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 UTILITY 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^2	KWH/ft^2	$\$/ft^2$	$/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
* This is the only utility currently metered per building.

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	1/8/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	ART	Texas Tech university/Lubbock, Tx
Facility Name	Building (s) name	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
61392	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12	1300	64%	4	70	3%	0	0	0%
Date (b) Occupied	SAT	6	150	6%	0	0	0%	0	0	0%
1970	SUN	6	70	3%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes __X__ No ____

EMS
(g) Yes __X__ No ____

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ____
4. Building has exterior floodlighting	Yes X	No ____

5 List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) ART (a) Building Size(s)(Gross Sq. Ft.): 61,392

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MCF (dd)	NATURAL GAS COST $ (ee)	$/MCF (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
	(1)	Avg.	(2)		Avg.	(3)		Avg.		(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	##########	KWH x 0.0116	=	13,694.60	MMBTU
(pp) Nat. Gas	1,267.40	MCF x 1.03	=	1,305.42	MMBTU
(qq1) Steam/Hot Water	3,701.31	MMBTU x 1.0	=	3,701.31	MMBTU
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU
(rr) Chilled Water	313,340.54	TON HRS x 0.012	=	3,760.09	MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(tt) Other Fuel	-	x	=	-	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		22,461.41	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI =	Total Annual BTU's			MMBTU/Sq.Ft./Yr.
	Building Gross Sq. Ft.			
EUI =	(uu)	22,461.41		
	(a)	61,392.00		
EUI =	(vv)	0.365868728		MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI =	Annual Energy Costs		$/Sq.Ft./Yr.
	Building Gross Sq. Ft.		
ECI =	(nn)	178,153.93	
	(a)	61,392.00	
ECI =	(ww)	2.901907903	$/Sq.Ft./Yr

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	ART	61392
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
X 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	356	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
X Reduce illumination levels		___	
___ Maximize use of daylight		___	
X Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	5973	Subtotal	0
		Totals	6329.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	ART	61,392
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3658687 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.9019079 $/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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:
Reset schedules
Time of day schedule optimization
Economizers

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

1.0 Describe proposed energy conservation measures:
Adjust AHU's reset schedule
Adjust AHU's economizer operation setpoint
Update building utiilities operation schedule

2.0 Estimate of installed cost of above measures: $36,061.26

3.0 Estimate of annual energy and water cost savings for above measures: $6,329.00

4.0 Projected simple payback period for above measures in years: 5.7

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	12/12/2002
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	ARCHITECTURE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
175562	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	2900	50%	4 Hrs	150	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	300	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
1970	SUN	6 Hrs	150	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___
5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) ARCHITECTURE (a) Building Size(s) (Gross Sq. Ft.) 175562

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
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	689.06	$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
Annual Totals	2,128,788	$137,658	Avg. $0.07	3,235.68	$22,058.93	Avg. $6.86	3,802.72	$10,737.18	Avg. $3.23	10,587.42	$116,394.07	896,056.35	$138,970.47	$425,818.87

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	2,128,787.61	KWH x 0.0116	=	24,693.94	MMBTU
(pp) Nat. Gas	3,235.68	MMBTU x 1.0	=	3,235.68	MMBTU
(qq1) Steam/Hot Water	10,587.42	MMBTU x 1.0	=	10,587.42	MMBTU
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU
(rr) Chilled Water	896,056.35	TON HRS x 0.012	=	10,752.68	MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(tt) Other Fuel	-	x	=	-	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		49,269.71	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 49,269.71 / (a) 175,562.00

EUI = (vv) 0.280639953 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 425,818.87 / (a) 175,562.00

ECI = (ww) 2.4254615 $/Sq.Ft./Yr.

*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.

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	ARCHITECTURE	175562
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
Ventilation System Operations		
X	Reduced ventilation	
___	Variable ventilation	
___	Unoccupied area ventilation shut down	
___	Repair of caulking & weatherstripping	
___	Maintenance & repair or operating controls	
	Subtotal	2129
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	852
Lighting Systems Operations		
X	Reduce illumination levels	
___	Maximize use of daylight	
X	Install high efficiency lamps	
___	Reduce or delete evening cleaning hours	
	Subtotal	17080

System Changes		% Cost Savings
Water Systems Operations		
___	Repair all leaks	
___	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	
___	Pipe insulation repair	
	Subtotal Subtotal	0
Other Measures (including water use)		
___		
___		
___		
___		
	Subtotal	0
	Totals	20061.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	ARCHITECTURE	175562
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.28064 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.4254615 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Fair

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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options: Lighting retrofit

Reset schedule

Time of day schedule optimization

Economizer

Service room cooling system

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

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: $107,736.54

3.0 Estimate of annual energy and water cost savings for above measures: $20,061.00

4.0 Projected simple payback period for above measures in years: 5.4

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/8/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	AGRICULTURAL SCIENCES	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
43902	Days	(c) Daylight			(d) Evening			(e) Night			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	SUN	6 Hrs	32	2%	0	0	0%	0	0	0%	(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): AGRICULTURAL SCIENCES (a) Building Size(s) (Gross Sq. Ft.) 43902

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
										STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
Annual Totals	552,240	$35,965	Avg. $0.07	809.27	$5,517.28	Avg. $6.86	950.93	$2,685.00	Avg. $3.23	2,647.55	$29,106.14	224,072.78	$34,751.72	$108,025.25

(1) (2) (3) (4) (5)

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	552240	KWH x 0.0116	=	6405.984	MMBTU
(pp) Nat. Gas	809.2738	MMBTU x 1.0	=	809.2738	MMBTU
(qq1) Steam/Hot Water	2647.54827	MMBTU x 1.0	=	2647.5483	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	224072.782	TON HRS x 0.012	=	2688.8734	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU

(uu) TOTAL ANNUAL BTU'S = 12551.679 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 12551.67946 / (a) 43902

EUI = (vv) 0.285902224 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 108025.2455 / (a) 43902

ECI = (ww) 2.460599641 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	AGRICULTURAL SCIENCES	43902
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
	Ventilation System Operations	
___	Reduced ventilation	
_X_	Variable ventilation	
___	Unoccupied area ventilation shut down	
___	Repair of caulking & weatherstripping	
___	Maintenance & repair or operating controls	
	Subtotal	12350
	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	216
	Lighting Systems Operations	
X	Reduce illumination levels	
___	Maximize use of daylight	
X	Install high efficiency lamps	
___	Reduce or delete evening cleaning hours	
	Subtotal	4302

	System Changes	% Cost Savings
	Water Systems Operations	
___	Repair all leaks	
___	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	
___	Pipe insulation repair	
	Subtotal Subtotal	0
	Other Measures (including water use)	
___		
___		
___		
___		
	Subtotal	0
	Totals	16868.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	AGRICULTURAL SCIENCES	43902
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2859022 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.4605996 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Regular 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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

Reset schedule

Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

Install VFDs on AHUs

2.0 Estimate of installed cost of above measures: $53,313.10

3.0 Estimate of annual energy and water cost savings for above measures: $16,868.00

4.0 Projected simple payback period for above measures in years: 3.2

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/10/2004
Name of Energy Auditor	Organization and Phone Number of Auditor	Date

TEXAS TECH UNIVERSITY	AGRICULTURAL PLANT SCIENCES	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
26725	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	280	60%	4 Hrs	9	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	23	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
1961	SUN	6 Hrs	9	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): AGRICULTURAL PLANT SCIENCES (a) Building Size(s) (Gross Sq. Ft.) 26725

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
	KWH	COST	$/KWH	MMBTU	COST	$/MMBTU	MGAL	COST	$/MGAL	STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH		$			$			$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	671680	KWH x 0.0116	=	7791.488 MMBTU
(pp)	Nat. Gas	486.751757	MMBTU x 1.0	=	486.75176 MMBTU
(qq1)	Steam/Hot Water	1611.67436	MMBTU x 1.0	=	1611.6744 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	136402.558	TON HRS x 0.012	=	1636.8307 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 11526.745 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 11526.74481 / (a) 26725

EUI = (vv) 0.431309441 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 87599.41015 / (a) 26725

ECI = (ww) 3.277807676 $/Sq.Ft./Yr

*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

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	AGRICULTURAL PLANT SCIENCES	26725
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	
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	175	___ 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
		Totals	175.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	AGRICULTURAL PLANT SCIENCES	26725
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.4313094 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.2778077 $/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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:

Reset schedule
Economizer

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

1.0 Describe proposed energy conservation measures:
Adjust AHU's reset schedule
Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $208.33

3.0 Estimate of annual energy and water cost savings for above measures: $175.00

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

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/14/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	AGRICULTURAL PAVILION	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
7263	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	100	83%	4 Hrs	2	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	6	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
1924	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) AGRICULTURAL PAVILION (a) Building Size(s) (Gross Sq. Ft.) 7263

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
	KWH	COST	$/KWH	MMBTU	COST	$/MMBTU	MGAL	COST	$/MGAL	STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH		$			$			$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
			Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	504800	KWH x 0.0116	= 5855.68	MMBTU
(pp)	Nat. Gas	167.925326	MMBTU x 1.0	= 167.92533	MMBTU
(qq1)	Steam/Hot Water	438.001529	MMBTU x 1.0	= 438.00153	MMBTU
(qq2)	Steam	0	LBS x 0.001390	= 0	MMBTU
(rr)	Chilled Water	37069.8514	TON HRS x 0.012	= 444.83822	MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	= 0	MMBTU
(tt)	Other Fuel	0	x	= 0	MMBTU
			(uu) TOTAL ANNUAL BTU'S =	6906.4451	MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 6906.445071 / (a) 7263

EUI = (vv) 0.950908037 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 44955.54047 / (a) 7263

ECI = (ww) 6.189665493 $/Sq.Ft./Yr.

