$/MCF	MGAL	COST	\$/MGAL	STEAM-HC	T WATER	CHILLED WA	TER	ENERGY
MONTH		\$	1		\$			s		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(99)	(hh)	(ii)	(ii)	(kk)	(11)	(mm)	(nn)
September	207,360	\$13,187.06	\$0.06	14.00	\$145.19	\$10.37	111.00	\$201.07	\$1.81			1		\$13,533.32
October	158,400	\$9,792.76	\$0.06	245.00	\$1,579.21	\$6.45	49.00	\$103.06	\$2.10					\$11,475.03
November	163,040	\$9,287	\$0.06	411.00	\$3,323.41	\$8.09	47.00	\$99.70	\$2.12					\$12,710.52
December	160,000	\$9,653	\$0.06	627.00	\$5,103.01	\$8.14	50.00	\$125.48	\$2.51					\$14,881.13
January	159,520	\$9,732	\$0.06	494.00	\$3,803.88	\$7.70	50.00	\$125.48	\$2.51					\$13,661.36
February	168,800	\$9,787	\$0.06	476.00	\$3,679.36	\$7.73	103.00	\$214.52	\$2.08					\$13,681.24
March	162,720	\$10,017.37	\$0.06	485.00	\$3,741.47	\$7.71	107.00	\$221.24	\$2.07					\$13,980.08
April	169,760	\$10,842.74	\$0.06	266.00	\$2,303.37	\$8.66	157.00	\$305.24	\$1.94					\$13,451.35
May	160,480	\$11,843.10	\$0.07	86.00	\$626.43	\$7.28	194.00	\$367.40	\$1.89					\$12,836.93
June	206,240	\$15,784.99	\$0.08	60.00	\$487.12	\$8.12	321.00	\$580.76	\$1.81					\$16,852.87
July	184,960	\$11,935.10	\$0.06	6.00	-\$213.31	-\$35.55	293.00	\$533.72	\$1.82					\$12,255.51
August	172,480	\$13,136.77	\$0.08	43.00	\$195.58	\$4.55	207.00	\$389.24	\$1.88					\$13,721.59
	D		Avg.	2		Avg.	(3)		Avg.	(4)		5)		
Annual	2,073,760	\$134,999	\$0.06	3,213.00	\$24,774.72	\$4.10	1,689.00	\$3,266.91	\$2.05	0.00	\$0.00	0.00	\$0.00	\$163,040.93
Totals		1		7	(		1			1		1		1

NNUAL ENERGY CONSUM	MPTION IN BTU'S:					ENERGY	UTILIZATION	INDEX (EUI)	
oo) Electricity	2073760	KWH x 0,0116	=	24055,616	MMBTU	EUI =	Total Annu	at BTU's	MMBTU/Sq.Ft./Yr.
op) Nat. Gas	3213	MCF x 1.03	=	3309.39	MM8TU	1	Building Gr	oss Sq. Ft.	
qq1) Steam/Hot Water	0	MMBTU x 1.0	-	0	MMBTU	EUI =	(uu)	27365.006	
qq2) Steam	0	LBS x 0.001390	=	0	MMBTU	i	(a)	75797	
r) Chilled Water	0	TON HRS x 0.012	=	0	MMBTU	1			
ss) Propane or Butane	0	GAL x 0.095475	-	0	MMBTU	EUI =	(vv)	0.361030199	MMBTU/Sq.Ft/Yr.
t) Other Fuel	0	x	-	0	MMBTU	1			
						ENERGY	COST INDEX	(ECI)	
		(uu) TOTAL ANNUAL BTU'S =		27365,006	MMBTU	ECI =	Annual End	rgy Costs	\$/Sq.Ft./Yr.
						1	Building Gr	oss Sq. Ft.	
						ECI =	(nn)	163040.93	
Do not include water costs (	hh).					1	(a)	75797	
* Electricity is metered by bu	silding.					1			
he remaining values are	metered at the Utilities De	epartment				ECI =	(ww)	2.151020885	\$/Sq.Ft./Yr.
nd estimated by buildings b	v using its gross square foot	value.				1			

TEXAS TECH UNIVERSITY	TEXAS TECH PLAZA	75797
Facility Name	Building Name(s)	Building Size(s) (GSF)
RECOMME AND WATER CONSEI Provide the following recommendations based of 1. Scheduled preventive maintenance plan.	NDED ENERGY RVATION MEASURES on an on-site inspection of bu ecommended X Yes range, of annual energy and illowing conservation measur avings System Chan Water Systen Repair	ilding(s): No water savings es.
Unoccupied area ventilation shut d	own Reduce	hot water temperature
Repair of caulking & weatherstripp		e chilled water temperature
Maintenance & repair or operating Subtota		Subtotal 0
Heating & Cooling System Operations	Utility Plant &	Distribution System Oper.
X Change in thermostat control set p Provide locking thermostat covers Reset of air & water temperatures Unoccupied reset or shut down of s Shut down non-critical exhaust sys Subto	Adjustm Combus	ent cleaning ent of ain/fuel ration stion monitoring & control ent of drives, fans, motors, etc. frap maintenance ulation repair Subtotal Subtotal 0
Lighting Systems Operations	Other Measur	res (including water use)
Reduce illumination levels  Reduce illumination levels  Maximize use of daylight  Install high efficiency lamps  Reduce or delete evening cleaning  Subtota	*** Noisy chill Ear protection	

Form PUA 3

	ECH UNIVERSITY	TEXAS TECH PLAZA	75797
titution	Name	Building Name	Building Size (GSF)
	ENERGY AND WATER CONSE	RVATION MEASURE RETR	OFIT RECOMMENDATIONS
1.0	Basic Building Data 1.1 Annual Energy Use	0.3610302	BTU/Sq.Ft./Yr.
	1.2 Annual Energy Cost	2.1510209	\$/Sq.Ft./Yr.
	1.3 Describe physical condition of building envelope:	Good condition	
	1.4 Describe physical condition of building energy and water	er-using systems: Good cor	ndition
		er energy and water conservation measure	retrofit implementation.
2.0	Based on 1.1 - 1.4 above, indicate the need and potential for Briefly outline recommended retrofit options: <u>Lighting r</u> AHUs' reset schedule	retrofit (Require further evaluation)	
3.0	Briefly outline recommended retrofit options: Lighting is	retrofit (Require further evaluation)  Iding conditions and/or site characteristics	present an opportunity to apply solar heating res No
	Based on auditor evaluation, indicate whether or not the but and/or cooling systems, or solar domestic hot water heating	retrofit (Require further evaluation)  Iding conditions and/or site characteristics	/es No
	Based on auditor evaluation, indicate whether or not the but and/or cooling systems, or solar domestic hot water heating	retrofit (Require further evaluation)  Iding conditions and/or site characteristics systems.	Yes No
3.0	Briefly outline recommended retrofit options:  Lighting i AHUs' reset schedule  Based on auditor evaluation, indicate whether or not the but and/or cooling systems, or solar domestic hot water heating  ENERGY AND WATER CON Describe proposed energy conservation measures:	Retrofit (Require further evaluation)  Iding conditions and/or site characteristics systemsX	Yes No
1.0	Briefly outline recommended retrofit options:  Lighting : AHUs' reset schedule  Based on auditor evaluation, indicate whether or not the but and/or cooling systems, or solar domestic hot water heating  ENERGY AND WATER CON  Describe proposed energy conservation measures: Adjust AHUs reset schedule	kiting conditions and/or site characteristics systemsX NSERVATION MEASURE RE Retrofit (efficiency/illumination leve	resNo TROFIT ASSESSMENT  1) existing lighting system

# III. Implementation Schedule

The estimated implementation schedule for the identified energy conservation measures is listed in Table 3.1. The estimated funding and completion dates are based on available funding through the LoanSTAR Revolving Loan Program managed by the State Energy Conservation Office.

Table 3.1

Project	Status	Est. Funding	Est. Completion
AHU VFDs and	50% Design	Feb 2006	July 2006
Library Stacks		100 2000	July 2000
ITC Performance Contract	50% Design	Apr 2006	Aug 2006
AHU Controls Upgrade	Concept	Jun 2006	Nov 2006
Boiler Side stream Heat Recovery	Concept	Sep 2006	Mar 2006

#### IV. FINANCE STRATEGY

The finance strategy consists of developing a budget to support the energy savings projects. The funding source identified for these projects is the LoanSTAR Revolving Loan Program managed by the State Energy Conservation Office. Through the finance strategy, every potential project under evaluation is selected only if it guarantees that its investment return clearly overcomes a financial investment with a similar risk level.

The estimated budget required per selected energy savings projects is the following:

Project	Fund Source	Est Amount
AHU VFDs/Library Stacks	LoanSTAR	\$600,000
ITC Performance Contract	LoanSTAR	\$560,000
AHU Controls Upgrade	LoanSTAR	\$500,000
Boiler Sidestream Heat Recovery	LoanSTAR	\$500,000
Total		\$2,160,000

Each project's financial feasibility was estimated by evaluating its Net Present Value, Internal Rate of Return, and Payback Period. These estimations were calculated in detail by breaking down costs and savings per building and HVAC equipment associated.

#### Campus VFD Project and Library Lighting Renovation

This project groups all HVAC motors that require a VFD to improve its efficiency and whose implementation payback period is lower or equal to five years. The library lighting project seeks to reduce the library electric load by managing the occupancy level of its physical area. This project has a payback period of 1.4 years.

The cumulative payback period for the project is estimated at 2.3 years.

#### International Textile Center Performance Contract

This measure seeks to reduce the overall utility costs of Texas Tech International Textile Center facility by implementing a series of facility improvement measures. The complete project financial evaluation shows a 6 year payback period.

#### AHUs Controls Upgrade

This project seeks to convert constant volume AHUs to variable volume units. The energy reduction is based on air demand system instead of constant air supply. This project is currently in the development stage. Estimated payback period is approximately 6 years.

# Boiler Side-stream Heat Recovery

This project involves installing a heat recovery system on the boilers at the Central Heating and Cooling Plant #1. This project is currently in development, and shows significant savings potential on natural gas.