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	AGRICULTURAL PAVILION	7263
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
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 temperatures	
___ Unoccupied reset or shut down of system	
___ Shut down non-critical exhaust systems	
Subtotal	90
Lighting Systems Operations	
X Reduce illumination levels	
___ Maximize use of daylight	
X Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	709

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
*** Noisy chiller area.	
Ear protection higly recommended.	
Subtotal	0
Totals	799.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	AGRICULTURAL PAVILION	7263
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.950908 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 6.1896655 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Regular 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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $4,449.92

3.0 Estimate of annual energy and water cost savings for above measures: $799.00

4.0 Projected simple payback period for above measures in years: 5.6

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/10/2004
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	AGRICULTURAL ED & COMMUNICATIONS	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
6594	Days	(c) Daytight			(d) Evening			(e) Night			
	M - F	12 Hrs	720	64%	4 Hrs	23	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	56	5%	0	0	0%	0	0	0%	
1951	SUN	6 Hrs	23	2%	0	0	0%	0	0	0%	EMS (g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) AGRICULTURAL ED & COMMUNICATIONS (a) Building Size(s) (Gross Sq. Ft.) 6594

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
	KWH	COST	$/KWH	MMBTU	COST	$/MMBTU	MGAL	COST	$/MGAL	STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH		$			$			$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	262240	KWH x 0.0116	=	3041.984	MMBTU
(pp) Nat. Gas	474.094574	MMBTU x 1.0	=	474.09457	MMBTU
(qq1) Steam/Hot Water	1519.94913	MMBTU x 1.0	=	1519.9491	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	128639.479	TON HRS x 0.012	=	1543.6737	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		6579.7014	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 6579.701449 / (a) 6594

EUI = (vv) 0.997831582 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 58518.5365 / (a) 6594

ECI = (ww) 8.874512663 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	AGRICULTURAL ED & COMMUNICA	6594
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	2970		
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	117	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		___	
___ Maximize use of daylight		___	
_X_ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	646	Subtotal	0
		Totals	3733.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	AGRICULTURAL ED & COMMUNICATIONS	6594
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

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 condition of building envelope: Regular 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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:

Lighting retrofit
VFD installation on AHUs
Reset schedule
Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system
Install VFDs on AHU's fan motors
Adjust AHU's reset schedule
Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $14,499.23

3.0 Estimate of annual energy and water cost savings for above measures: $3,733.00

4.0 Projected simple payback period for above measures in years: 3.9

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/28/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	ADMINSTRATIVE SUPPORT CENTER	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
32909	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	60	64%	4 Hrs	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1998	SUN	6 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes ____ No X
3. Summer Program Use — Yes ____ No X
4. Building has exterior floodlighting — Yes X No ____

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

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 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MCF (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MCF (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
Annual Totals	776,320	$51,484	Avg. $0.07	0.00	$0.00	Avg. N/A	0.00	$0.00	Avg. N/A	0.00	$0.00	0.00	$0.00	$51,483.52

*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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	776320	KWH x 0.0116	= 9005.312	MMBTU
(pp)	Nat. Gas	0	MCF x 1.03	= 0	MMBTU
(qq1)	Steam/Hot Water	0	MMBTU x 1.0	= 0	MMBTU
(qq2)	Steam	0	LBS x 0.001390	= 0	MMBTU
(rr)	Chilled Water	0	TON HRS x 0.012	= 0	MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	= 0	MMBTU
(tt)	Other Fuel	0	x	= 0	MMBTU

(uu) TOTAL ANNUAL BTU'S = 9005.312 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 9005.312 / (a) 32909

EUI = (vv) 0.273642833 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 51483.51847 / (a) 32909

ECI = (ww) 1.564420629 $/Sq.Ft./Yr.

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	ADMINSTRATIVE SUPPORT CENTE	32909
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	0	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
___ Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
___ Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	0	Subtotal	0
		Totals	0.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	ADMINSTRATIVE SUPPORT CENTER	32909
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2736428 BTU/Sq.Ft./Yr.

1.2 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 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:

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

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 measures: $0.00

4.0 Projected simple payback period for above measures in years: #DIV/0!

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	12/17/2002
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	ADMINISTRATION	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
113975	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	11 Hrs	575	63%	0 Hrs	0	0%	0 Hrs	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	EMS (g) Yes X No
1925	SUN	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation	Yes X	No	5. List year and type of major building modifications and additions
2. 9 month per year operation	Yes	No X	
3. Summer Program Use	Yes	No X	
4. Building has exterior floodlighting	Yes X	No	

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) ADMINISTRATION (a) Building Size(s)(Gross Sq. Ft.): 113975

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH	ELECTRICITY COST $	$/KWH	NATURAL GAS MMBTU	NATURAL GAS COST $	$/MMBTU	WATER MGAL	WATER COST $	$/MGAL	PURCHASED THERMAL STEAM-HOT WATER MMBTU	PURCHASED THERMAL STEAM-HOT WATER COST	PURCHASED THERMAL CHILLED WATER TON HRS	PURCHASED THERMAL CHILLED WATER COST	TOTAL ENERGY COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
Annual Totals	1547760	$101,235.82	Avg. $0.07	(2) 3,250.78	$22,178.81	Avg. $6.86	(3) 3,799.82	$10,728.98	Avg. $3.23	(4) 10,579.34	$116,305.23	895,372.42	$138,864.40	$389,313.25

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	1547760	KWH x 0.0116	=	17954.016	MMBTU
(pp) Nat. Gas	3250.78313	MMBTU x 1.0	=	3250.7831	MMBTU
(qq1) Steam/Hot Water	10579.338	MMBTU x 1.0	=	10579.338	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	895372.421	TON HRS x 0.012	=	10744.469	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		42528.606	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 42528.60621 / (a) 113975 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.373139778 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 389313.2463 / (a) 113975 $/Sq.Ft./Yr.

ECI = (ww) 3.415777551 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	ADMINISTRATION	113975
Facility Name	Building Name(s)	Building Size(s) (GSF)

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			Water Systems Operations		
___	Reduced ventilation		___	Repair all leaks	
X	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	613			
Heating & Cooling System Operations			Utility Plant & Distribution System Oper.		
X	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	779	___	Pipe insulation repair	
				Subtotal Subtotal	0
Lighting Systems Operations			Other Measures (including water use)		
X	Reduce illumination levels		___		
___	Maximize use of daylight		___		
X	Install high efficiency lamps		___		
___	Reduce or delete evening cleaning hours		___		
	Subtotal	11216		Subtotal	0
				Totals	12608.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	ADMINISTRATION	113975
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3731398 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.4157776 $/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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:
Reset schedules
Time of day schedule optimization
Economizers
High efficiency lighting

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. _____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system
Adjust AHU's reset schedule
Install VFDs on AHUS
Adjust AHU's economizer operation setpoint
Update building utilities operation schedule

2.0 Estimate of installed cost of above measures: $72,894.73

3.0 Estimate of annual energy and water cost savings for above measures: $12,608.00

4.0 Projected simple payback period for above measures in years: 5.8

Form PUA 4

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	4/28/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	ATHLETIC TRAINING CENTER	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
97388	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	120	64%	4	4	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	9	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
1986	SUN	4 hrs	4	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) ATHLETIC TRAINING CENTER (a) Building Size(s) (Gross Sq. Ft.) 97388

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
	KWH	COST	$/KWH	MMBTU	COST	$/MMBTU	MGAL	COST	$/MGAL	STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH		$			$			$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	415719	KWH x 0.0116	=	4822.3404	MMBTU
(pp) Nat. Gas	1804.65642	MMBTU x 1.0	=	1804.6564	MMBTU
(qq1) Steam/Hot Water	5873.068	MMBTU x 1.0	=	5873.068	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	497061.64	TON HRS x 0.012	=	5964.7397	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		18464.804	MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 18464.8045 / (a) 97388

EUI = (vv) 0.189600408 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 183002.9883 / (a) 97388

ECI = (ww) 1.879112296 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	ATHLETIC TRAINING CENTER	97388
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
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	
___ Reset of air & water temperatures	
___ Unoccupied reset or shut down of system	
___ Shut down non-critical exhaust systems	
Subtotal	0
Lighting Systems Operations	
___ Reduce illumination levels	
___ Maximize use of daylight	
___ Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	0

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
*** Noisy chiller area.	
Ear protection higly recommended.	
Subtotal	0
Totals	0.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	ATHLETIC TRAINING CENTER	97388
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.1896004 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 1.8791123 $/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 energy and water conservation measure retrofit implementation. Briefly outline recommended retrofit options:

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

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 measures: $0.00

4.0 Projected simple payback period for above measures in years: #DIV/0!

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/24/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	BIOLOGY	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
156219	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	3124	60%	4 Hrs	104	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	260	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
1969	SUN	6 Hrs	104	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

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	Recommissioning - FY00
3. Summer Program Use	Yes X	No	
4. Building has exterior floodlighting	Yes X	No	

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) BIOLOGY (a) Building Size(s) (Gross Sq. Ft.) 156219

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL ENERGY COSTS*
										STEAM-HOT WATER		CHILLED WATER		
	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	MMBTU	COST	TON HRS	COST	
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(mm)	(nn)
September	295,920	$19,238.01	$0.07	154.48	$989.10	$6.40	359.01	$958.12	$2.67	416.69	$14,614.45	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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	3309600	KWH x 0.0116	=	38391.36	MMBTU
(pp) Nat. Gas	2836	MMBTU x 1.0	=	2836	MMBTU
(qq1) Steam/Hot Water	9421	MMBTU x 1.0	=	9421	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	797331	TON HRS x 0.012	=	9567.972	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		60216.332	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 60216.332 / (a) 156219

EUI = (vv) 0.385461 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 472592 / (a) 156219

ECI = (ww) 3.025188997 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	BIOLOGY	156219
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
X 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	945	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
X Reduce illumination levels		___	
___ Maximize use of daylight		___	
X Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	15376	Subtotal	0
		Totals	16321.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	BIOLOGY	156219
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT 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 condition of building envelope: Fair

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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

Reset schedule

Time of day schedule optimization

Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

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: $91,440.23

3.0 Estimate of annual energy and water cost savings for above measures: $16,321.00

4.0 Projected simple payback period for above measures in years: 5.6

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	12/17/2002
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	CIVIL ENGINEERING	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
91094	Time Period: Hrs/Occupants/% GSF									
	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	1670	55%	4 Hrs	61	2%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	152	5%	0	0	0%	0	0	0%
1951	SUN	6 Hrs	61	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes __X__ No ____

EMS
(g) Yes __X__ No ____

II MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ____
4. Building has exterior floodlighting — Yes __X__ No ____
5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) CIVIL ENGINEERING (a) Building Size(s) (Gross Sq. Ft.) 91094

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
MONTH	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	STEAM-HOT WATER MMBTU	STEAM-HOT WATER COST	CHILLED WATER TON HRS	CHILLED WATER COST	ENERGY COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	1012800	KWH x 0.0116	=	11748.48	MMBTU
(pp) Nat. Gas	1658	MMBTU x 1.0	=	1658	MMBTU
(qq1) Steam/Hot Water	5494	MMBTU x 1.0	=	5494	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	464937	TON HRS x 0.012	=	5579.244	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		24479.724	MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = (uu) Total Annual BTU's / (a) Building Gross Sq. Ft. = 24479.724 / 91094 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.268730366 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = (nn) Annual Energy Costs / (a) Building Gross Sq. Ft. = 215262 / 91094 $/Sq.Ft./Yr.