#### V. UTILITIES AWARENESS PLAN

Educating personnel on energy conservation methods and practices presents many challenges for a large University. The multifaceted functions of the university in areas of utilities, education and research create many separate and distinct environments. One of the major obstacles to energy conservation is communication. Energy requirements in each area changes and without some method of communication these requirements may not be met. Usually, when energy requirements aren't being met the need gets communicated, the main problem arises when the energy requirements are no longer needed. Many times the energy continues to be consumed when the need no longer exists. Case in point, Air handlers running to cool a research project. When the project ends many times employees do not pass on the word that the air handler can be placed back on a regular schedule. Also, many employees are under the assumption that it is not cost effective to turn off fluorescent lights for short periods of time. This was true years back but with new electronic ballasts this is no longer necessary. The following plan is intended to give an overview of the methods and strategies used to educate Texas Tech employees in these and other areas of energy savings and to develop ways to communicate energy needs and to track when these needs are no longer necessary.

#### Physical Plant Energy Committee

The mission of the Physical Plant Energy Committee is to identify and implement energy conservation projects on Texas Tech campus. Committee members include the Physical Plant Director and people from the Areas of Utilities, Building Maintenance, and Construction and Engineering. The committee meets on a monthly basis. The committee determines the use of the annual energy improvement allocation and makes recommendations to the administration on temperature set point adjustments. The committee will be responsible for implementing the projects identified in the Resource Efficiency Plan.

#### Operation Efficiency

Operational efficiency improvements are tactics that will be implemented with low/no cost or during routine maintenance. Examples include:

- Continued education of central plant personnel on efficient operation of heating and cooling plants.
- Discussion of plant efficiency goals and strategies during routine monthly meetings, and developing energy conservation strategies.
- Scheduling and annual verification of mechanical equipment.
- Monitoring and discussion of energy consumption in E&G facilities.
- Recommissioning of Air handling units.

#### Campus Involvement

In order to achieve the energy reduction goals we have set, energy awareness in the campus community is mandatory. This includes educating the faculty and staff on energy conservation strategies and soliciting input from these groups. The following is a brief list of ideas for campus involvement.

- TechAnnounce automatic email Tips
- Annual Work Coordinators Conferences
- Physical Plant Newsletters

# UTILITIES AWARENESS PLAN Measures for Campus Involvement

#### 1. Develop a brochure to be passed out

Brochure is complete and covers:

- Lighting Turn off lights when not in use.
- Computers Turn on sleep mode.
- Leaks Report all leaks no matter how small.
- Dress Modify dress for comfort instead of thermostat.
- Fan Allow use of small fan for comfort on warmer days.
- Windows and Doors Keep shut.

#### 2. Send out forms to department heads requesting information on AHU's schedule

Document all continuous running AHUs and their department reasons for continuous use. Reschedule run times wherever possible.

#### 3. Develop a weekly Energy Tip to be placed on TechAnnounce.

Place Energy tips in the TechAnnounce automatic email to keep people aware of energy conservation.

#### 4. Discuss energy savings ideas for plant operations at monthly safety meeting.

Discuss one Energy Saving Idea at every Safety Meeting relating to the plant.

# 5. Have an Energy Committee to develop energy saving ideas.

The Energy Committee, already formed, must be responsible for:

- Developing and Implementing Energy Conservation Strategies.
- Reviewing areas of high energy consumption and evaluating ways to reduce it.

#### 6. Place Energy Conservation tips in the Physical Plant's Newsletter.

Begin a regular column on energy saving tips to be practiced at work and home.

# VI. ASSET MANAGEMENT INVENTORY

FACILITY NAME	YEAR	R FACILITY TYPE	AREA (SF)	CONSTRUCTION
ACADEMIC BUILDING	1970	General Purpose Building	5796	Load-bearing Masonry Walls
ADMINISTRATION	1925	General Purpose Building	113975	Reinforced Concrete Masonry
ADMINISTRATIVE BUILDING	1970	General Purpose Building	6100	Load-bearing Masonry Walls
ADMINISTRATIVE SUPPORT CENTER	1998	General Purpose Building	32909	Load-bearing Masonry Walls
AG ENG RESEARCH & TESTING LAB	1972	Agricultural Service	3600	Lightweight Metal Walls
AGRICULTURAL ED & COMMUNICATION	1951	General Purpose Building	25204	Reinforced Concrete Masonry
AGRICULTURAL PAVILION	1924	General Purpose Building	7263	Load-bearing Masonry Walls
AGRICULTURAL PLANT SCIENCES	1961	General Purpose Building	26275	Reinforced Concrete Masonry
AGRICULTURE SCIENCES	1942	General Purpose Building	43902	Reinforced Concrete Masonry
AGRONOMY/ERSKINE	1983	Agricultural Service	3655	Lightweight Metal Walls
AGRONOMY/HORTICULTURE	1978	Agricultural Service	4583	Reinforced Concrete Frame
ANIMAL SCIENCE	1951	General Purpose Building	16244	Reinforced Concrete Masonry
ANTENNA FACILITIES	1963	General Purpose Building	468	Load-bearing Masonry Walls
ARCHITECTURE	1970	General Purpose building	175562	Reinforced Concrete Masonry
ART	1970	General Purpose Building	61392	Reinforce Concrete Frame
ATHLETIC DEPARTMENT STORAGE	1964	Auxiliary Services	289	Lightweight Metal Walls
ATHLETIC SERVICES	1996	Auxiliary Services	5381	Load-bearing Masonry Walls
ATHLETICS TRAINING CENTER	1986	Auxiliary Services	97388	Reinforce Concrete Frame
BABY PIG BLDG	1978	Agricultural Service	4038	Reinforced Concrete Frame
BASEBALL STORAGE	1980	Auxiliary Services	150	Load-bearing Masonry Walls
BEEF CATTLE CENTER	1978	Agricultural Service	609	Reinforced Concrete Frame
BIOLOGY	1969	General Purpose building	156219	Reinforced Concrete Masonry
BLEDSOE HALL	1947	Residence, Single	87996	Reinforced Concrete Masonry
BOAR HOUSE	1979	Agricultural Service	300	Reinforced Concrete Frame
BOOKSTORE	1926	Rental Property	32123	Reinforced Concrete Masonry
BUSINESS ADMINISTRATION	1969	General Purpose Building	204495	Reinforced Concrete Masonry
CABIN #1	1950	Residence, Single	536	Steel Frame

FACILITY NAME	YEAR	FACILITY TYPE	AREA (SF)	CONSTRUCTION
CABIN #10	1950	General Purpose Building	536	Steel Frame
CABIN #11	1950	Residence, Single	536	Steel Frame
CABIN #12	1950	Residence, Single	1834	Load-bearing Masonry Walls
CABIN #13 AND #14	1950	Academic/Residence	1834	Steel Frame
CABIN #15	1950	Residence, Single	536	Steel Frame
CABIN #16	1950	Residence, Single	536	Steel Frame
CABIN #17 AND #18	1950	Academic/Residence	1834	Load-bearing Masonry Walls
CABIN #19	1950	Residence, Single	536	Steel Frame
CABIN #2	1950	Residence, Single	536	Steel Frame
CABIN #20	1950	Residence, Single	536	Steel Frame
CABIN #3 AND #4	1950	Academic/Residence	1834	Load-bearing Masonry Walls
CABIN #5	1950	Residence, Single	536	Steel Frame
CABIN #6	1950	Residence, Single	536	Steel Frame
CABIN #7 AND #8	1950	Academic/Residence	1834	Load-bearing Masonry Walls
CABIN #9	1950	General Purpose Building	536	Steel Frame
CARPENTER/WELLS	1998	Academic/Residence	143760	Load-bearing Masonry Walls
CENTRAL FOOD FACILITIES	1964	Auxiliary Services	33905	Reinforced Concrete Masonry
CENTRAL HTG & COOLING PLANT 1	1968	Physical Plant Buildings	80766	Reinforced Concrete Masonry
CENTRAL HTG & COOLING PLANT 2	1976	Physical Plant Buildings	60143	Load-bearing Masonry Walls
CHARLES E. MAEDGEN, JR. THEATR	1964	General Purpose Building	32958	Reinforced Concrete Masonry
CHEMICAL ENGINEERING	1961	General Purpose Building	18776	Reinforced Concrete Masonry
CHEMICAL STORAGE/ERC	1987	General Purpose Building	261	Load-bearing Masonry Walls
CHEMISTRY	1929	General Purpose Building	192980	Reinforced Concrete Masonry
CHILD DEVELOPMENT RESEARCH	1927	General Purpose Building	3900	Load-bearing Masonry Walls
CHITWOOD HALL	1967	Residence, Single	134816	Steel Frame
CHLORINATOR SHED	1970	General Purpose Building	100	Load-bearing Masonry Walls
CIVIL ENGINEERING	1951	General Purpose Building	91094	Reinforced Concrete Masonry
CLEMENT HALL	1964	Residence, Single	92732	Steel Frame
COLEMAN HALL	1967	Residence, Single	132968	Steel Frame

FACILITY NAME	YEAR	R FACILITY TYPE	AREA (SF	CONSTRUCTION
COMPLEX DINING FACILITIES	1967	Academic/Residence	78815	Steel Frame
CONCESSIONS - DAN LAW FIELD	1993	Auxiliary Services	300	Load-bearing Masonry Walls
COOKS HOUSE	1970	Academic/Residence	1200	Load-bearing Masonry Walls
DAIRY CENTER	1978	Agricultural Service	2056	Reinforced Concrete Frame
DEVELOPMENT OFFICE	1944	General Purpose Building	6594	Reinforced Concrete Masonry
DEVITT & MALLET RANCH BUILDING	1976	General Purpose Building	20633	Wood Frame with Masonry
DOAK HALL	1934	Residence Building	72292	Reinforced Concrete Masonry
DOUBLE T SHOPPE	1991	Auxiliary Services	2500	Steel Frame
DRANE HALL	1939	General Purpose Building	75538	Reinforced Concrete Masonry
EAST LOCKER ROOM DAN LAW FIELD	1994	Auxiliary Services	1054	Load-bearing Masonry Walls
EDUCATION BUILDING (NEW)	2002	General Purpose Building	85000	Reinforced Concrete Masonry
EDUCATIONAL T.V. STATION	1951	General Purpose Building	7784	Load-bearing Masonry Walls
ELECTRICAL ENGINEERING	1928	General Purpose Building	98734	Reinforced Concrete Masonry
ENGINEERING & TECHNOLOGY LABS	1961	General Purpose Building	21657	Reinforced Concrete Masonry
ENGINEERING CENTER	1962	General Purpose Building	57665	Reinforced Concrete Masonry
ENGLISH AND PHILOSOPHY	2002	General Purpose Building	125000	Reinforced Concrete Masonry
ENTOMOLOGY GREENHOUSE	1973	General Purpose Building	149	Glass Building
ENTOMOLOGY/ERSKINE	1983	Agricultural Service	3123	Lightweight Metal Walls
ENVIRONMENTAL HEALTH & SAFETY	1953	Agricultural Services	580	Lightweight Metal Walls
EXERCISE SCIENCES CENTER	1958	General Purpose Building	47837	Reinforced Concrete Masonry
EXTENDED STUDIES	2000	General Purpose Building	29674	Steel Frame
FARM MGR RESIDENCE	1981	Residence/Family	1512	Wood Frame
FARM SHOP	1978	Agricultural Service	5041	Reinforced Concrete Frame
FARROWING/NURSERY	1978	Agricultural Service	6313	Reinforced Concrete Frame
FEEDMILL	1976	Agricultural Service	18258	Reinforced Concrete Frame
FERTILIZER STORAGE	1978	Agricultural Service	3232	Reinforced Concrete Frame
FISHERIES & WILDLIFE	1961	General Purpose Building	8486	Reinforced Concrete Masonry
FOOD TECHNOLOGY	1976	General Purpose Building	17400	Reinforced Concrete Masonry
FOREIGN LANGUAGE	1967	General Purpose Building	66858	Reinforced Concrete Masonry