ECI = (ww) 2.363075504 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	CIVIL ENGINEERING	91094
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
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	
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
Lighting Systems Operations	
X Reduce illumination levels	
___ Maximize use of daylight	
X Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	8919

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
___	
___	
___	
___	
Subtotal	0
Totals	9350.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	CIVIL ENGINEERING	91094
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2687304 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.3630755 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options: Lighting retrofit
Reset schedule
Time of day schedule optimization
Economizer
VFD installation on AHUs

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. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system
Adjust AHU's reset schedule/Economizer operation setpoint
Update building utilities operation schedule
Install VFDs on AHU's fan motors

2.0 Estimate of installed cost of above measures: $53,407.33

3.0 Estimate of annual energy and water cost savings for above measures: $9,350.00

4.0 Projected simple payback period for above measures in years: 5.7

Form PUA 4

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/24/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	CHEMISTRY	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
192980	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	3350	52%	4 Hrs	150	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	12 Hrs	300	5%	0	0	0%	0	0	0%	
1929	SUN	12 Hrs	150	2%	0	0	0%	0	0	0%	EMS (g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

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___	Recommissioning - FY00
3. Summer Program Use	Yes X	No___	
4. Building has exterior floodlighting	Yes X	No___	

PRELIMINARY WATER AND ENERGY AUDIT

Building Name(s): CHEMISTRY | (e) Building State's Gross Sq. Ft.): 192860

ENERGY USE AND COST DATA For Year Ending 6/31/2005 | ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	STEAM-HOT WATER COST (kk)	CHILLED WATER TON HRS (ll)	CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	386,000	$25,744.30	$0.07	190.63	$1,221.66	$6.40	443.49	$1,183.58	$2.67	514.75	$5,700.31	101,088.54	$13,648.88	47398.924
October	342,000	$21,265.29	$0.06	219.80	$1,237.69	$5.64	258.14	$721.70	$3.03	860.33	$9,611.85	85,356.66	$11,837.21	44593.733
November	308,000	$17,588.11	$0.06	318.81	$2,394.35	$7.42	188.47	$518.29	$3.26	1,288.10	$17,793.81	54,293.52	$8,866.74	47233.046
December	300,960	$18,272.92	$0.06	429.67	$2,962.62	$6.94	179.66	$649.83	$3.62	1,554.88	$18,320.52	47,727.68	$8,961.23	47177.124
January	354,480	$21,745.57	$0.06	491.49	$3,166.13	$6.44	153.86	$578.26	$3.76	1,559.06	$17,656.46	51,084.37	$8,786.39	50233.81
February	322,320	$18,594.16	$0.06	424.06	$2,775.59	$6.55	93.01	$369.96	$3.98	1,428.82	$15,612.72	57,280.85	$8,466.40	44118.653
March	331,440	$20,566.92	$0.06	375.94	$2,478.07	$6.59	112.22	$458.88	$4.09	1,273.76	$15,888.06	59,505.73	$8,701.81	48112.652
April	392,640	$25,254.85	$0.06	323.28	$2,429.96	$7.52	169.31	$630.30	$3.33	859.51	$10,987.14	72,102.91	$10,442.84	49714.901
May	354,720	$26,269.76	$0.07	238.87	$1,598.36	$6.69	357.30	$1,101.30	$3.08	735.44	$4,602.04	82,505.76	$15,802.03	50393.492
June	393,280	$28,485.96	$0.08	196.12	$1,327.69	$6.77	358.07	$1,104.26	$3.08	537.02	$240.57	111,916.86	$22,460.62	54609.087
July	426,960	$27,876.86	$0.07	191.53	$1,452.44	$7.57	868.07	$1,725.65	$2.58	556.77	$5,276.85	129,557.20	$17,813.48	54145.286
August	387,600	$29,664.35	$0.08	89.77	$668.42	$7.78	1,198.38	$2,880.46	$2.22	494.58	$5,780.73	132,556.83	$22,038.39	60846.352
Annual Totals	4,298,400	$282,672.86	Avg. $0.07	3,490.35	$23,731.19	Avg. $6.86	4,160.00	$11,802.44	Avg. $3.23	11,637.83	$127,941.85	984,956.62	$152,758.12	598606.46

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(eo)	Electricity	4,298,400.00	KWH x 0.0118	=	49,881.44	MMBTU
(go)	Nat. Gas	3,490.35	MMBTU x 1.0	=	3,490.35	MMBTU
(gs1)	Steam/Hot Water	11,637.83	MMBTU x 1.0	=	11,637.83	MMBTU
(gs2)	Steam	1,237,430.00	LBS x 0.001380	=	1,720.03	MMBTU
(rf)	Chilled Water	984,956.62	TON HRS x 0.012	=	11,819.48	MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(fo)	Other Fuel	-	x	=	-	MMBTU
			(uu) TOTAL ANNUAL BTU'S =		76,529.12	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 76,529.12 / (a) 192,860.00 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.406929795 MMBTU/Sq Ft /Yr

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 598,606.46 / (a) 192,860.00 $/Sq Ft./Yr

ECI = (ww) 3.103463893 $/Sq Ft /Yr

*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 feet value.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	CHEMISTRY	192980
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
X 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	1198	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
X Reduce illumination levels		___	
___ Maximize use of daylight		___	
X Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	19093	Subtotal	0
		Totals	20291.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

TEXAS TECH UNIVERSITY	CHEMISTRY	192960
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.4069288 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.1034639 $/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 energy and water conservation measure retrofit implementation

Briefly outline recommended retrofit options:

Reset schedule

High efficiency lighting

Reduced ventilation

Economizer

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. ___ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Adjust AHU's reset schedule

Retrofit (efficiency/illumination level) existing lighting system

Retrofit ventilation system

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $112,908.65

3.0 Estimate of annual energy and water cost savings for above measures: $20,291.00

4.0 Projected simple payback period for above measures in years: 5.6

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/24/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	CHEMICAL ENGINEERING	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
18776	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	160	59%	4 Hrs	5	2%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	14	5%	0	0	0%	0	0	0%
1961	SUN	6 Hrs	5	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes __X__ No ____

EMS
(g) Yes __X__ No ____

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ____
4. Building has exterior floodlighting — Yes __X__ No ____
5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) CHEMICAL ENGINEERING (a) Building Size(s) (Gross Sq. Ft.) 18776

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
February	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
March	33,120	$2,057.20	$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
April	39,360	$2,531.64	$0.06	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
May	32,320	$2,395.37	$0.07	23.24	$155.51	$6.69	34.76	$107.15	$3.08	71.55	$447.76	8,027.40	$1,634.75	$4,740.54
June	31,520	$2,424.85	$0.08	19.08	$129.18	$6.77	34.86	$107.44	$3.08	52.25	$20.49	10,868.96	$2,187.25	$4,869.21
July	34,400	$2,246.03	$0.07	18.67	$141.32	$7.57	65.00	$167.90	$2.58	54.17	$513.41	12,605.27	$1,733.16	$4,801.82
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
Annual Totals	409,760	$26,705	Avg. $0.07	343.64	$2,340.45	Avg. $6.86	406.69	$1,148.32	Avg. $3.23	1,132.30	$12,448.11	95,831.41	$14,862.61	$57,504.98

(1) (2) (3) (4) (5)

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	409760	KWH x 0.0116	=	4753.216 MMBTU
(pp)	Nat. Gas	343.644367	MMBTU x 1.0	=	343.64437 MMBTU
(qq1)	Steam/Hot Water	1132.303	MMBTU x 1.0	=	1132.303 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	95831.4099	TON HRS x 0.012	=	1149.9769 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 7379.1403 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 7379.140288 / (a) 18776

EUI = (vv) 0.393009176 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 57504.97887 / (a) 18776

ECI = (ww) 3.062685283 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	CHEMICAL ENGINEERING	18776
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
Ventilation System Operations	
___ Reduced ventilation	
X Variable ventilation	
___ Unoccupied area ventilation shut down	
___ Repair of caulking & weatherstripping	
___ Maintenance & repair or operating controls	
Subtotal	288
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	115
Lighting Systems Operations	
X Reduce illumination levels	
___ Maximize use of daylight	
X Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	1841

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
*** Noisy chiller area.	
Ear protection higly recommended.	
Subtotal	0
Totals	2244.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	CHEMICAL ENGINEERING	18776
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3930092 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.0626853 $/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: Regular 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:
Lighting retrofit
VFD installation on AHU#1
Reset schedule
Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system
Install VFD on AHU#1's fan motors
Adjust AHU's reset schedule
Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $16,173.51

3.0 Estimate of annual energy and water cost savings for above measures: $2,244.00

4.0 Projected simple payback period for above measures in years: 7.2

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/24/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	CHARLES MAEDGEN THEATRE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF										BASIC HVAC CONTROL DATA
32958	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	100	53%	0	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1964	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling. (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) CHARLES MAEDGEN THEATRE (a) Building Size(s) (Gross Sq. Ft.) 32958

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
MONTH	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	STEAM-HOT WATER MMBTU	STEAM-HOT WATER COST	CHILLED WATER TON HRS	CHILLED WATER COST	ENERGY COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	723720	KWH x 0.0116	=	8395.152	MMBTU
(pp) Nat. Gas	600.280877	MMBTU x 1.0	=	600.28088	MMBTU
(qq1) Steam/Hot Water	1987.56084	MMBTU x 1.0	=	1987.5608	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	168215.36	TON HRS x 0.012	=	2018.5843	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		13001.578	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 13001.57804 / (a) 32958

EUI = (vv) 0.394489291 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 101147.0056 / (a) 32958

ECI = (ww) 3.068966733 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	CHARLES MAEDGEN THEATRE	32958
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
Ventilation System Operations	
___ Reduced ventilation	
X Variable ventilation	
___ Unoccupied area ventilation shut down	
___ Repair of caulking & weatherstripping	
___ Maintenance & repair or operating controls	
Subtotal	6090
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	202
Lighting Systems Operations	
___ Reduce illumination levels	
___ Maximize use of daylight	
___ Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	0

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
*** Noisy chiller area.	
Ear protection higly recommended.	
Subtotal	0
Totals	6292.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	CHARLES MAEDGEN THEATRE	32958
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3944893 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.0689667 $/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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:

VFD installation on AHUs
Reset schedule
Economizer

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

1.0 Describe proposed energy conservation measures:

Install VFDs on AHU's fan motors
Adjust AHU's reset schedule
Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $15,190.33

3.0 Estimate of annual energy and water cost savings for above measures: $6,292.00

4.0 Projected simple payback period for above measures in years: 2.4

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/24/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	CENTRAL HEATING AND COOLING PLANT I	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
80766	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	35	28%	4 Hrs	4	3%	8 Hrs	4	3%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	12 Hrs	4	3%	4 Hrs	4	3%	8 Hrs	4	3%	
1968	SUN	12 Hrs	4	3%	4 Hrs	4	3%	8 Hrs	4	3%	EMS (g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler Purchased steam	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	Operation room
						Machine room
						Electrical substation

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation	Yes X	No	5. List year and type of major building modifications and additions.
2. 9 month per year operation	Yes	No X	Cooling towers (4) installation
3. Summer Program Use	Yes	No X	Boiler installation
4. Building has exterior floodlighting	Yes X	No	Chiller (2) installation
			Office building annex

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): CENTRAL HEATING AND COOLING PLANT I (a) Building Size(s) (Gross Sq. Ft.): 80766

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 Metered X Best Estimate

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	CHILLED WATER TON HRS (ll)	CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	$33,679	$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.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	10374801	KWH x 0.0116	=	120347.692 MMBTU
(pp)	Nat. Gas	724837	MMBTU x 1.0	=	724837 MMBTU
(qq1)	Steam/Hot Water	4870.66384	MMBTU x 1.0	=	4870.66384 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	412224.097	TON HRS x 0.012	=	4946.68917 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 855002.045 MMBTU

*Do not include water costs (hh).