FACILITY NAME	YEAF	R FACILITY TYPE	AREA (SF	CONSTRUCTION
GASTON HALL	1958	Residence Single	66350	Reinforced Concrete Masonry
GATES HALL	1963	Residence, Single	92733	Steel Frame
GERALD & LOUSEMERKET ALUMNI	1924	Non Institutional Agency	18062	Reinforced Concrete Masonry
GODDARD RANGE & WILDLIFE MGT	1975	General Purpose Building	27625	Steel Frame
GORDON HALL	1947	Residence, Single	91398	Reinforced Concrete Masonry
GRANTHAM PLANT	1983	Physical Plant Buildings	18889	Load-bearing Masonry Walls
GROUND WATER ANALYSIS LAB	1999	General Purpose Building	3911	Load-bearing Masonry Walls
GROUNDS MAINT/MC HALL	1960	Physical Plant Buildings	326	Load-bearing Masonry Walls
GROUNDS MAINT/REC CENTER	1982	Physical Plant Buildings	20	Reinforce Concrete Frame
GROUNDS MAINTENANCE/ENGLISH	1960	Physical Plant Buildings	326	Load-bearing Masonry Walls
GROWING & FINISHING	1978	Agricultural Service	8332	Reinforced Concrete Frame
HAZARDOUS CHEMICAL STORAGE	1979	General Purpose Building	1789	Reinforce Concrete Frame
HOLDEN HALL	1949	General Purpose Building	176442	Reinforced Concrete Masonry
HORN HALL	1947	Residence, Single	83486	Reinforced Concrete Masonry
HORSE CENTER	1978	Agricultural Service	9887	Reinforced Concrete Frame
HOUSING SERVICES	1985	Auxiliary Services	24917	Load-bearing Masonry Walls
HULEN HALL	1964	Residence, Single	92732	Steel Frame
HUMAN SCIENCES	1925	General Purpose Building	175428	Reinforced Concrete Masonry
IDLER BLDG NORTHEAST	1985	Agricultural Service	135	Load-bearing Masonry Walls
IDLER BLDG NORTHWEST	1985	Agricultural Service	168	Load-bearing Masonry Walls
IDLER BLDG SOUTHWEST	1958	Agricultural Service	144	Load-bearing Masonry Walls
INDUSTRIAL ENGINEERING	1925	General Purpose Building	28130	Reinforced Concrete Masonry
INSTITUTE FOR ENVIRNMTL& HUMAN	1987	General Purpose Building	45625	Load-bearing Masonry Walls
INTERNATIONAL CULTURAL CENTER	1996	General Purpose Building	34700	Steel Frame
INTERNATIONAL TEXTILE CENTER	1984	General Purpose Building	109376	Steel Frame
JONES STADIUM	1960	Auxiliary Services	59485	Reinforced Concrete Masonry
KNAPP HALL	1947	Residence, Single	83486	Reinforced Concrete Masonry
KTXT TRANSMITTER BLDG	1982	General Purpose Building	875	Reinforce Concrete Frame
LAW BUILDING	1969	General Purpose Building	129043	Reinforced Concrete Masonry

FACILITY NAME	YEAR	FACILITY TYPE	AREA (SF)	CONSTRUCTION	
LECTURE HALL	1970	Auxiliary Services	5815	Load-bearing Masonry Walls	
LEN & HARRIET MCCLELLAN MEMORIAL	1956	General Purpose Building	14062	Reinforced Concrete Masonry	
LIBRARY	1962	General Purpose Building	303150	Reinforced Concrete Masonry	
LIVESTOCK ARENA & MEAT LAB	1978	General Purpose Building	43931	Steel Frame	
LUBBOCK LAKE LAANDMARK RESEARCH	1990	General Purpose Building	3595	Steel Frame	
LUBBOCK LAKE LANDMARK PREFAB	1994	General Purpose Building	893	Wood Frame	
MAINTENANCE	1978	Physical Plant Building	6300	Lightweight Metal Walls	
MASS COMMUNICATION	1976	General Purpose Building	78586	Reinforced Concrete Masonry	
MATHEMATICAL SCIENCES	1938	General Purpose Building	67203	Reinforced Concrete Masonry	
MECHANICAL ENGINEERING	1960	General Purpose Building	88748	Reinforce Concrete Frame	
MOBILE HOME-CRAFTSMAN	1979	Residence/Family	768	Reinforced Concrete Frame	
MURDOUGH HALL	1964	Residence, Single	117510	Steel Frame	
MUSEUM	1970	Auxiliary Services	158266	Load-bearing Masonry Walls	
MUSIC	1951	General Purpose Building	106430	Reinforced Concrete Masonry	
NECROPSY	1978	Agricultural Service	1188	Reinforced Concrete Frame	
PETROLEUM ENGINEERING	1950	General Purpose Building	69892	Reinforced Concrete Masonry	
PHYSICAL PLANT	1961	Physical Plant Buildings	106326	Reinforced Concrete Masonry	
PHYSICAL PLANT ANNEX	1969	General Purpose Building	2611	Steel Frame	
PIT CONTROL BLDG	1985	Agricultural Service	190	Load-bearing Masonry Walls	
PORT OF ENTRY STATION/W. OF GO	1967	Auxiliary Services	19	Reinforce Concrete Frame	
PORT OF ENTRY STATION-15TH&FLI	1967	Auxiliary Services	19	Steel Frame	
PORT OF ENTRY STATION-15TH&UNI	1967	Auxiliary Services	19	Steel Frame	
PORT OF ENTRY STATION-BROADWAY	1967	Auxiliary Services	19	Steel Frame	
PORT OF ENTRY STATION-N. BOSTO	1967	Auxiliary Services	19	Steel Frame	
PORT OF ENTRY STATION-S BOSTON	1967	Auxiliary Services	19	Steel Frame	
PRESTON F GOTT SKYVIEW OBSERVA	1992	General Purpose Building	669	Lightweight Metal Walls	
PRINTECH	1961	Auxiliary Services	42224	Lightweight Metal Walls	
PSYCHOLOGY	1964	General Purpose Building	39221	Reinforced Concrete Masonry	
PUMP HOUSE	1978	Agricultural Service	200	Reinforced Concrete Frame	

FACILITY NAME	YEAR	R FACILITY TYPE	AREA (SF)	CONSTRUCTION
RANGE & WILDLIFE FIELD LAB ANN	1994	General Purpose building	3000	Lightweight Metal Walls
RANGE & WILDLIFE/ERSKINE	1983	Agricultural Service	4800	Lightweight Metal Walls
RECREATION ANNEX	1961	General Purpose Building	3473	Load-bearing Masonry Walls
RECREATIONAL AQUATIC FACILITIE	1976	Auxiliary Services	46610	Load-bearing Masonry Walls
RESEARCH CENTER	1978	Agricultural Service	7550	Reinforced Concrete Frame
RIECK TRACT RESIDENCE	1950	Residence/Family	1600	Wood Frame with Masonry
ROBERT H. EWALT STUDENT REC CE	1980	Auxiliary Services	130546	Reinforce Concrete Frame
ROUGHAGE BARN	1984	Agricultural Service	3720	Reinforced Concrete Frame
SCALE HOUSE	1985	Agricultural Service	389	Load-bearing Masonry Walls
SCIENCE	1951	General Purpose Building	118544	Reinforced Concrete Masonry
SEISMOGRAPH	1970	General Purpose Building	1000	Wood Frame
SEMINAR HOUSE	1970	Academic/Residence	1160	Load-bearing Masonry Walls
SHEEP & GOAT CENTER	1978	Agricultural Service	1838	Reinforced Concrete Frame
SNEED HALL	1938	Residence, Single	73956	Reinforced Concrete Masonry
SOW/BOAR	1978	Agricultural Service	3537	Reinforced Concrete Frame
SPORTS STUDIES CENTER	1961	General Purpose Building	24264	Reinforced Concrete Masonry
STANGEL HALL	1964	Residence, Single	117510	Steel Frame
STUDENT MEDIA BUILDING	1941	General Purpose Building	19245	Reinforced Concrete Masonry
STUDENT UNION BUILDING	1953	Auxiliary Services	153409	Reinforced Concrete Masonry
STUDY UNIT	1978	Academic/Residence	4300	Wood Frame
SUP STUDY UNIT	1979	Academic/Residence	7450	Lightweight Metal Walls
SW COLL/SPEC COLLECTIONS LIBRA	1996	General Purpose Building	77943	Steel Frame
TEXAS TECH POLICE DEPARTMENT	1998	General Purpose Building	32709	Steel Frame
THOMPSON HALL	1958	Non Institutional Agency	83110	Reinforced Concrete Masonry
TICKET OFFICE JONES STADIUM	1979	Auxiliary Services	11482	Reinforced Concrete Masonry
TOILET BUILDING	1970	General Purpose Building	1455	Load-bearing Masonry Walls
TOOL & EQUIPMENT STORAGE	1970	Auxiliary Services	100	Lightweight Metal Walls
TRACK DRESSING ROOM	1971	Auxiliary Services	3089	Reinforced Concrete Masonry
TTU WAREHOUSE	1978	Physical Plant Buildings	15000	Lightweight Metal Walls