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = 855002.0446 / 80766 MMBTU/Sq.Ft./Yr.
(uu) (a)

EUI = (vv) 10.58616305 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = 4947455.441 / 80766 $/Sq.Ft./Yr.
(nn) (a)

ECI = (ww) 61.25666049 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	CENTRAL HEATING AND COOLING PLANT I	80766
Facility Name	Building Name(s)	Building Size(s) (GSF)

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 _____ 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	
___ Reset of air & water temperatures	
___ Unoccupied reset or shut down of system	
___ Shut down non-critical exhaust systems	
Subtotal	0
Lighting Systems Operations	
___ Reduce illumination levels	
___ Maximize use of daylight	
___ Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	0

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
X Side Stream Energy Recovery	
___	
___	
___	
Subtotal	566410
Totals	566410.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	CENTRAL HEATING AND COOLING PLANT I	80766
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 10.586163 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 61.25666 $/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 energy and water conservation measure retrofit implementation. Briefly outline recommended retrofit options:

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

1.0 Describe proposed energy conservation measures: Install side stream waste heat recovery system on boiler

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: $566,410.00

4.0 Projected simple payback period for above measures in years: 0.9

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant/806 742 1696	11/24/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date

TEXAS TECH UNIVERSITY	BUSINESS ADMINISTRATION	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
204495	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	11 Hrs	4090	60%	3 Hrs	200	3%	0 Hrs	0	0%
Date (b) Occupied	SAT	9 Hrs	400	6%	0 Hrs	0	0%	0 Hrs	0	0%
1969	SUN	10 Hrs	200	3%	0 Hrs	0	0%	0 Hrs	0	0%

Central Bldg. Panel
(f) Yes __X__ No ____

EMS
(g) Yes __X__ No ____

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ____
4. Building has exterior floodlighting	Yes __X__	No ____

5. List year and type of major building modifications and additions.
Recommissioning - FY00

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) BUSINESS ADMINISTRATION (a) Building Size(s) (Gross Sq. Ft.) 204,495

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST $ (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST $ (mm)	TOTAL ENERGY COSTS* $ (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	$ 8,852.25	$ 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	63,058.40	$ 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
Annual Totals	(1) 2,024,881	$132,500.14	Avg. $ 0.07	(2) 3,672	$ 24,940.18	Avg. $ 6.86	(3) 4,429	$ 12,506.69	Avg. $ 3.23	(4) 12,332.25	$ 135,576.06	(5) 1,043,728	$161,873.11	$ 467,396.18

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	2,024,881	KWH x 0.0116	=	23,489 MMBTU
(pp)	Nat. Gas	3,672	MCF x 1.00	=	3,672 MMBTU
(qq1)	Steam/Hot Water	12,332	MMBTU x 1.0	=	12,332 MMBTU
(qq2)	Steam	-	LBS x 0.001390	=	- MMBTU
(rr)	Chilled Water	1,043,728	TON HRS x 0.012	=	12,525 MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	=	- MMBTU
(tt)	Other Fuel	-	x	=	- MMBTU

(uu) TOTAL ANNUAL BTU'S = 52,018 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 52,018 / (a) 204,495

EUI = (vv) 0.254371071 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 467,396 / (a) 204,495

ECI = (ww) 2.285611797 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	BUSINESS ADMINISTRATION	204495
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	
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	935	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
X Reduce illumination levels		___	
___ Maximize use of daylight		___	
X Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	20132	Subtotal	0
		Totals	21067.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	BUSINESS ADMINISTRATION	204495
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

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 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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:

Reset schedules

Time of day schedule optimization

Economizers

High efficiency lighting

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

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: $119,633.41

3.0 Estimate of annual energy and water cost savings for above measures: $21,067.00

4.0 Projected simple payback period for above measures in years: 5.7

Form PUA 4

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	ENGLISH & PHILOSOPHY	Texas Tech university/Lubbock, Tx
Facility Name	* Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
68100	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	3090	63%	4 Hrs	98	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	245	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
2002	SUN	6 Hrs	98	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) ENGLISH & PHILOSOPHY (a) Building Size(s) (Gross Sq. Ft.) 68100

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
MONTH	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	STEAM-HOT WATER MMBTU	STEAM-HOT WATER COST	CHILLED WATER TON HRS	CHILLED WATER COST	ENERGY COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	1028000	KWH x 0.0116	=	11924.8	MMBTU
(pp) Nat. Gas	2274.06383	MMBTU x 1.0	=	2274.0638	MMBTU
(qq1) Steam/Hot Water	7236.70431	MMBTU x 1.0	=	7236.7043	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	612471.729	TON HRS x 0.012	=	7349.6608	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		28785.229	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 28785.22889 / (a) 68100 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.422690586 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 264066.2089 / (a) 68100 $/Sq.Ft./Yr.

ECI = (ww) 3.877624213 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	ENGLISH & PHILOSOPHY	68100
Facility Name	Building Name(s)	Building Size(s) (GSF)

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 ____ Yes __X__ No; Recommended ____ 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		**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	1320		
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	528	___ 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
		Totals	0.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	ENGLISH & PHILOSOPHY	68100
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.4226906 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.8776242 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Very good condition (New building)

1.4 Describe physical condition of building energy and water-using systems: Very good condition (New building)

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:

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. _____ Yes _____ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT 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 measures: $0.00

4.0 Projected simple payback period for above measures in years: #DIV/0!

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	ENGINEERING CENTER	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
57665	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	1230	64%	4 Hrs	38	2%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	96	5%	0	0	0%	0	0	0%
1980	SUN	6 Hrs	38	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes __X__ No ____

EMS
(g) Yes __X__ No ____

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes __X__ No ____
2. 9 month per year operation — Yes ____ No __X__
3. Summer Program Use — Yes ____ No __X__
4. Building has exterior floodlighting — Yes __X__ No ____
5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) ENGINEERING CENTER (a) Building Size(s) (Gross Sq. Ft.) 57665

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
	KWH	COST	$/KWH	MMBTU	COST	$/MMBTU	MGAL	COST	$/MGAL	STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH		$			$			$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	1975200	KWH x 0.0116	=	22912.32	MMBTU
(pp) Nat. Gas	1178	MMBTU x 1.0	=	1178	MMBTU
(qq1) Steam/Hot Water	3478	MMBTU x 1.0	=	3478	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	294318	TON HRS x 0.012	=	3531.816	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		31100.136	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 31100.136 / (a) 57665

EUI = (vv) 0.539324304 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 224871 / (a) 57665

ECI = (ww) 3.899609815 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	ENGINEERING CENTER	57665
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
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		
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	450
Lighting Systems Operations		
X	Reduce illumination levels	
___	Maximize use of daylight	
X	Install high efficiency lamps	
___	Reduce or delete evening cleaning hours	
	Subtotal	5680

	System Changes	% Cost Savings
Water Systems Operations		
___	Repair all leaks	
___	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	
___	Pipe insulation repair	
	Subtotal Subtotal	0
Other Measures (including water use)		
___		
___		
___		
___		
	Subtotal	0
	Totals	6130.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	ENGINEERING CENTER	57665
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.5393243 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.8996098 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

Reset schedule

Time of day schedule optimization

Economizer

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. ___ Yes _X_ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures:

Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule/Economizer operation setpoint

Update building utilities operation schedule

2.0 Estimate of installed cost of above measures: $33,884.33

3.0 Estimate of annual energy and water cost savings for above measures: $6,130.00

4.0 Projected simple payback period for above measures in years: 5.5

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	ENGINEERING & TECHNOLOGY LABS	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
21657	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	50	66%	4 Hrs	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1961	SUN	6 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

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	
3. Summer Program Use	Yes X	No	
4. Building has exterior floodlighting	Yes X	No	

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) ENGINEERING & TECHNOLOGY LABS (a) Building Size(s) (Gross Sq. Ft.) 21657

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	COST (kk)	CHILLED WATER TON HRS (ll)	COST (mm)	TOTAL ENERGY COSTS* (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
Annual Totals	578,200	$37,751	Avg. $0.07 (2)	407.20	$2,783.81	Avg. $6.86 (3)	469.10	$1,324.52	Avg. $3.23	1,306.04 (4)	$14,358.15	(5) 110,535.84	$17,143.14	$73,360.38

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	578200	KWH x 0.0116	=	6707.12	MMBTU
(pp) Nat. Gas	407.20194	MMBTU x 1.0	=	407.20194	MMBTU
(qq1) Steam/Hot Water	1306.04421	MMBTU x 1.0	=	1306.0442	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	110535.835	TON HRS x 0.012	=	1326.43	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		9746.7962	MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. (uu) 9746.796175 / (a) 21657 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.450052924 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. (nn) 73360.38107 / (a) 21657 $/Sq.Ft./Yr.

ECI = (ww) 3.387375032 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	ENGINEERING & TECHNOLOGY LA	21657
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
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	
___ Reset of air & water temperatures	
___ Unoccupied reset or shut down of system	
___ Shut down non-critical exhaust systems	
Subtotal	0
Lighting Systems Operations	
___ Reduce illumination levels	
___ Maximize use of daylight	
___ Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	0

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
*** Noisy chiller area.	
Ear protection higly recommended.	
Subtotal	0
Totals	0.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	ENGINEERING & TECHNOLOGY LABS	21657
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

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 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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:

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

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 measures: $0.00

4.0 Projected simple payback period for above measures in years: #DIV/0!

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date

TEXAS TECH UNIVERSITY	ELECTRICAL ENGINEERING	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
98734	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	2073	63%	4 Hrs	66	2%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	165	5%	0	0	0%	0	0	0%
1928	SUN	6 Hrs	66	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) ELECTRICAL ENGINEERING (a) Building Size(s) (Gross Sq. Ft.) 98734

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	49,200	$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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	600,000	$38,876	$0.07	1,801	$12,257	$6.86	2,139	$6,038	$3.23	5,954	$65,459	503,932	$78,155	$200,786

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	600000	KWH x 0.0116	=	6960	MMBTU
(pp) Nat. Gas	1801	MMBTU x 1.0	=	1801	MMBTU
(qq1) Steam/Hot Water	5954	MMBTU x 1.0	=	5954	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	503932	TON HRS x 0.012	=	6047.184	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU

(uu) TOTAL ANNUAL BTU'S = 20762.184 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 20762.184 / (a) 98734

EUI = (vv) 0.210284036 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 200786 / (a) 98734

ECI = (ww) 2.033605445 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	ELECTRICAL ENGINEERING	98734
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
X 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	402	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
X Reduce illumination levels		___	
___ Maximize use of daylight		___	
X Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	9625	Subtotal	0
		Totals	10027.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY (Institution Name) | ELECTRICAL ENGINEERING (Building Name) | 98734 (Building Size (GSF))

ENERGY AND WATER CONSERVATION MEASURE 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 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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

Reset schedule

Time of day schedule optimization

Economizer

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. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures:

Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule/Economizer operation setpoint

Update building utilities operation schedule

2.0 Estimate of installed cost of above measures: $57,869.33

3.0 Estimate of annual energy and water cost savings for above measures: $10,027.00

4.0 Projected simple payback period for above measures in years: 5.8

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	EDUCATION	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
85000	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	1240	63%	4 Hrs	39	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	98	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
2002	SUN	6 Hrs	39	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___
5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) EDUCATION (a) Building Size(s) (Gross Sq. Ft.) 85000

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
Annual Totals	1,043,600	$67,922	Avg. $0.07	1,686.28	$11,504.84	Avg. $6.86	1,971.08	$5,565.46	Avg. $3.23	5,487.83	$60,331.17	464,457.73	$72,033.32	$217,357.21

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	1043600	KWH x 0.0116	=	12105.76	MMBTU
(pp) Nat. Gas	1686.28306	MMBTU x 1.0	=	1686.2831	MMBTU
(qq1) Steam/Hot Water	5487.8341	MMBTU x 1.0	=	5487.8341	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	464457.728	TON HRS x 0.012	=	5573.4927	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		24853.37	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 24853.3699 / (a) 85000

EUI = (vv) 0.292392587 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 217357.2122 / (a) 85000

ECI = (ww) 2.557143673 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	EDUCATION	85000
Facility Name	Building Name(s)	Building Size(s) (GSF)

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 ____ Yes __X__ No; Recommended ____ 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		**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	1087		
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	435	___ 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
		Totals	0.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	EDUCATION	85000
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2923926 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.5571437 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Very good condition (New building)

1.4 Describe physical condition of building energy and water-using systems: Very good condition (New building)

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:

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. _____ Yes _____ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT 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 measures: $0.00

4.0 Projected simple payback period for above measures in years: #DIV/0!

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	DRANE HALL	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
		Time Period: Hrs/Occupants/% GSF								
75358	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	11	1700	66%	0	0	0%	0	0	0%
Date (b) Occupied	SAT	0	0	0%	0	0	0%	0	0	0%
1939	SUN	0	0	0%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation	Yes X	No
2. 9 month per year operation	Yes	No X
3. Summer Program Use	Yes	No X
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

Building Name(s)	DRANE HALL				(a) Building Size(s)(Gross Sq. Ft.):		75,358		
ENERGY USE AND COST DATA	For Year Ending	8/31/2005	** Metered X	Best Estimate X					

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
										STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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	$6,055.96	$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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	907200	KWH x 0.0116	=	10523.52 MMBTU
(pp)	Nat. Gas	1437.01516	MMBTU x 1.0	=	1437.0152 MMBTU
(qq1)	Steam/Hot Water	4544.5297	MMBTU x 1.0	=	4544.5297 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	384622.038	TON HRS x 0.012	=	4615.4645 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 21120.529 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 21120.529 / (a) 75358 = (vv) 0.2802692 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 183584 / (a) 75358 = (ww) 2.4361581 $/Sq.Ft./Yr.

*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.

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	DRANE HALL	75358
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
X 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	367	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
X Reduce illumination levels		___	
___ Maximize use of daylight		___	
X Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	7438	Subtotal	0
		Totals	7805.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	DRANE HALL	75,358
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2802692 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.4361581 $/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:

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 schedule adjustment
High efficiency lighting
Operation schedule update
Economizer setpoint adjustment

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. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system
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: $44,217.40

3.0 Estimate of annual energy and water cost savings for above measures: $7,805.00

4.0 Projected simple payback period for above measures in years: 5.7

Form PUA 4

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	DEVELOPMENT OFFICE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
6594	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	50	71%	0	0	0%	0	0	0%	Central Bldg Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1944	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes No X
3. Summer Program Use — Yes No X
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

Building Name(s) DEVELOPMENT OFFICE (a) Building Size(s) (Gr

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered

	ELECTRICITY			NATURAL GAS			WATER	
MONTH	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $
	(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
Annual Totals	907,200	$59,520	Avg. $0.07	116.99	$793.20	Avg. $6.66	142.83	$403.28

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	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	x	= 0

(uu) TOTAL ANNUAL BTU'S = 11442.032

*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

ɔss Sq. Ft.) 6594

X Best Estimate X

$/MGAL	PURCHASED THERMAL				TOTAL ENERGY
	STEAM-HOT WATER		CHILLED WATER		
	MMBTU	COST	TON HRS	COST	COSTS*
(ii)	(jj)	(kk)	(ll)	(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

ENERGY UTILIZATION INDEX (EUI)

MMBTU
MMBTU
MMBTU
MMBTU
MMBTU
MMBTU
MMBTU

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 11442.032 / (a) 6594

EUI = (vv) 1.7352187 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

MMBTU

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 70307.616 / (a) 6594

ECI = (ww) 10.662362 $/Sq.Ft./Yr.

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	DEVELOPMENT OFFICE	6594
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	0	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
___ Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
___ Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	0	Subtotal	0
		Totals	0.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	DEVELOPMENT OFFICE	6594
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 1.73521866 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 10.6623622 $/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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:

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

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 measures: $0.00

4.0 Projected simple payback period for above measures in years: #DIV/0!

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	EXERCISE SCIENCES CENTER	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
47837	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	630	45%	4 Hrs	28	2%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	70	5%	0	0	0%	0	0	0%
1958	SUN	6 Hrs	28	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): EXERCISE SCIENCES CENTER (a) Building Size(s) (Gross Sq. Ft.) 47837

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	$7,946.93
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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	292640	KWH x 0.0116	=	3394.624	MMBTU
(pp) Nat. Gas	886.447502	MMBTU x 1.0	=	886.4475	MMBTU
(qq1) Steam/Hot Water	2884.85187	MMBTU x 1.0	=	2884.8519	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	244156.751	TON HRS x 0.012	=	2929.881	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		10095.804	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 10095.80438 / (a) 47837

EUI = (vv) 0.211045935 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 97586.40462 / (a) 47837

ECI = (ww) 2.03997752 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	EXERCISE SCIENCES CENTER	47837
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	195	___ 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
		Totals	195.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	EXERCISE SCIENCES CENTER	47837
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT 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 condition of building envelope: Regular condition

1.4 Describe physical condition of building energy and water-using systems: Regular 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 schedule

Economizer

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

1.0 Describe proposed energy conservation measures:

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $208.33

3.0 Estimate of annual energy and water cost savings for above measures: $195.00

4.0 Projected simple payback period for above measures in years: 1.1

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	JOURNALISM	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)		OPERATING SCHEDULE Time Period. Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
19245	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	391	61%	4 Hrs	13	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	32	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
1941	SUN	6 Hrs	13	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): JOURNALISM (a) Building Size(s) (Gross Sq. Ft.) 19245

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
	KWH	COST	$/KWH	MMBTU	COST	$/MMBTU	MGAL	COST	$/MGAL	STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH		$			$			$		MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
			Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	964400	KWH x 0.0116	=	11187.04	MMBTU
(pp) Nat. Gas	166.605959	MMBTU x 1.0	=	166.60596	MMBTU
(qq1) Steam/Hot Water	511.755607	MMBTU x 1.0	=	511.75561	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	43311.9591	TON HRS x 0.012	=	519.74351	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		12385.145	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. (uu) 12385.14507 / (a) 19245 = MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.643551316 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. (nn) 76872.06097 / (a) 19245 = $/Sq.Ft./Yr.

ECI = (ww) 3.994391321 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	JOURNALISM	19245
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	154	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
___ Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
___ Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	1887	Subtotal	0
		Totals	2041.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	JOURNALISM	19245
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.6435513 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.9943913 $/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: Regular 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:

Lighting retrofit

Reset schedule

Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $11,447.41

3.0 Estimate of annual energy and water cost savings for above measures: $2,041.00

4.0 Projected simple payback period for above measures in years: 5.6

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	INTERNATIONAL TEXTILE CENTER	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period	Hrs/Occupants/% GSF								
109376	Days	(c) Daytight			(d) Evening			(e) Night		
	M - F	12 Hrs	60	66%	0	2	2%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	5	5%	0	0	0%	0	0	0%
1984	SUN	6 Hrs	2	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation	Yes X	No
2. 9 month per year operation	Yes	No X
3. Summer Program Use	Yes	No X
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): INTERNATIONAL TEXTILE CENTER (a) Building Size(s) (Gross Sq. Ft.) 109376

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MCF (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	256,320	$16,664	$0.07	2,765.00	$15,595.04	$5.64	251.36	$670.82	$2.67					$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
Annual Totals	2,848,560	$183,404	Avg. $0.07	(2) 22,144.45	$143,604.49	Avg. $6.62	(3) 2,369.11	$6,689.31	Avg. $3.23	(4) 0.00	$0.00	(5) 0.00	$0.00	$333,698.18

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	2848560	KWH x 0.0116	=	33043.296	MMBTU
(pp) Nat. Gas	22764.4931	MMBTU x 1.03	=	23447.42794	MMBTU
(qq1) Steam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	0	TON HRS x 0.012	=	0	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		56490.72394	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 56490.72394 / (a) 109376

EUI = (vv) 0.516481897 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 333698.1814 / (a) 109376

ECI = (ww) 3.050926908 $/Sq.Ft./Yr.

*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 squere foot value.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	INTERNATIONAL TEXTILE CENTER 109376	
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
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	
___ Reset of air & water temperatures	
___ Unoccupied reset or shut down of system	
___ Shut down non-critical exhaust systems	
Subtotal	0
Lighting Systems Operations	
___ Reduce illumination levels	
___ Maximize use of daylight	
___ Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	0

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
*** Noisy chiller area.	
Ear protection higly recommended.	
99120 Performance Contract	
Subtotal	99120
Totals	99120.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	INTERNATIONAL TEXTILE CENTER	109376
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.5164819 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.0509269 $/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 (Exception: AHU 3-85/Regular 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:

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

1.0 Describe proposed energy conservation measures: Smaller, more efficient chiller. VFDs on cooling towers, ddc controls on AHUs, VFDs on AHUs and lighting upgrade

2.0 Estimate of installed cost of above measures: $553,446.00

3.0 Estimate of annual energy and water cost savings for above measures: $99,120.00

4.0 Projected simple payback period for above measures in years: 5.6

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	INTERNATIONAL CULTURAL CENTER	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
34700	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	30	76%	0	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1996	SUN	6 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes No X
3. Summer Program Use — Yes No X
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): INTERNATIONAL CULTURAL CENTER (a) Building Size(s) (Gross Sq. Ft.) 34700

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
Annual Totals	516,000	$33,372	Avg. $0.07	6,007.30	$33,099.94	Avg. $5.58	170.20	$276.76	Avg. $2.19	0.00	$0.00	0.00	$0.00	$66,748.86

(1) (2) (3) (4) (5)

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	516000	KWH x 0.0116	=	5985.6	MMBTU
(pp) Nat. Gas	6175.5044	MMBTU x 1.0	=	6175.5044	MMBTU
(qq1) Steam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	0	TON HRS x 0.012	=	0	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU

(uu) TOTAL ANNUAL BTU'S = 12161.104 MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 12161.1044 / (a) 34700

EUI = (vv) 0.350464104 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 66748.86 / (a) 34700

ECI = (ww) 1.923598271 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	INTERNATIONAL CULTURAL CENT	34700
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	334		
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	133	___ 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
		Totals	467.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	INTERNATIONAL CULTURAL CENTER	34700
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3504841 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 1.9235983 $/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 energy and water conservation measure retrofit implementation. Briefly outline recommended retrofit options:

3.0 Based on audit/or 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

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 measures: $467.00

4.0 Projected simple payback period for above measures in years: 0

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	INDUSTRIAL ENGINEERING	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
28130	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	290	89%	4 Hrs	7	2%	0	0	0%	Central Bldg. Panel (f) Yes __X__ No ____
Date (b) Occupied	SAT	6 Hrs	16	5%	0	0	0%	0	0	0%	EMS (g) Yes __X__ No ____
1925	SUN	6 Hrs	7	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ____
4. Building has exterior floodlighting	Yes __X__	No ____