FACILITY NAME	YEAR	FACILITY TYPE	AREA (SF)	CONSTRUCTION
UNITED SPIRIT ARENA	1999	Auxiliary Services	271880	Load-bearing Masonry Walls
UNIVERSITY GREENHOUSE	1973	General Purpose Building	21464	Glass Building
UNIVERSITY PLAZA	2000	General Purpose Building	75797	Steel Frame
WALL HALL	1963	Residence, Single	92732	Steel Frame
WAREHOUSE	1970	Physical Plant Building	1344	Lightweight Metal Walls
WATER STORAGE TANK	1979	Agricultural Service	300	Reinforced Concrete Frame
WEEKS HALL	1957	Residence Single	84373	Reinforced Concrete Masonry
WELLHOUSE/LUBB LAKE OPERATIONS	2000	Physical Plant Buildings	1	Load-bearing Masonry Walls
WEST HALL	1934	General Purpose Building	74388	Reinforced Concrete Masonry
WEST LOCKER ROOM DAN LAW FIELD	1994	Auxiliary Services	2013	Load-bearing Masonry Walls
WEYMOUTH HALL	1967	Residence, Single	134816	Steel Frame
WIND ENGINEERING RESEARCH	1987	General Purpose Building	1369	Lightweight Metal Walls

# VII. UTILITY HISTORY REPORT

# ELECTRICITY (KWH)

Year 2003

Provider: Lubbock Power and Light

Estimated Rate: \$ .05/KWH

EACH PEV NAME	EACH ITW TYDE	ADEA (SE	TITH ITV HER	COST/YEAR
FACILITY NAME	FACILITY TYPE	AREA (SF)		
ADMINISTRATION	General Purpose Building	113975	1535520	73185
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	273760	36047
AGRICULTURAL PAVILION	General Purpose Building	7263	154831	7940
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	336415	17795
AGRICULTURE SCIENCES	General Purpose Building	43902	538080	30373
ARCHITECTURE	General Purpose building	175562	2201397	93572
ART	General Purpose Building	61392	769803	32722
BIOLOGY	General Purpose building	156219	3478913	134569
BUSINESS ADMINISTRATION	General Purpose Building	204495	2012160	93664
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	110607.32	112584
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	385582	20633
CHEMICAL ENGINEERING	General Purpose Building	18776	439520	21492
CHEMISTRY	General Purpose Building	192980	77278.32	99857
CIVIL ENGINEERING	General Purpose Building	91094	1122240	60240
DEVELOPMENT OFFICE	General Purpose Building	6594	76663	3957
DRANE HALL	General Purpose Building	75538	876137	45226
EDUCATION BUILDING (NEW)	General Purpose Building	85000	1008000	53564
ELECTRICAL ENGINEERING	General Purpose Building	98734	33718.67	47691
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	615800	30557
ENGINEERING CENTER	General Purpose Building	57665	1746000	71812
ENGLISH AND PHILOSOPHY	General Purpose Building	125000	1325600	68626
EXERCISE SCIENCES CENTER	General Purpose Building	47837	323200	20106

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FISHERIES & WILDLIFE	General Purpose Building	8486	274080	14313
FOOD TECHNOLOGY	General Purpose Building	17400	370929	19021
FOREIGN LANGUAGE	General Purpose Building	66858	606720	41817
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	347445	18395
HOLDEN HALL	General Purpose Building	176442	1674400	81824
HUMAN SCIENCES	General Purpose Building	175428	44413.55	50965
INDUSTRIAL ENGINEERING	General Purpose Building	28130	366000	20719
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	3296400	142644
LAW BUILDING	General Purpose Building	129043	2798400	115335
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	168884	9726
LIBRARY	General Purpose Building	303150	133025.78	96437
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	694080	37817
MASS COMMUNICATION	General Purpose Building	78586	834132	39986
MATHEMATICAL SCIENCES	General Purpose Building	67203	745280	40663
MECHANICAL ENGINEERING	General Purpose Building	88748	787324	44236
MUSEUM	Auxiliary Services	158266	103512.26	98316
MUSIC	General Purpose Building	106430	504214	69791
PETROLEUM ENGINEERING	General Purpose Building	69892	1043040	51751
PHYSICAL PLANT	Physical Plant Buildings	106326	39541.77	13844
PSYCHOLOGY	General Purpose Building	39221	458858	24554
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	3706560	148678
SCIENCE	General Purpose Building	118544	55389.75	16655
SPORTS STUDIES CENTER	General Purpose Building	24264	174000	10608
STUDENT MEDIA BUILDING	General Purpose Building	19245	204268	9765
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1214320	51514
UNIVERSITY GREENHOUSE	General Purpose Building	21464	440820	23674
WEST HALL	General Purpose Building	83650	992320	51782

# ELECTRICITY (KWH)

Year 2004

Provider: Lubbock Power and Light

Estimated Rate: \$ .06/KWH

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
ADMINISTRATION	General Purpose Building	113975	1424640	84427
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	258240	16465
AGRICULTURAL PAVILION	General Purpose Building	7263	147435	8212
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	328313	18841
AGRICULTURE SCIENCES	General Purpose Building	43902	547920	33046
ARCHITECTURE	General Purpose building	175562	2089963	108185
ART	General Purpose Building	61392	730837	37831
BIOLOGY	General Purpose building	156219	3353442	156979
BUSINESS ADMINISTRATION	General Purpose Building	204495	1934640	126144
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	98753.85	178721
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	337914	20435
CHEMICAL ENGINEERING	General Purpose Building	18776	416800	22749
CHEMISTRY	General Purpose Building	192980	90617.7	118137
CIVIL ENGINEERING	General Purpose Building	91094	1073760	63344
DEVELOPMENT OFFICE	General Purpose Building	6594	71566	4374
DRANE HALL	General Purpose Building	75538	817874	49895
EDUCATION BUILDING (NEW)	General Purpose Building	85000	967600	57257
ELECTRICAL ENGINEERING	General Purpose Building	98734	34940	52421
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	641800	34709
ENGINEERING CENTER	General Purpose Building	57665	1906080	94298
ENGLISH AND PHILOSOPHY	General Purpose Building	125000	1174800	68043
EXERCISE SCIENCES CENTER	General Purpose Building	47837	311760	20513
FISHERIES & WILDLIFE	General Purpose Building	8486	231000	13173
FOOD TECHNOLOGY				

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FOREIGN LANGUAGE	General Purpose Building	66858	566520	37155
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	339367	19475
HOLDEN HALL	General Purpose Building	176442	1449600	85253
HUMAN SCIENCES	General Purpose Building	175428	46402.25	55872
INDUSTRIAL ENGINEERING	General Purpose Building	28130	329520	20814
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	3216000	177072
LAW BUILDING	General Purpose Building	129043	2518560	127251
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	144958	9001
LIBRARY	General Purpose Building	303150	161826.53	114078
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	708720	41554
MASS COMMUNICATION	General Purpose Building	78586	784325	45138
MATHEMATICAL SCIENCES	General Purpose Building	67203	665680	41395
MECHANICAL ENGINEERING	General Purpose Building	88748	665680	41395
MUSEUM	Auxiliary Services	158266	131303.21	118660
MUSIC	General Purpose Building	106430	483218	30584
PETROLEUM ENGINEERING	General Purpose Building	69892	901200	48609
PHYSICAL PLANT	Physical Plant Buildings	106326	37254.5	39767
PSYCHOLOGY	General Purpose Building	39221	402126	24318
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	3670560	176349
SCIENCE	General Purpose Building	118544	15788.14	58672
SPORTS STUDIES CENTER	General Purpose Building	24264	173040	11388
STUDENT MEDIA BUILDING	General Purpose Building	19245	192075	11054
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1214080	63063
UNIVERSITY GREENHOUSE	General Purpose Building	21464	457920	24605
WEST HALL	General Purpose Building	83650	912480	52383

# ELECTRICITY (KWH)

Year 2005

Provider: Lubbock Power and Light

Estimated Rate: \$ .065/KWH

FACILITY NAME	FACILITY TYPE	AREA (SF	UTILITY USE	COST/YEAR
ADMINISTRATION	General Purpose Building	175428	1547760	101236
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	262240	17075
AGRICULTURAL PAVILION	General Purpose Building	7263	504800	32769
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	671680	43779
AGRICULTURE SCIENCES	General Purpose Building	43902	552240	35965
ARCHITECTURE	General Purpose building	175562	2128787.606	137658
ART	General Purpose Building	61392	744412.394	48137
BIOLOGY	General Purpose building	156219	3309600	216519
BUSINESS ADMINISTRATION	General Purpose Building	204495	2024880	132500
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	10374800	696848
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	723720	47107
CHEMICAL ENGINEERING	General Purpose Building	18776	409760	26705
CHEMISTRY	General Purpose Building	192980	4298400	282673
CIVIL ENGINEERING	General Purpose Building	91094	1012800	65910
DEVELOPMENT OFFICE	General Purpose Building	6594	907200	59520
DRANE HALL	General Purpose Building	75538	907200	59520
EDUCATION BUILDING (NEW)	General Purpose Building	91000	1043600	67922
ELECTRICAL ENGINEERING	General Purpose Building	98734	600000	38876
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	578200	37751
ENGINEERING CENTER	General Purpose Building	57665	1975200	129323
ENGLISH AND PHILOSOPHY	General Purpose Building	120000	1028000	66617
EXERCISE SCIENCES CENTER	General Purpose Building	47837	292640	19031
FISHERIES & WILDLIFE	General Purpose Building	8486	224880	14746
FOOD TECHNOLOGY	General Purpose Building	17400	504800	32769