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): INDUSTRIAL ENGINEERING (a) Building Size(s) (Gross Sq. Ft.) 28130

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
										STEAM-HOT WATER		CHILLED WATER		ENERGY
MONTH	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
Annual Totals	306,480	$19,803	Avg. $0.07	539.18	$3,695.79	Avg. $6.86	609.30	$1,720.40	Avg. $3.23	1,696.40	$18,649.62	143,573.58	$22,267.00	$66,135.44

(2) (3) (4) (5)

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	306480	KWH x 0.0116	=	3555.168	MMBTU
(pp) Nat. Gas	539.182452	MMBTU x 1.0	=	539.18245	MMBTU
(qq1) Steam/Hot Water	1696.4041	MMBTU x 1.0	=	1696.4041	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	143573.581	TON HRS x 0.012	=	1722.883	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		7513.6375	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 7513.637529 / (a) 28130

EUI = (vv) 0.267104071 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 66135.4409 / (a) 28130

ECI = (ww) 2.351064376 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	INDUSTRIAL ENGINEERING	28130
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	
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	132	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
X Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
X Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	2735	Subtotal	0
		Totals	2867.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	INDUSTRIAL ENGINEERING	28130
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2671041 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.3510644 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

Reset schedule

Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $16,636.25

3.0 Estimate of annual energy and water cost savings for above measures: $2,867.00

4.0 Projected simple payback period for above measures in years: 5.8

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	HUMAN SCIENCES	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)		OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
175428	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	3509	60%	0	117	2%	0	0	0%	Central Bldg. Panel (f) Yes X No ____
Date (b) Occupied	SAT	0 Hrs	292	5%	0	0	0%	0	0	0%	EMS (g) Yes X No ____
1925	SUN	0 Hrs	117	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ____
4. Building has exterior floodlighting — Yes X No ____
5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT PUA2

Building Name(s) HUMAN SCIENCES (a) Building Size(s) (Gross Sq. Ft. 175428

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	$27,404.99
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
Annual Totals	738,000	$47,982	Avg. $0.07	3,367	$23,082	Avg. $6.86	3,800.00	$10,729	Avg. $3.23	10,579	$116,305	895,372	$138,864	$336,963

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	738,000.00	KWH x 0.0116	= 8,560.80	MMBTU
(pp)	Nat. Gas	3,367.00	MMBTU x 1.0	= 3,367.00	MMBTU
(qq1)	Steam/Hot Water	10,579.00	MMBTU x 1.0	= 10,579.00	MMBTU
(qq2)	Steam	-	LBS x 0.001390	= -	MMBTU
(rr)	Chilled Water	895,372.00	TON HRS x 0.012	= 10,744.46	MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	= -	MMBTU
(tt)	Other Fuel	-	x	= -	MMBTU

(uu) TOTAL ANNUAL BTU'S = 33,251.26 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's (uu) 33,251.26 / Building Gross Sq. Ft. (a) 175,428.00 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.18954365 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs (nn) 336,963.00 / Building Gross Sq. Ft. (a) 175,428.00 $/Sq.Ft./Yr.

ECI = (ww) 1.92080512 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	HUMAN SCIENCES	175428
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
	Ventilation System Operations	
___	Reduced ventilation	
_X_	Variable ventilation	
___	Unoccupied area ventilation shut down	
___	Repair of caulking & weatherstripping	
___	Maintenance & repair or operating controls	
	Subtotal	10176
	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	674
	Lighting Systems Operations	
_X_	Reduce illumination levels	
___	Maximize use of daylight	
_X_	Install high efficiency lamps	
___	Reduce or delete evening cleaning hours	
	Subtotal	17160

	System Changes	% Cost Savings
	Water Systems Operations	
___	Repair all leaks	
___	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	
___	Pipe insulation repair	
	Subtotal Subtotal	0
	Other Measures (including water use)	
___		
___		
___		
___		
	Subtotal	0
	Totals	28010.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	HUMAN SCIENCES	175428
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT 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 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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options: Lighting retrofit
Reset schedule
Time of day schedule optimization
Economizer
VFD installation on AHUs

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. _____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system
Adjust AHU's reset schedule/Economizer operation setpoint
Update building utilities operation schedule
Install VFDs on AHU's fan motors

2.0 Estimate of installed cost of above 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 for above measures in years: 5.6

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	HOLDEN HALL	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
178442	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	3271	55%	0	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1949	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes No X
3. Summer Program Use — Yes No X
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) HOLDEN HALL (a) Building Size(s) (Gross Sq. Ft.) 178442

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
Annual Totals	1,478,000	$96,396	Avg. $0.07	3,262	$22,210	Avg. $6.86	3,865	$10,913	Avg. $3.23	10,761	$118,303	910,756	$141,250	$389,073

(2) (3) (4) (5)

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	1,478,000.00	KWH x 0.0116	=	17144.8	MMBTU
(pp) Nat. Gas	3,262.00	MMBTU x 1.0	=	3,262.00	MMBTU
(qq1) Steam/Hot Water	10,761.00	MMBTU x 1.0	=	10,761.00	MMBTU
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU
(rr) Chilled Water	910,756.00	TON HRS x 0.012	=	10,929.07	MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(tt) Other Fuel	-	x	=	-	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		42,096.87	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 42,096.87 / (a) 178,442.00

EUI = (vv) 0.23591347 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 389,073.00 / (a) 178,442.00

ECI = (ww) 2.18038915 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	HOLDEN HALL	178442
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
	Ventilation System Operations	
___	Reduced ventilation	
_X_	Variable ventilation	
___	Unoccupied area ventilation shut down	
___	Repair of caulking & weatherstripping	
___	Maintenance & repair or operating controls	
	Subtotal	7767
	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	778
	Lighting Systems Operations	
_X_	Reduce illumination levels	
___	Maximize use of daylight	
_X_	Install high efficiency lamps	
___	Reduce or delete evening cleaning hours	
	Subtotal	17510

	System Changes	% Cost Savings
	Water Systems Operations	
___	Repair all leaks	
___	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	
___	Pipe insulation repair	
	Subtotal Subtotal	0
	Other Measures (including water use)	
___		
___		
___		
___		
	Subtotal	0
	Totals	26055.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	HOLDEN HALL	178442
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

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 water-using systems: Good 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:
Lighting retrofit
Reset schedule
Time of day schedule optimization
Economizer

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. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Install VFDs on AHU Motors
Retrofit (efficiency/illumination level) existing lighting system
Adjust AHU's reset schedule/Economizer operation setpoint
Update building utilities operation schedule

2.0 Estimate of installed cost of above measures: $129,556.33

3.0 Estimate of annual energy and water cost savings for above measures: $26,055.00

4.0 Projected simple payback period for above measures in years: 5

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	FOREIGN LANGUAGE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
66858	Time Period: Hrs/Occupants/% GSF									
	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12	1100	50%	4	50	2%	0	0	0%
Date (b) Occupied	SAT	0	0	0%	0	0	0%	0	0	0%
1967	SUN	0	0	0%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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___
4. Building has exterior floodlighting	Yes X	No___

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

Building Name(s): FOREIGN LANGUAGE — (a) Building Size(s)(Gross Sq. Ft.): 66,858

ENERGY USE AND COST DATA — For Year Ending 8/31/2005 — ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	$11,801.50
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	$7.56	415.18	$921.72	$2.22	171.34	$2,002.74	45,924.37	$7,635.21	$21,279.01
Annual Totals	582,360.00	$37,861.39	Avg. $0.07	② 2,186.13	########	Avg. $6.84	③ 1,448.16	$4,088.96	Avg. $3.23	④ 4,031.93	$44,325.51	⑤ 341,238.62	$52,923.11	$154,802.60

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	582,360.00	KWH x 0.0116	=	6,755.38	MMBTU
(pp) Nat. Gas	2,186.13	MMBTU x 1.0	=	2,186.13	MMBTU
(qq1) Steam/Hot Water	4,031.93	MMBTU x 1.0	=	4,031.93	MMBTU
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU
(rr) Chilled Water	341,238.62	TON HRS x 0.012	=	4,094.86	MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(tt) Other Fuel	-	x	=	-	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		17,068.30	MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. — MMBTU/Sq.Ft./Yr.

EUI = (uu) 17,068.30 / (a) 66,858.00

EUI = (vv) 0.25529183 — MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. — $/Sq.Ft./Yr.

ECI = (nn) 154,802.60 / (a) 66,858.00

ECI = (ww) 2.31539388 — $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	FOREIGN LANGUAGE	66858
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	2938		
Heating & Cooling System Operations		**Utility Plant & Distribution System Oper.**	
_X_ 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	310	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		_X_ Noise/Vibration on mechanical room	
___ Maximize use of daylight		___	
_X_ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	6540	Subtotal	0
		Totals	9788.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	FOREIGN LANGUAGE	66,858
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2552918 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.3153939 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options: Lighting retrofit

Reset schedule

Time of day schedule optimization

Economizer

Variable Frequency Drives for AHU's fans

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Install variable frequency drives on AHU's fixed speed fans

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $52,439.40

3.0 Estimate of annual energy and water cost savings for above measures: $9,788.00

4.0 Projected simple payback period for above measures in years: 5.4

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	FOOD TECHNOLOGY	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
17400		Time Period: Hrs/Occupants/% GSF								
	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	350	63%	4 Hrs	11	2%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	28	5%	0	0	0%	0	0	0%
1976	SUN	6 Hrs	11	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) FOOD TECHNOLOGY (a) Building Size(s) (Gross Sq. Ft.) 17400

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	47,520	$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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	504800	KWH x 0.0116	=	5855.68 MMBTU
(pp)	Nat. Gas	331.72848	MMBTU x 1.0	=	331.72848 MMBTU
(qq1)	Steam/Hot Water	1049.32213	MMBTU x 1.0	=	1049.3221 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	88808.4007	TON HRS x 0.012	=	1065.7008 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 8302.4314 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 8302.431414 / (a) 17400 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.477151231 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 61414.86813 / (a) 17400

ECI = (ww) 3.529590122 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	FOOD TECHNOLOGY	17400
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	3390		
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	123	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		___	
___ Maximize use of daylight		___	
_X_ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	1699	Subtotal	0
		Totals	5212.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	FOOD TECHNOLOGY	17400
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.4771512 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.5295901 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Regular 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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

VFD installation on AHUs

Reset schedule

Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Install VFDs on AHU's fan motors

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: $5,212.00

4.0 Projected simple payback period for above measures in years: 3.2

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	FISHERIES & WILDLIFE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
8486	Days	Time Period: Hrs/Occupants/% GSF (c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	240	74%	4 Hrs	6	2%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	16	5%	0	0	0%	0	0	0%
1961	SUN	6 Hrs	6	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers Also freezers & cooler	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes No X
3. Summer Program Use — Yes No X
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): FISHERIES & WILDLIFE (a) Building Size(s) (Gross Sq. Ft.) 8486

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	224880	KWH x 0.0116	=	2608.608	MMBTU
(pp) Nat. Gas	157.250528	MMBTU x 1.0	=	157.25053	MMBTU
(qq1) Steam/Hot Water	511.755607	MMBTU x 1.0	=	511.75561	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	43311.9591	TON HRS x 0.012	=	519.74351	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		3797.3576	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 3797.357644 / (a) 8486

EUI = (vv) 0.447484992 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 28681.37838 / (a) 8486

ECI = (ww) 3.379846616 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	FISHERIES & WILDLIFE	8486
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	
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	57	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
X Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
X Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	837	Subtotal	0
		Totals	894.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	FISHERIES & WILDLIFE	8486
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

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 condition of building envelope: Regular 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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

Reset schedule

Economizer

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

1.0 Describe proposed energy conservation measures:

Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $5,164.15

3.0 Estimate of annual energy and water cost savings for above measures: $894.00

4.0 Projected simple payback period for above measures in years: 5.8

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	KTXT TV	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)		OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
875	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	20	5%	0	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1982	SUN	6 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ____
4. Building has exterior floodlighting — Yes X No ____

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) KTXT TV (a) Building Size(s) (Gross Sq. Ft.) 875

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MCF (dd)	NATURAL GAS COST $ (ee)	$/MCF (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	37360.000	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
October	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	11600.000	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
June	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
July	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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	214800	KWH x 0.0116	= 2491.68	MMBTU
(pp)	Nat. Gas	16.2142602	MCF x 1.03	= 16.700688	MMBTU
(qq1)	Steam/Hot Water	52.7676356	MMBTU x 1.0	= 52.767636	MMBTU
(qq2)	Steam	0	LBS x 0.001390	= 0	MMBTU
(rr)	Chilled Water	4485.93969	TON HRS x 0.012	= 53.591276	MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	= 0	MMBTU
(tt)	Other Fuel	0	x	= 0	MMBTU

(uu) TOTAL ANNUAL BTU'S = 2614.7396 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. (uu) 2614.7396 / (a) 875 = MMBTU/Sq.Ft./Yr.

EUI = (vv) 2.986273828 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. (nn) 15713.44636 / (a) 875 = $/Sq.Ft./Yr.

ECI = (ww) 17.95822441 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	KTXT TV	875
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
_X_ 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	31	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
___ Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
___ Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	0	Subtotal	0
		Totals	31.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	KTXT TV	875
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 2.9882738 BTU/Sq.Ft./Yr.

1.2 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 schedule

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

1.0 Describe proposed energy conservation measures:
Adjust AHU's reset schedule

2.0 Estimate of installed cost of above measures: $98.00

3.0 Estimate of annual energy and water cost savings for above measures: $31.00

4.0 Projected simple payback period for above measures in years: 3.2

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	LIBRARY	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
303150	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	4345	43%	4 Hrs	202	2%	2 Hrs	101	1%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	12 Hrs	505	5%	4 Hrs	202	2%	2 Hrs	101	1%	EMS
1962	SUN	12 Hrs	505	5%	4 Hrs	202	2%	2 Hrs	101	1%	(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.
Recommissioning - FY00

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) LIBRARY (a) Building Size(s) (Gross Sq. Ft.) 303150

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	544,080.00	$ 35,371.11	$ 0.07	299.78	$ 1,919.40	$ 6.40	696.67	$ 1,859.27	$ 2.67	808.61	$ 8,954.55	158,798.79	$ 21,283.77	$ 69,388.10
October	470,760.00	$ 29,299.00	$ 0.06	344.96	$ 1,944.28	$ 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	$ 0.06	500.82	$ 3,714.12	$ 7.42	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	$ 26,603.08	$ 0.06	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	$ 0.06	772.08	$ 4,973.64	$ 6.44	241.39	$ 908.38	$ 3.76	2,449.15	$ 28,207.59	80,216.42	$ 10,660.66	$ 78,399.22
February	452,080.00	$ 26,500.62	$ 0.06	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	$ 28,880.32	$ 0.06	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	$ 38,085.23	$ 0.06	507.81	$ 3,817.19	$ 7.52	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	$ 0.07	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	$ 37,409.81	$ 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	$ 36,286.40	$ 0.07	301.50	$ 2,281.62	$ 7.57	1,049.47	$ 2,710.81	$ 2.58	874.63	$ 8,289.34	203,519.87	$ 27,982.99	$ 77,551.17
August	500,600.00	$ 38,317.79	$ 0.08	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
	(c)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	6,010,600.00	KWH x 0.0116	=	69,722.96 MMBTU
(pp) Nat. Gas	5,423.00	MMBTU x 1.0	=	5,423.00 MMBTU
(qq1) Steam/Hot Water	18,282.00	MMBTU x 1.0	=	18,282.00 MMBTU
(qq2) Steam	-	LBS x 0.001390	=	- MMBTU
(rr) Chilled Water	1,547,257.00	TON HRS x 0.012	=	18,567.08 MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	- MMBTU
(tt) Other Fuel	-	x	=	- MMBTU
		(uu) TOTAL ANNUAL BTU'S =		111,995.04 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 111,995.04 / (a) 303,150.00

EUI = (vv) 0.369437717 MMBTU/Sq.FL/Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 889,885.00 / (a) 303,150.00

ECI = (ww) 2.935460993 $/Sq.FL/Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	LIBRARY	303150
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
_X_ 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	1780	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
___ Reduce illumination levels		_X_ Lighting Controls	
___ Maximize use of daylight		___	
___ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	0	Subtotal	78431
		Totals	80211.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	LIBRARY	303150
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

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 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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:
Reset schedule
Time of day schedule optimization
Economizer

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

1.0 Describe proposed energy conservation measures:
Adjust AHU's reset schedule/Economizer operation setpoint
Update building utilities operation schedule
Install Lighting controls on the Library Stacks.

2.0 Estimate of installed cost of above measures: $106,572.33

3.0 Estimate of annual energy and water cost savings for above measures: $80,211.00

4.0 Projected simple payback period for above measures in years: 1.3

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	LAW	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
129043	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	2882	67%	0	86	2%	0	0	0%
Date (b) Occupied	SAT	0 Hrs	215	5%	0	0	0%	0	0	0%
1969	SUN	0 Hrs	86	2%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.
Recommissioning - FY00

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) LAW

(a) Building Size(s) (Gross Sq. Ft 129043

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	194,240.00	$ 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	$1,624.86	$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)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	2,536,480.00	KWH x 0.0116	=	29,423.17	MMBTU
(pp) Nat. Gas	2,335.00	MMBTU x 1.0	=	2,335.00	MMBTU
(qq1) Steam/Hot Water	7,782.00	MMBTU x 1.0	=	7,782.00	MMBTU
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU
(rr) Chilled Water	658,627.00	TON HRS x 0.012	=	7,903.52	MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(tt) Other Fuel	-	x	=	-	MMBTU

(uu) TOTAL ANNUAL BTU'S = 47,443.69 MMBTU

*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

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 47,443.69 / (a) 129,043.00

EUI = (vv) 0.36765801 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 377,228.00 / (a) 129,043.00

ECI = (ww) 2.92327364 $/Sq.Ft./Yr.

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	LAW	129043
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
Ventilation System Operations	
X Reduced ventilation	
X Variable ventilation	
___ Unoccupied area ventilation shut down	
___ Repair of caulking & weatherstripping	
___ Maintenance & repair or operating controls	
Subtotal	$39,689.000
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	754
Lighting Systems Operations	
X Reduce illumination levels	
___ Maximize use of daylight	
X Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	12687

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
___	
___	
___	
___	
Subtotal	0
Totals	53130.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY (Institution Name) | LAW (Building Name) | 129043 (Building Size (GSF))

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.367658 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.9232736 $/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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options: Lighting retrofit
Reset schedule
Time of day schedule optimization
Economizer
VFD installation on AHUs

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system
Adjust AHU's reset schedule/Economizer operation setpoint
Update building utilities operation schedule
Install VFDs on AHU's fan motors

2.0 Estimate of installed cost of above measures: $146,961.33

3.0 Estimate of annual energy and water cost savings for above measures: $53,130.00

4.0 Projected simple payback period for above measures in years: 2.8

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	LIVESTOCK ARENA & MEAT LAB	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
43931		Time Period: Hrs/Occupants/% GSF								
	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	?	87%	4 Hrs	?	0%	0	0	0%
Date (b) Occupied	SAT	6 Hrs	?	0%	0	0	0%	0	0	0%
1978	SUN	6 Hrs	?	0%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes __X__ No ____

EMS
(g) Yes __X__ No ____

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ____
4. Building has exterior floodlighting — Yes __X__ No ____
5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) LIVESTOCK ARENA & MEAT LAB (a) Building Size(s) (Gross Sq. Ft.) 43931

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL ENERGY
										STEAM-HOT WATER	CHILLED WATER			
	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	MMBTU	COST	TON HRS	COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(co)	Electricity	609120	KWH x 0.0116	=	7065.792 MMBTU
(pp)	Nat. Gas	796.186261	MMBTU x 1.0	=	796.18626 MMBTU
(qq1)	Steam/Hot Water	2649.29714	MMBTU x 1.0	=	2649.2971 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	224220.796	TON HRS x 0.012	=	2690.6496 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 13201.925 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 13201.92496 / (a) 43931

EUI = (vv) 0.300515011 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 111941.089 / (a) 43931

ECI = (ww) 2.548111561 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	LIVESTOCK ARENA & MEAT LAB	43931
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	560		
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	224	___ 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
		Totals	784.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	LIVESTOCK ARENA & MEAT LAB	43931
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.300515 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.5481116 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Regular condition

1.4 Describe physical condition of building energy and water-using systems:

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:

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) 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 above measures: $784.00

4.0 Projected simple payback period for above measures in years: 0

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	MUSEUM	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
158266	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	380	50%	0	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1970	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation	Yes X	No
2. 9 month per year operation	Yes	No X
3. Summer Program Use	Yes	No X
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): MUSEUM — (a) Building Size(s) (Gross Sq. Ft.) 158266

ENERGY USE AND COST DATA — For Year Ending: 8/31/2005 — ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MCF (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	STEAM-HOT WATER COST (kk)	CHILLED WATER TON HRS (ll)	CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	4746640	KWH x 0.0116	=	55061.024 MMBTU
(pp)	Nat. Gas	6999.311886	MMBTU x 1.0	=	6999.3119 MMBTU
(qq1)	Steam/Hot Water	0	MMBTU x 1.0	=	0 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	0	TON HRS x 0.012	=	0 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 62060.336 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. — MMBTU/Sq.Ft./Yr.

EUI = (uu) 62060.33589 / (a) 158266

EUI = (vv) 0.392126773 — MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. — $/Sq.Ft./Yr.