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FOREIGN LANGUAGE	General Purpose Building	66858	582,360	37,861
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	671680	43779
HOLDEN HALL	General Purpose Building	178442	1478000	96396
HUMAN SCIENCES	General Purpose Building	175428	738000	47982
INDUSTRIAL ENGINEERING	General Purpose Building	28130	306480	19803
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	2848560	183404
LAW BUILDING	General Purpose Building	129043	2536480	165759
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	133920	8749
LIBRARY	General Purpose Building	303150	6010600	393587
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	609120	39939
MASS COMMUNICATION	General Purpose Building	78586	774686.3305	50498
MATHEMATICAL SCIENCES	General Purpose Building	67203	639760	41679
MECHANICAL ENGINEERING	General Purpose Building	88748	792960	51747
MUSEUM	Auxiliary Services	158266	4746640	310577
MUSIC	General Purpose Building	106430	702400	45664
PETROLEUM ENGINEERING	General Purpose Building	69892	913680	59359
PHYSICAL PLANT	Physical Plant Buildings	106326	1416600	92818
PSYCHOLOGY	General Purpose Building	39221	723720	47107
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	3655680	237674
SCIENCE	General Purpose Building	118544	1330400	86828
SPORTS STUDIES CENTER	General Purpose Building	24264	160320	10423
STUDENT MEDIA BUILDING	General Purpose Building	19245	189713.6695	12366
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1196480	78365
UNIVERSITY GREENHOUSE	General Purpose Building	21464	411900	26791
WEST HALL	General Purpose Building	83650	952000	62304

# NATURAL GAS (MMBTU)

Year 2003

Provider: Varies according to gas market price

Estimated Rate: \$ 4.7/MMBTU

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
ADMINISTRATION	General Purpose Building	113975	2040	9651
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	451	2134
AGRICULTURAL PAVILION	General Purpose Building	7263	130	615
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	478	2263
AGRICULTURE SCIENCES	General Purpose Building	43902	786	3718
ARCHITECTURE	General Purpose building	175562	3143	14867
ART	General Purpose Building	61392	1099	5199
BIOLOGY	General Purpose building	156219	2796	13229
BUSINESS ADMINISTRATION	General Purpose Building	204495	3661	17317
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	529931	139701
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	590	2791
CHEMICAL ENGINEERING	General Purpose Building	18776	336	1590
CHEMISTRY	General Purpose Building	192980	3454	16342
CIVIL ENGINEERING	General Purpose Building	91094	1631	7714
DEVELOPMENT OFFICE	General Purpose Building	6594	118	558
DRANE HALL	General Purpose Building	75538	1349	6381
EDUCATION BUILDING (NEW)	General Purpose Building	85000	1522	7198
ELECTRICAL ENGINEERING	General Purpose Building	98734	1767	8361
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	388	1834
ENGINEERING CENTER	General Purpose Building	57665	1032	4883
ENGLISH AND PHILOSOPHY	General Purpose Building	125000	1219	5767
EXERCISE SCIENCES CENTER	General Purpose Building	47837	856	4051
FISHERIES & WILDLIFE	General Purpose Building	8486	495	2339
FOOD TECHNOLOGY	General Purpose Building	17400	311	1473

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FOREIGN LANGUAGE	General Purpose Building	66858	1197	5662
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	152	719
HOLDEN HALL	General Purpose Building	176442	3194	15111
HUMAN SCIENCES	General Purpose Building	175428	3140	14855
INDUSTRIAL ENGINEERING	General Purpose Building	28130	504	2382
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	20416	115899
LAW BUILDING .	General Purpose Building	129043	2310	10927
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	252	1191
LIBRARY	General Purpose Building	303150	5427	25671
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	786	3720
MASS COMMUNICATION	General Purpose Building	78586	1407	6655
MATHEMATICAL SCIENCES	General Purpose Building	67203	1203	5691
MECHANICAL ENGINEERING	General Purpose Building	88748	1589	7515
MUSEUM	Auxiliary Services	158266	2833	13402
MUSIC	General Purpose Building	106430	1905	9013
PETROLEUM ENGINEERING	General Purpose Building	69892	1251	5918
PHYSICAL PLANT	Physical Plant Buildings	106326	1903	9004
PSYCHOLOGY	General Purpose Building	39221	702	3321
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	2337	11055
SCIENCE	General Purpose Building	118544	2122	10038
SPORTS STUDIES CENTER	General Purpose Building	24264	434	2055
STUDENT MEDIA BUILDING	General Purpose Building	19245	152	719
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1395	6600
UNIVERSITY GREENHOUSE	General Purpose Building	21464	384	1818
WEST HALL	General Purpose Building	83650	1332	6299

# NATURAL GAS (MMBTU)

Year 2004

Provider: Varies according to gas market price

Estimated Rate: \$ 6.1/MMBTU

FACILITY NAME	FACILITY TYPE	AREA (SF	UTILITY USI	E COST/YEAR
ADMINISTRATION	General Purpose Building	113975	2089	12481
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	462	2760
AGRICULTURAL PAVILION	General Purpose Building	7263	133	795
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	490	2927
AGRICULTURE SCIENCES	General Purpose Building	43902	805	4808
ARCHITECTURE	General Purpose building	175562	3217	19225
ART	General Purpose Building	61392	1125	6723
BIOLOGY	General Purpose building	156219	2863	17107
BUSINESS ADMINISTRATION	General Purpose Building	204495	3748	22394
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	739017	4083410
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	604	3609
CHEMICAL ENGINEERING	General Purpose Building	18776	344	2056
CHEMISTRY	General Purpose Building	192980	3537	21133
CIVIL ENGINEERING	General Purpose Building	91094	1669	9976
DEVELOPMENT OFFICE	General Purpose Building	6594	121	722
DRANE HALL	General Purpose Building	75538	1381	8252
EDUCATION BUILDING (NEW)	General Purpose Building	85000	1558	9308
ELECTRICAL ENGINEERING	General Purpose Building	98734	1809	10812
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	397	2372
ENGINEERING CENTER	General Purpose Building	57665	1057	6315
ENGLISH AND PHILOSOPHY	General Purpose Building	125000	1248	7457
EXERCISE SCIENCES CENTER	General Purpose Building	47837	877	5239
FISHERIES & WILDLIFE	General Purpose Building	8486	506	3025
FOOD TECHNOLOGY	General Purpose Building	17400	319	1905

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FOREIGN LANGUAGE	General Purpose Building	66858	1225	7321
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	156	929
HOLDEN HALL	General Purpose Building	176442	3270	19541
HUMAN SCIENCES	General Purpose Building	175428	3215	19211
INDUSTRIAL ENGINEERING	General Purpose Building	28130	516	3080
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	23081	150673
LAW BUILDING	General Purpose Building	129043	2365	14131
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	258	1540
LIBRARY	General Purpose Building	303150	5556	33197
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	805	4811
MASS COMMUNICATION	General Purpose Building	78586	1440	8606
MATHEMATICAL SCIENCES	General Purpose Building	67203	1232	7359
MECHANICAL ENGINEERING	General Purpose Building	88748	1626	9719
MUSEUM	Auxiliary Services	158266	2900	17331
MUSIC	General Purpose Building	106430	1950	11655
PETROLEUM ENGINEERING	General Purpose Building	69892	1281	7654
PHYSICAL PLANT	Physical Plant Buildings	106326	1949	11644
PSYCHOLOGY	General Purpose Building	39221	719	4295
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	2392	14296
SCIENCE	General Purpose Building	118544	2172	12981
SPORTS STUDIES CENTER	General Purpose Building	24264	445	2657
STUDENT MEDIA BUILDING	General Purpose Building	19245	156	929
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1428	8535
UNIVERSITY GREENHOUSE	General Purpose Building	21464	393	2350
WEST HALL	General Purpose Building	83650	1363	8146

# NATURAL GAS (MMBTU)

Year 2005

Provider: Varies according to gas market price

Estimated Rate: \$ 6.83/MMBTU

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
ADMINISTRATION	General Purpose Building	175428	3245	410
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	466	59
AGRICULTURAL PAVILION	General Purpose Building	7263	134	17
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	486	61
AGRICULTURE SCIENCES	General Purpose Building	43902	812	103
ARCHITECTURE	General Purpose building	175562	3248	410
ART	General Purpose Building	61392	1136	143
BIOLOGY	General Purpose building	156219	2890	365
BUSINESS ADMINISTRATION	General Purpose Building	204495	3783	478
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	1494	189
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	610	77
CHEMICAL ENGINEERING	General Purpose Building	18776	347	44
CHEMISTRY	General Purpose Building	192980	3570	451
CIVIL ENGINEERING	General Purpose Building	91094	1685	213
DEVELOPMENT OFFICE	General Purpose Building	6594	122	15
DRANE HALL	General Purpose Building	75538	1397	176
EDUCATION BUILDING (NEW)	General Purpose Building	91000	1683	213
ELECTRICAL ENGINEERING	General Purpose Building	98734	1826	231
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	401	51
ENGINEERING CENTER	General Purpose Building	57665	1067	135
ENGLISH AND PHILOSOPHY	General Purpose Building	120000	2220	280
EXERCISE SCIENCES CENTER	General Purpose Building	47837	885	112
FISHERIES & WILDLIFE	General Purpose Building	8486	157	20
FOOD TECHNOLOGY	General Purpose Building	17400	322	41

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FOREIGN LANGUAGE	General Purpose Building	66858	1237	156
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	511	65
HOLDEN HALL	General Purpose Building	178442	3301	417
HUMAN SCIENCES	General Purpose Building	175428	3245	410
INDUSTRIAL ENGINEERING	General Purpose Building	28130	520	66
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	2023	255
LAW BUILDING	General Purpose Building	129043	2387	301
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	260	33
LIBRARY	General Purpose Building	303150	5608	708
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	813	103
MASS COMMUNICATION	General Purpose Building	78586	1454	184
MATHEMATICAL SCIENCES	General Purpose Building	67203	1243	157
MECHANICAL ENGINEERING	General Purpose Building	88748	1642	207
MUSEUM	Auxiliary Services	158266	2928	370
MUSIC	General Purpose Building	106430	1969	249
PETROLEUM ENGINEERING	General Purpose Building	69892	1293	163
PHYSICAL PLANT	Physical Plant Buildings	106326	1967	248
PSYCHOLOGY	General Purpose Building	39221	726	92
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	2415	305
SCIENCE	General Purpose Building	118544	2193	277
SPORTS STUDIES CENTER	General Purpose Building	24264	449	57
STUDENT MEDIA BUILDING	General Purpose Building	19245	356	45
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1442	182
UNIVERSITY GREENHOUSE	General Purpose Building	21464	397	50
WEST HALL	General Purpose Building	83650	1547	195

# WATER (MGAL)

Year 2003

Provider: City of Lubbock Estimated Rate: \$ 4.8/MGAL

FACILITY NAME	FACILITY TYPE		) UTILITY USI	
ADMINISTRATION	General Purpose Building	113975	1549	5551
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	343	1228
AGRICULTURAL PAVILION	General Purpose Building	7263	99	354
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	343	1228
AGRICULTURE SCIENCES	General Purpose Building	43902	597	2138
ARCHITECTURE	General Purpose building	175562	2386	8551
ART	General Purpose Building	61392	835	2990
BIOLOGY	General Purpose building	156219	2124	7608
BUSINESS ADMINISTRATION	General Purpose Building	204495	2780	9960
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	1098	3934
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	448	1605
CHEMICAL ENGINEERING	General Purpose Building	18776	255	914
CHEMISTRY	General Purpose Building	192980	2623	9399
CIVIL ENGINEERING	General Purpose Building	91094	1238	4437
DEVELOPMENT OFFICE	General Purpose Building	6594	90	321
DRANE HALL	General Purpose Building	75538	1024	3670
EDUCATION BUILDING (NEW)	General Purpose Building	85000	1155	4140
ELECTRICAL ENGINEERING	General Purpose Building	98734	1342	4809
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	294	1055
ENGINEERING CENTER	General Purpose Building	57665	784	2809
ENGLISH AND PHILOSOPHY	General Purpose Building	125000	926	3317
EXERCISE SCIENCES CENTER	General Purpose Building	47837	650	2330
FISHERIES & WILDLIFE	General Purpose Building	8486	376	1345
FOOD TECHNOLOGY	General Purpose Building	17400	237	847

FACILITY NAME	FACILITY TYPE	AREA (SF	) UTILITY US	E COST/YEAR
FOREIGN LANGUAGE	General Purpose Building	66858	909	3256
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	115	413
HOLDEN HALL	General Purpose Building	176442	2426	8691
HUMAN SCIENCES	General Purpose Building	175428	2385	8544
INDUSTRIAL ENGINEERING	General Purpose Building	28130	382	1370
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	1487	5327
LAW BUILDING	General Purpose Building	129043	1754	6285
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	191	685
LIBRARY	General Purpose Building	303150	4121	14765
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	597	2140
MASS COMMUNICATION	General Purpose Building	78586	1068	3827
MATHEMATICAL SCIENCES	General Purpose Building	67203	914	3273
MECHANICAL ENGINEERING	General Purpose Building	88748	1206	4322
MUSEUM	Auxiliary Services	158266	2151	7708
MUSIC	General Purpose Building	106430	1447	5184
PETROLEUM ENGINEERING	General Purpose Building	69892	950	3404
PHYSICAL PLANT	Physical Plant Buildings	106326	1445	5178
PSYCHOLOGY	General Purpose Building	39221	533	1910
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	1775	6358
SCIENCE	General Purpose Building	118544	1611	5774
SPORTS STUDIES CENTER	General Purpose Building	24264	330	1182
STUDENT MEDIA BUILDING	General Purpose Building	19245	115	413
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1060	3796
UNIVERSITY GREENHOUSE	General Purpose Building	21464	292	1045
WEST HALL	General Purpose Building	83650	1011	3623

## WATER (MGAL)

Year 2004

Provider: City of Lubbock Estimated Rate: \$ 5.06/MGAL

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
ADMINISTRATION	General Purpose Building	175428	3472	17567
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	499	2524
AGRICULTURAL PAVILION	General Purpose Building	7263	144	727
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	520	2631
AGRICULTURE SCIENCES	General Purpose Building	43902	869	4396
ARCHITECTURE	General Purpose building	175562	3474	17580
ART	General Purpose Building	61392	1215	6148
BIOLOGY	General Purpose building	156219	3092	15643
BUSINESS ADMINISTRATION	General Purpose Building	204495	4047	20478
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	1598	8088
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	652	3300
CHEMICAL ENGINEERING	General Purpose Building	18776	372	1880
CHEMISTRY	General Purpose Building	192980	3819	19325
CIVIL ENGINEERING	General Purpose Building	91094	1803	9122
DEVELOPMENT OFFICE	General Purpose Building	6594	130	660
DRANE HALL	General Purpose Building	75538	1495	7564
EDUCATION BUILDING (NEW)	General Purpose Building	91000	1801	9113
ELECTRICAL ENGINEERING	General Purpose Building	98734	1954	9887
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	429	2169
ENGINEERING CENTER	General Purpose Building	57665	1141	5774
ENGLISH AND PHILOSOPHY	General Purpose Building	120000	2375	12017
EXERCISE SCIENCES CENTER	General Purpose Building	47837	947	4790
FISHERIES & WILDLIFE	General Purpose Building	8486	168	850
FOOD TECHNOLOGY	General Purpose Building	17400	344	1742

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FOREIGN LANGUAGE	General Purpose Building	66858	1323	6695
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	547	2766
HOLDEN HALL	General Purpose Building	178442	3531	17869
HUMAN SCIENCES	General Purpose Building	175428	3472	17567
INDUSTRIAL ENGINEERING	General Purpose Building	28130	557	2817
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	2165	10953
LAW BUILDING	General Purpose Building	129043	2554	12922
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	278	1408
LIBRARY	General Purpose Building	303150	5999	30357
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	869	4399
MASS COMMUNICATION	General Purpose Building	78586	1555	7869
MATHEMATICAL SCIENCES	General Purpose Building	67203	1330	6730
MECHANICAL ENGINEERING	General Purpose Building	88748	1756	8887
MUSEUM	Auxiliary Services	158266	3132	15848
MUSIC	General Purpose Building	106430	2106	10658
PETROLEUM ENGINEERING	General Purpose Building	69892	1383	6999
PHYSICAL PLANT	Physical Plant Buildings	106326	2104	10647
PSYCHOLOGY	General Purpose Building	39221	776	3927
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	2584	13073
SCIENCE	General Purpose Building	118544	2346	11871
SPORTS STUDIES CENTER	General Purpose Building	24264	480	2430
STUDENT MEDIA BUILDING	General Purpose Building	19245	381	1927
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1542	7805
UNIVERSITY GREENHOUSE	General Purpose Building	21464	425	2149
WEST HALL	General Purpose Building	83650	1655	8377

## WATER (MGAL)

Year 2005

Provider: City of Lubbock Estimated Rate: \$ 5.06/MGAL

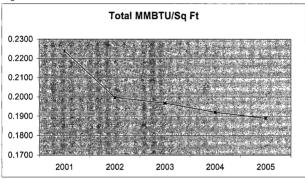
FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
ADMINISTRATION	General Purpose Building	175428	3800	19227
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	546	2762
AGRICULTURAL PAVILION	General Purpose Building	7263	157	796
AGRICULTURAL PLANT SCIENCES	General Purpose Building	26275	569	2880
AGRICULTURE SCIENCES	General Purpose Building	43902	951	4812
ARCHITECTURE	General Purpose building	175562	3803	19242
ART	General Purpose Building	61392	1330	6729
BIOLOGY	General Purpose building	156219	3384	17122
BUSINESS ADMINISTRATION	General Purpose Building	204495	4429	22413
CENTRAL HTG & COOLING PLANT 1	Physical Plant Buildings	80766	1749	8852
CHARLES E. MAEDGEN, JR. THEATER	General Purpose Building	32958	714	3612
CHEMICAL ENGINEERING	General Purpose Building	18776	407	2058
CHEMISTRY	General Purpose Building	192980	4180	21151
CIVIL ENGINEERING	General Purpose Building	91094	1973	9984
DEVELOPMENT OFFICE	General Purpose Building	6594	143	723
DRANE HALL	General Purpose Building	75538	1636	8279
EDUCATION BUILDING (NEW)	General Purpose Building	91000	1971	9974
ELECTRICAL ENGINEERING	General Purpose Building	98734	2139	10821
ENGINEERING & TECHNOLOGY LABS	General Purpose Building	21657	469	2374
ENGINEERING CENTER	General Purpose Building	57665	1249	6320
ENGLISH AND PHILOSOPHY	General Purpose Building	120000	2599	13152
EXERCISE SCIENCES CENTER	General Purpose Building	47837	1036	5243
FISHERIES & WILDLIFE	General Purpose Building	8486	184	930
FOOD TECHNOLOGY	General Purpose Building	17400	377	1907

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
FOREIGN LANGUAGE	General Purpose Building	66858	1448	7328
GODDARD RANGE & WILDLIFE MGT	General Purpose Building	27625	598	3028
HOLDEN HALL	General Purpose Building	178442	3865	19557
HUMAN SCIENCES	General Purpose Building	175428	3800	19227
INDUSTRIAL ENGINEERING	General Purpose Building	28130	609	3083
INTERNATIONAL TEXTILE CENTER	General Purpose Building	109376	2369	11988
LAW BUILDING	General Purpose Building	129043	2795	14143
LEN & HARRIET MCCLELLAN MEMORIAL	General Purpose Building	14062	305	1541
LIBRARY	General Purpose Building	303150	6566	33226
LIVESTOCK ARENA & MEAT LAB	General Purpose Building	43931	952	4815
MASS COMMUNICATION	General Purpose Building	78586	1702	8613
MATHEMATICAL SCIENCES	General Purpose Building	67203	1456	7366
MECHANICAL ENGINEERING	General Purpose Building	88748	1922	9727
MUSEUM	Auxiliary Services	158266	3428	17346
MUSIC	General Purpose Building	106430	2305	11665
PETROLEUM ENGINEERING	General Purpose Building	69892	1514	7660
PHYSICAL PLANT	Physical Plant Buildings	106326	2303	11653
PSYCHOLOGY	General Purpose Building	39221	850	4299
ROBERT H. EWALT STUDENT REC CE	Auxiliary Services	130546	2828	14308
SCIENCE	General Purpose Building	118544	2568	12993
SPORTS STUDIES CENTER	General Purpose Building	24264	526	2659
STUDENT MEDIA BUILDING	General Purpose Building	19245	417	2109
SW COLL/SPEC COLLECTIONS LIBRA	General Purpose Building	77943	1688	8543
UNIVERSITY GREENHOUSE	General Purpose Building	21464	465	2352
WEST HALL	General Purpose Building	83650	1812	9168

### VIII. SAVINGS MONITORING AND EVALUATION PLAN

The monitoring and evaluation plan currently tracks the consumption pattern for electricity, natural gas, steam, and chilled-water. A summary graph (Figure 8.1) shows the energy consumption per year per square foot of building space. The chart shows a continuous reduction in energy consumption per square foot as result of the energy savings measures implemented in the last five-year period. This chart is updated monthly to track campus energy consumption and gage the effectiveness of the Energy Conservation Program.

Figure 8.1



#### IX. PROJECT IMPLEMENTATION HPDATE

This section enumerates the different energy savings measures detected during the preliminary utility audits that has been implemented to the date. The format describes the measure and its completion date per university building following the preliminary utility audits schedule. The preliminary utility audits schedule was divided in three phases. Each phase contained a group of university buildings that totalized about 95% of the university total square-footage. The measures implemented during the preliminary utility audit schedule were:

- Lighting retrofit
- Independent AHUs
- AHU's set up
- VFD's installation
- Energy awareness plan

The implementation projects of these measures were financially evaluated considering their net present value and payback period. This section includes the financial calculation (costs and savings) per project and their funding sources.

### Lighting Retrofit

The lighting retrofit program consisted mainly in the replacement of lamps, ballasts, and fixtures for more efficient energy and illumination equipment. The program included 36 buildings.

### Independent AHUs

This measure consisted in the installation of small air conditioning units on selected server rooms with the purpose of reducing the operation time of big AHUs previously serving the rooms. This measure was implemented in 5 buildings.

#### AHU's set up

This measure consisted in the revision and update, when required, of the following settings:

- AHU reset schedule set up
- AHU economizer mode set up
- AHU operation schedule

#### VFD's installation

This measure consisted in the identification of an AHU's motor (fan and/or pump) that presented significant energy savings when installing a VFD that allowed the reduction of the motor operation while controlling its speed.

## **Energy Awareness Plan**

The energy awareness plan is implemented as a continuous process aimed to preserve an energy savings culture among the university community and continuously support the energy management plan.

# PROJECT IMPLEMENTATION UPDATE FOR ENERGY SAVING MEASURES Preliminary Utility Audits – Phase I

Administration		
Measures	Completion date	
Reset schedule adjustment	02/14/03 (Completed)	
Economizer setpoint adjustment		
Lighting retrofit	August 2003 (Completed)	

Architecture		
Measures	Completion date	
Reset schedule adjustment	10/30/02 (Completed)	
Economizer setpoint adjustment		
Lighting retrofit	11/13/02 (Completed)	
Independent HVAC unit installation	08/31/03 (Completed)	

	Art
Measures	Completion date
Reset schedule adjustment	02/21/03 (Completed)
Economizer setpoint adjustment	
Lighting retrofit	August 2003 (Completed)

Biology		
Measures	Completion date	
AHUs operation schedule update	02/28/03 (Completed)	
Lighting retrofit	01/29/03 (Completed)	

Business Administration			
Measures Completion date			
Reset schedule adjustment	03/21/03 (Completed)		
Economizer setpoint adjustment			
Lighting retrofit	11/16/02 (Completed)		

Chemistry		
Measures	Completion date	
Reset schedule adjustment	04/04/03 (Completed)	
Lighting retrofit	11/14/02 (Completed)	

Civil Engineering		
Measures	Completion date	
Reset schedule adjustment	04/11/03 (Completed)	
AHUs operation schedule update	02/28//03 (Completed)	
Lighting retrofit	August 2003 (Completed)	

Doak Hall	
Measures	Completion date
Independent HVAC unit installation	12/30/02 (Completed)

Drane Hall	
Measures	Completion date
Reset schedule adjustment	05/16/03 (Completed)
Lighting retrofit	01/31/03 (Completed)

Electrical Engineering	
Measures	Completion date
Reset schedule adjustment	04/25/03 (Completed)
Lighting retrofit	August 2003 (Completed)
Electric heaters replacement	Not replaced
-	Negative Net Present Value

Engineering Center	
Measures	Completion date
Reset schedule adjustment	05/02/03 (Completed)
Lighting retrofit	August 2003 (Completed)
Electric heaters replacement	Not replaced
•	Negative Net Present Value

Foreign Language	
Measures	Completion date
Reset schedule adjustment	05/30/03 (Completed)
Lighting retrofit	12/05/02 (Completed)

Holden Hall	
Measures	Completion date
Reset schedule adjustment	06/13/03 (Completed)
Lighting retrofit	12/18/03 (Completed)

Human Sciences	
Measures	Completion date
Reset schedule adjustment	06/20/03 (Completed)
AHUs operation schedule update	02/28/03 (Completed)
Lighting retrofit	01/09/03 (Completed)
VFD installation on AHU's fans	04/30/03 (Completed)

Law	
Measures	Completion date
Reset schedule adjustment	07/04/03 (Completed)
Independent HVAC unit installation	12/30/02 (Completed)
Lighting retrofit	August 2003 (Completed)

Library	
Measures	Completion date
Reset schedule adjustment	07/18/03 (Completed)

Mass Communication	
Measures	Completion date
Reset schedule adjustment	07/31/03 (Completed)
Lighting retrofit	12/18/03 (Completed)

Mathematics	
Measures	Completion date
Reset schedule adjustment	08/08/03 (Completed)
AHUs operation schedule update	08/30/03 9Completed)

Mechanical Engineering	
Measures	Completion date
Reset schedule adjustment	10/03/03 (Completed)
AHUs operation schedule update	08/30/03 (Completed)
Lighting retrofit	10/14/03 (Completed)

Music	
Measures	Completion date
Reset schedule adjustment	08/15/03 (Completed)
Lighting retrofit	02/10/03 (Completed)

Petroleum Engineering	
Measures	Completion date
Reset schedule adjustment	08/22/03 (Completed)
Lighting retrofit	August 2003 (Completed)

Physical Plant	
Measures	Completion date
Reset schedule adjustment	08/29/03 (Completed)
Lighting retrofit	12/12/02 (Completed)

Science	
Measures	Completion date
Reset schedule adjustment	09/05/03 (Completed)
Economizer set point adjustment (AHU 6)	
Independent HVAC unit installation	Not installed
•	Large Payback Period
Lighting retrofit	01/12/03 (Completed)

Southwest Collection	
Measures	Completion date
Reset schedule adjustment	09/12/03 (Completed)

West Hall	
Measures	Completion date
Reset schedule adjustment	09/26/03 (Completed)
Lighting retrofit	10/8/03 (Completed)

## Preliminary Utility Audits - Phase II

Administrative Support Center	
Measures	Completion date
Reset schedule adjustment	04/02/04 (Completed)
Economizer set point adjustment	` • ′

Agricultural Education and Communications	
Measures	Completion date
Reset schedule adjustment	10/03/03 (Completed)
Economizer set point adjustment	, , ,
Lighting retrofit	01/31/03 (Completed)

Agricultural Pavilion	
Measures	Completion date
Reset schedule adjustment	10/10/03 (Completed)
Economizer set point adjustment	, , ,
Lighting retrofit	August 2003 (Completed)

Agricultural Plant Sciences	
Measures	Completion date
Reset schedule adjustment	10/17/03 (Completed)
Economizer set point adjustment	

Agricultural Sciences	
Measures	Completion date
Reset schedule adjustment	10/24/03 (Completed)
Economizer set point adjustment	
Lighting retrofit	01/30/03 (Completed)

Central Heating and Cooling Plant I	
Measures	Completion date
Reset schedule adjustment	04/23/04 (Completed)
Economizer set point adjustment	

Charles Maedgen Theater	
Measures	Completion date
Reset schedule adjustment	12/12/03 (Completed)
Economizer set point adjustment	
Lighting retrofit	August 2003 (Completed)

Chemical Engineering	
Measures	Completion date
Reset schedule adjustment	02/06/04 (Completed)
Economizer set point adjustment	
Lighting retrofit	August 2003 (Completed)

Development Office	
Measures	Completion date
Reset schedule adjustment	04/30/04 (Completed)
Economizer set point adjustment	, , ,
Lighting retrofit	August 2003 (Completed)

Education	
Measures	Completion date
Reset schedule adjustment	04/23/04 (Completed)
Economizer set point adjustment	

Engineering and Technology Labs	
Measures	Completion date
Reset schedule adjustment	10/31/03 (Completed)
Economizer set point adjustment	

English & Philosophy	
Measures	Completion date
Reset schedule adjustment	04/30/04 (Completed)
Economizer set point adjustment	

Exercise Science Center	
Measures	Completion date
Reset schedule adjustment	02/27/04 (Completed)
Economizer set point adjustment	

Fisheries and Wildlife	
Measures	Completion date
Reset schedule adjustment	11/07/03 (Completed)
Economizer set point adjustment	
Lighting retrofit	August 2003 (Completed)

Food Technology		
Measures	Completion date	
Reset schedule adjustment	11/14/03 (Completed)	
Economizer set point adjustment		
Lighting retrofit	01/30/03 (Completed)	

Industrial Engineering	
Measures	Completion date
Reset schedule adjustment	02/13/04 (Completed)
Economizer set point adjustment	
Lighting retrofit	August 2003 (Completed)
AHUs operation schedule update	August 2003 (Completed)

International Cultural Center	
Measures	Completion date
Reset schedule adjustment	04/09/04 (Completed)
Economizer set point adjustment	

International Textile Center	
Measures	Completion date
Reset schedule adjustment	04/16/04 (Completed)
Economizer set point adjustment	

Journalism	
Measures	Completion date
Reset schedule adjustment	01/30/04 (Completed)
Economizer set point adjustment	
Lighting retrofit	02/03/03 (Completed)

Livestock Arena & Meat Lab	
Measures	Completion date
Reset schedule adjustment	11/21/03 (Completed)
Economizer set point adjustment	
Lighting retrofit	August 2003 (Completed)

McClellan Memorial	
Measures Completion date	
Reset schedule adjustment	12/05/03 (Completed)
Economizer set point adjustment	
Lighting retrofit	August 2003 (Completed)

Museum	
Measures	Completion date
Reset schedule adjustment	11/28/03 (Completed)
Economizer set point adjustment	

Psychology	
Measures	Completion date
Reset schedule adjustment	01/23/04 (Completed)
Economizer set point adjustment	
Lighting retrofit	02/06/03 (Completed)
AHUs operation schedule update	08/30/03 (Completed)

Sport Studies Center	
Measures	Completion date
Reset schedule adjustment	03/05/04 (Completed)
Economizer set point adjustment	` • • · ·

University Greenhouse	
Measures	Completion date
Reset schedule adjustment	03/19/04 (Completed)
Economizer set point adjustment	

University Police	
Measures	Completion date
Reset schedule adjustment	03/26/04 (Completed)
Economizer set point adjustment	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \

# Preliminary Utility Audits - Phase III

Engineering & Technology Labs	
Measures	Completion date
Reset schedule adjustment	05/07/04 (Completed)
Economizer set point adjustment	

Engineering Center	
Measures	Completion date
Reset schedule adjustment	05/14/04 (Completed)
Economizer set point adjustment	

English & Philosophy	
Measures	Completion date
Independent HVAC unit	07/30/04 (Completed)

Fisheries & Wildlife Management	
Measures	Completion date
Reset schedule adjustment	05/21/04 (Completed)
Economizer set point adjustment	

KTXT - TV		
Measures	Completion date	
Reset schedule adjustment	05/28/04 (Completed)	
Economizer set point adjustment		

Texas Tech Plaza		
Measures Completion date		
Reset schedule adjustment	06/04/04 (Completed)	
Economizer set point adjustment		

## Energy Awareness Plan

Main Campus			
Measures	Completion date		
President's letters on energy savings	Continuous Process		
Brochures development			
Rescheduling solicitude letters			
TechAnnounce energy tips			
Energy savings ideas on monthly safety meeting			
Energy committee to develop energy saving ideas			

### FUNDING SOURCE FOR ENERGY SAVINGS MEASURES IMPLEMENTED - 2003

BUILDING	PROJECT	FUNDING SOURCE	DEBIT	CREDIT	BALANCE
		Annual Energy Improvement Allocation			
		(Initial Balance)		\$4,400.00	\$4,400.00
		Annual Energy Improvement Allocation		\$35,000.00	\$39,400.00
		Loanstar Loan		\$1,591,565.00	
Main Campus	Lighting Project	Loanstar Loan	\$1,591,565.00		
Architecture	Independent AC Unit	Annual Energy Improvement Allocation	\$7,130.00		\$14,807.35
Doak	Independent AC Unit	Annual Energy Improvement Allocation	\$9,300.00		\$5,507.35
Human Science	VFD Installation	Annual Energy Improvement Allocation	\$4,443.00		\$34,957.00
Law	Independent AC Unit	Annual Energy Improvement Allocation	\$1,765.78		\$21,937.35
Science	Independent AC Unit	Annual Energy Improvement Allocation	\$11,253.87		\$23,703.13
Main Campus	Recommissioning	Physical Plant Overhead	\$5,000.00		\$507.35

### FUNDING SOURCE FOR ENERGY SAVINGS MEASURES IMPLEMENTED - 2004

BUILDING	PROJECT	FUNDING SOURCE DEBIT	CREDIT	BALANCE
		Annual Energy Improvement Allocation		
		(Initial Balance)	\$507.35	\$507.35
		Annual Energy Improvement Allocation	\$35,000.00	\$35,507.35
English/Philosop	hy Independent AC Unit	Annual Energy Improvement Allocation \$34,600.00		\$907.35
Main Campus	Recommissioning	Physical Plant Overhead/Annual Allocation \$500.00		\$407.35

# PROJECT IMPLEMENTATION UPDATE - SAVINGS ESTIMATION Installation of individual air conditioning units and reschedule of air handling units

## English & Phylosophy Building

AHU 3E (50 H	P)	Old Daily Operation Schedule (Hours):	24
		New Daily Operation Schedule (Hours):	12
AHU Equip	ment use (Hours x week) HP	Fan Electricity Consumption (KWH/Semester)	167535
BASE 55.00	20	Building Electricity Consumption Cost (\$/KWH)	0.05
A01E 55.00	40	Building Steam Consumption (MMBTU/Semester)	2579.28
A01W 76.00	40	Building Steam Consumption Cost (\$/MMBTU)	7.48
A02E 60.00	40	Building Chilled Water Consumption (TON-Hour/Semester	)157533.66
A02W 50.00	40	Building Chilled Water Consumption Cost (\$/TON-Hour)	0.11
A03E 120.00	50	Total Building Savings (\$/Semester)	7345.42
A03W 75.00	50		
A04E 60.00	30		
A04W 60	40		
TOTAL 611.0	290		

# PROJECT IMPLEMENTATION UPDATE - FINANCIAL EVALUATION Installation of individual air conditioning units and reschedule of air handling units

### English and Philosophy

Net Investment

Individual units cost 8000

Savings (\$/Year)

Total Savings (\$/Year) 14690.84 \* Present Value of Savings 61877.82

Net Present Value 53877.82

Internal Rate of Return

PVIFA(r,5) 0.544557 r (aprox) 182.00%

Payback Period 0.544557

<sup>\*</sup> A 5-year individual unit useful life is considered to estimate the PV of savings. Interest rate (6%) is based on Government treasury bills rate. PV(savings)=savings x year\*PVIF(6%,5)

# PROJECT IMPLEMENTATION UPDATE - COST BREAK DOWN Preliminary Utility Audits - Phase I

Administration			COST 2003
	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$66,561.40
Architecture	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$102,528.21
	Installation of small unit	Energy Allocation	\$7,130.00
Art	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$35,852.93
Biology	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$91,231.90
Business Administration	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$119,425.08
Chemistry	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$112,700.32
Civil Engineering	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$53,198.90
Doak Hall	Installation of small unit	Energy Allocation	\$9,300.00
Drane Hall	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$44,009.07
Electrical Engineering	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$57,660.66
Engineering Center	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$33,676.36
Foreign Languages	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$39,045.07
Holden Hall	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$104,210.13
Human Sciences	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$102,449.95
	Installation of VFDs	Energy Allocation	\$4,443.00
Law	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$75,361.11
	Installation of small unit	Energy Allocation	\$1,766.00
Library	Recommissioning	Physical Plant Overhead	\$98.00
Mass Communication	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$45,894.22
Mathematical Sciences	Recommissioning	Physical Plant Overhead	\$98.00
Mamemancal Sciences			
Mathematical Sciences Mechanical Engineering	Recommissioning	Physical Plant Overhead	\$98.00

BUILDING	MEASURE	BUDGET	COST 2003
Music	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$62,155.12
Petroleum Engineering	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$40,816.93
Physical Plant	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$62,094.38
Science	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$69,229.70
	Installation of small uni	t Energy Allocation	\$11,254.00
Southwest Collection	Recommissioning	Physical Plant Overhead	\$98.00
West Hall	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$43,442.59
		-	\$1,449,617.86

# PROJECT IMPLEMENTATION UPDATE - COST BREAK DOWN Preliminary Utility Audits - Phase II

BUILDING	MEASURE	BUDGET	COST 2003
Administrative Support Center	Recommissioning	Physical Plant Overhead	\$98.00
Agricultural Education and Comm	. Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$14,719.14
Agricultural Pavilion	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$4,241.59
Agricultural Plant Sciences	Recommissioning	Physical Plant Overhead	\$98.00
Agricultural Sciences	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$25,638.77
Athletic Training Center	Recommissioning	Physical Plant Overhead	\$98.00
Central Heating and Cooling Plant	Recommissioning	Physical Plant Overhead	\$98.00
Charles Maedgen Theater	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$19,247.47
Chemical Engineering	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$10,965.18
Development Office	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$3,850.90
Education	Recommissioning	Physical Plant Overhead	\$98.00
Engineering and Technology Labs	Recommissioning	Physical Plant Overhead	\$98.00
English and Philosophy	Recommissioning	Physical Plant Overhead	\$98.00
Exercise Science Center	Recommissioning	Physical Plant Overhead	\$98.00
Fisheries and Wildlife	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$4,955.82
Food Technology	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$10,161.60
Industrial Engineering	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$16,427.92
International Cultural Center	Recommissioning	Physical Plant Overhead	\$98.00
International Textile Center	Recommissioning	Physical Plant Overhead	\$98.00
Journalism	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$11,239.08
Livestock Arena and Meat Lab	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$25,655.70
Mcclellan Memorial	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$8,212.21
Museum	Recommissioning	Physical Plant Overhead	\$98.00
Psychology	Recommissioning	Physical Plant Overhead	\$98.00
	Lighting retrofit	Loanstar Loan	\$22,905.06
Sport Studies Center	Recommissioning	Physical Plant Overhead	\$98.00

BUILDING	MEASURE	BUDGET	COST 2003
University Greenhouse	Recommissioning	Physical Plant Overhead	\$98.00
University Police	Recommissioning	Physical Plant Overhead	\$98.00
			\$180,866.45

# PROJECT IMPLEMENTATION UPDATE - COST BREAK DOWN Preliminary Utility Audits - Phase III

BUILDING	MEASURE	BUDGET	COST 2004
Engineering and Technology La	bs Recommissioning	Physical Plant Overhead	\$98.00
Engineering Center	Recommissioning	Physical Plant Overhead	\$98.00
English and Philosophy	Independent AC Unit	Energy Allocation	\$34,600.00
Fisheries and Wildlife Mgmt.	Recommissioning	Physical Plant Overhead	\$98.00
KTXT - TV	Recommissioning	Physical Plant Overhead	\$98.00
Texas Tech Plaza	Recommissioning	Physical Plant Overhead	\$98.00
			\$35,000,00

## X. Fleet Fuel Management Plan (Vehicles)

In FY2004 the Texas Tech University vehicle fleet consumed 201,186 gallons of fuel and traveled 2,279,692 miles. In FY2005 the Texas Tech University reduced consumption to 196,059 gallons of fuel, a reduction of 2.5%. The agency determined goal for FY2006 is 5% or 186,256 gallons. The estimated efficiency, in miles per gallons (mpg) required will be approximately 12.4. Tactics necessary to achieve this goal are:

- Improve overall fuel efficiency of fleet vehicles by replacing older, inefficient vehicles with newer, more efficient vehicles.
- Continue the aggressive Preventative Maintenance program to maintain all vehicles at their peak efficiency.
- 3) Continue to utilize the State's Fleet Data Management System.
- 4) Educate personnel on the efficient use of University vehicles.
- 5) Document agency best practices for operation and maintenance.

The tables below indicate the size, age and efficiency of the University fleet.

Table I. University Vehicle Fleet

Vehicle Age	FY04 TTL	FY05 TTL
6 years or less	142	169
7 - 14 years	123	121
15 - 24 years	117	101
25 years or greater	10	9
Totals	392	400

Table II. Historical University Vehicle Fleet Efficiency

MPG	1st Q	2nd Q	3rd Q	4th Q	Annual
FY 04	10.0	11.5	12.5	11.7	11.3
FY 05	11.7	10.8	11.9	12.6	11.8