ECI = (nn) 362570.8345 / (a) 158266

ECI = (ww) 2.290895293 — $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	MUSEUM	158266
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
Ventilation System Operations	
___ Reduced ventilation	
_X_ Variable ventilation	
___ Unoccupied area ventilation shut down	
___ Repair of caulking & weatherstripping	
___ Maintenance & repair or operating controls	
Subtotal	24207
Heating & Cooling System Operations	
___ Change in thermostat control set points	
___ Provide locking thermostat covers	
___ Reset of air & water temperatures	
___ Unoccupied reset or shut down of system	
___ Shut down non-critical exhaust systems	
Subtotal	0
Lighting Systems Operations	
___ Reduce illumination levels	
___ Maximize use of daylight	
___ Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	0

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
*** Noisy chiller area.	
Ear protection higly recommended.	
Subtotal	0
Totals	24207.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	MUSEUM	158266
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3921268 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.2908953 $/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: Very good 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:

Review automatic pressure control on chilled-water system

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

1.0 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

3.0 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

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	MECHANICAL ENGINEERING	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
	Time Period: Hrs/Occupants/% GSF									
88748	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12	1800	62%	4 Hrs	90	3%	0 Hrs	0	0%
Date (b) Occupied	SAT	12	180	6%	0 Hrs	0	0%	0 Hrs	0	0%
1960	SUN	12	90	3%	0 Hrs	0	0%	0 Hrs	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): MECHANICAL ENGINEERING (a) Building Size(s)(Gross Sq. Ft.): 88,748

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	CHILLED WATER TON HRS (ll)	CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	792,960.00	KWH x 0.0116	=	9,198.34	MMBTU
(pp) Nat. Gas	1,627.41	MMBTU x 1.0	=	1,627.41	MMBTU
(qq1) Steam/Hot Water	5,352.03	MMBTU x 1.0	=	5,352.03	MMBTU
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU
(rr) Chilled Water	452,963.68	TON HRS x 0.012	=	5,435.56	MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(tt) Other Fuel	-	x	=	-	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		21,613.33	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 21,613.33 / (a) 88,748.00 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.24353601 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 197,350.63 / (a) 88,748.00 $/Sq.Ft./Yr.

ECI = (ww) 2.22371915 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	MECHANICAL ENGINEERING	88748
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	698		
Heating & Cooling System Operations		**Utility Plant & Distribution System Oper.**	
_X_ 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	395	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		___	
___ Maximize use of daylight		___	
_X_ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	8713	Subtotal	0
		Totals	9806.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	MECHANICAL ENGINEERING	88,748
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT 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

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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:
Reset schedule
Time of day schedule optimization
Economizer

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. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Install VFDs on AHUs
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: $56,747.33

3.0 Estimate of annual energy and water cost savings for above measures: $9,806.00

4.0 Projected simple payback period for above measures in years: 5.8

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	MCLELLAN MEMORIAL	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
14062	Days	Time Period: Hrs/Occupants/% GSF (c) Daylight			(d) Evening			(e) Night		
	M - F	12 Hrs	30	57%	0	0	0%	0	0	0%
Date (b) Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%
1956	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes ___ No X
3. Summer Program Use — Yes ___ No X
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

Building Name(s): MCLELLAN MEMORIAL (a) Building Size(s) (Gross Sq. Ft.) 14062

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL ENERGY
	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	STEAM-HOT WATER MMBTU	STEAM-HOT WATER COST	CHILLED WATER TON HRS	CHILLED WATER COST	COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(cc) Electricity	133920	KWH x 0.0116	=	1553.472	MMBTU
(pp) Nat. Gas	253.787325	MMBTU x 1.0	=	253.78733	MMBTU
(qq1) Steam/Hot Water	848.021134	MMBTU x 1.0	=	848.02113	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	71771.4788	TON HRS x 0.012	=	861.25775	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		3516.5382	MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 3516.538205 / (a) 14062 = 0.250073831 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 31788.37747 / (a) 14062 = (ww) 2.260587219 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	MCLELLAN MEMORIAL	14062
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	
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	64	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
___ Reduce illumination levels		___	
___ Maximize use of daylight		___	
X Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	1382	Subtotal	0
		Totals	1446.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	MCLELLAN MEMORIAL	14062
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2500738 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.2605872 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Regular condition

1.4 Describe physical condition of building energy and water-using systems: Regular 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:
Lighting retrofit
Reset schedule
Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system
Adjust AHU's reset schedule
Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $8,420.54

3.0 Estimate of annual energy and water cost savings for above measures: $1,446.00

4.0 Projected simple payback period for above measures in years: 5.8

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	MATHMATICAL SCIENCES	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)		OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
67203	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	1322	59%	0	67	3%	0	0	0%	Central Bldg Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	134	6%	0	0	0%	0	0	0%	
1938	SUN	0 Hrs	67	3%	0	0	0%	0	0	0%	EMS (g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water System (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) MATHMATICAL SCIENCES (a) Building Size(s) (Gross Sq. F 67203

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	56,880.00	$ 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	49,600.00	$ 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	47,840.00	$ 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	52,480.00	$ 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
Annual Totals	639,760	$41,679	Avg. $0.07	1,281	$8,774	Avg. $6.86	1,456	$4,110	Avg. $3.23	4,053	$44,554	342,999	$53,196	$152,313

(1) (2) (3) (4) (5)

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	639,760.00	KWH x 0.0116	=	7,421.22 MMBTU
(pp) Nat. Gas	1,281.00	MMBTU x 1.0	=	1,281.00 MMBTU
(qq1) Steam/Hot Water	4,053.00	MMBTU x 1.0	=	4,053.00 MMBTU
(qq2) Steam	-	LBS x 0.001390	=	- MMBTU
(rr) Chilled Water	342,999.00	TON HRS x 0.012	=	4,115.99 MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	- MMBTU
(tt) Other Fuel	-	x	=	- MMBTU

(uu) TOTAL ANNUAL BTU'S = ######## MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 16,871.20 / (a) 67,203.00

EUI = (vv) 0.25104838 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 152,313.00 / (a) 67,203.00

ECI = (ww) 2.26646132 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	MATHMATICAL SCIENCES	67203
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	1899		
Heating & Cooling System Operations		**Utility Plant & Distribution System Oper.**	
_X_ 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	305	___ 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
		Totals	2204.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	MATHMATICAL SCIENCES	67203
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2510484 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.2664613 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Reset schedule

Time of day schedule optimization

Economizer

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

1.0 Describe proposed energy conservation measures: Install VFDs on AHU Motors

Adjust AHU's reset schedule/Economizer operation setpoint

Update building utilities operation schedule

2.0 Estimate of installed cost of above measures: $208.33

3.0 Estimate of annual energy and water cost savings for above measures: $20,152.00

4.0 Projected simple payback period for above measures in years: 0

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	MASS COCOMMUNICATIONS	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE									BASIC HVAC CONTROL DATA
78586	Time Period: Hrs/Occupants/% GSF									
	Days	(c) Daylight			(d) Evening			(e) Night		
	M - F	12	1600	60%	3	80	3%	0	0	0%
Date (b) Occupied	SAT	0	0	0%	0	0	0%	0	0	0%
1976	SUN	0	0	0%	0	0	0%	0	0	0%

Central Bldg. Panel
(f) Yes X No

EMS
(g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): MASS COMMUNICATION (a) Building Size(s)(Gross Sq. Ft.) 78,586

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	$6.59	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
Annual Totals	964,400.00	$62,864.07	Avg. $0.07	(2) 1384.796	$9,379.49	Avg. $6.78	(3) 1702.193	$4,806.23	Avg. $3.23	(4) 4739.197	$52,100.93	(5) 401097.528	$62,206.70	$191,357.43

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	964,400.00	KWH x 0.0116	=	######## MMBTU
(pp)	Nat. Gas	1,384.80	MMBTU x 1.0	=	1,384.80 MMBTU
(qq1)	Steam/Hot Water	4,739.20	MMBTU x 1.0	=	4,739.20 MMBTU
(qq2)	Steam	-	LBS x 0.001390	=	- MMBTU
(rr)	Chilled Water	401,097.53	TON HRS x 0.012	=	4,813.17 MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	=	- MMBTU
(tt)	Other Fuel	-	x	=	- MMBTU

(uu) TOTAL ANNUAL BTU'S = 22124.2 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 22,124.20 / (a) 78,586.00

EUI = (vv) 0.28152856 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 191,357.43 / (a) 78,586.00

ECI = (ww) 2.43500655 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	MASS COMMUNICATION	78586
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	4931		
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	383	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		___	
___ Maximize use of daylight		___	
_X_ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	7707	Subtotal	0
		Totals	13021.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	MASS COMMUNICATION	78,586
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2815286 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.4350066 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options: High efficicency lighting

Reset schedules

Time of day schedule optimization

Economizers

Variable Frequency Drives for AHU's fans

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. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

Install variable frequency drives on AHU's fixed speed fans

2.0 Estimate of installed cost of above measures: $62,453.55

3.0 Estimate of annual energy and water cost savings for above measures: $13,021.00

4.0 Projected simple payback period for above measures in years: 4.8

Form PUA 4

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	11/22/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	MUSIC	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)		OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
106430	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	1600	45%	4 Hrs	80	2%	0 Hrs	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	
1951	SUN	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	EMS (g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): MUSIC

(a) Building Size(s)(Gross Sq. Ft.): 106430

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST $ (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST $ (mm)	TOTAL ENERGY COSTS* $ (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	286.17	$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	$9,824.28	$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
Annual Totals	(b) 702,400.00	$45,663.61	Avg. $0.07	(2) 1,983.22	$13,541.30	Avg. $6.86	(3) 2,305.30	$6,509.14	Avg. $3.23	(4) 6,418.35	$70,560.94	(5) ##########	$84,247.32	##########

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	##########	KWH x 0.0116	=	8,147.84	MMBTU
(pp) Nat. Gas	1,983.22	MMBTU x 1.0	=	1,983.22	MMBTU
(qq1) Steam/Hot Water	6,418.35	MMBTU x 1.0	=	6,418.35	MMBTU
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU
(rr) Chilled Water	##########	TON HRS x 0.012	=	6,518.54	MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(tt) Other Fuel	-	x	=	-	MMBTU

(uu) TOTAL ANNUAL BTU'S = ########## MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 23,067.95 / (a) ########## MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.21674297 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) ########## / (a) ########## $/Sq.Ft./Yr.

ECI = (ww) 2.07199391 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	MUSIC	106430
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	22067		
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	441	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		___	
___ Maximize use of daylight		___	
_X_ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	10410	Subtotal	0
		Totals	32918.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY (Institution Name) | MUSIC (Building Name) | 106430 (Building Size (GSF))

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.216743 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.0719939 $/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:

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: High efficiency lighting

Reset schedules

Time of day schedule optimization

Economizers

Variable Frequency Drives for AHU's fans

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. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

Install variable frequency drives on AHU's fixed speed fans

2.0 Estimate of installed cost of above measures: $62,363.45

3.0 Estimate of annual energy and water cost savings for above measures: $66,181.00

4.0 Projected simple payback period for above measures in years: 0.9

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	1/8/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	PETROLEUM ENGINEERING	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
69892	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12	1700	75%	4 Hrs	80	4%	0 Hrs	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	10	170	8%	0 Hrs	0	0%	0 Hrs	0	0%	EMS (g) Yes X No
1950	SUN	10	80	4%	0 Hrs	0	0%	0 Hrs	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT PUA2

Building Name(s) PETROLEUM ENGINEERING (a) Building Size(s)(Gross Sq. Ft.): 69,892

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL ENERGY COSTS*
										STEAM-HOT WATER		CHILLED WATER		
	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	MMBTU	COST	TON HRS	COST	
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
Annual Totals	913,680.00	$59,359.42	Avg. $0.07	(2) 1,302.46	$8,893.18	Avg. $6.86	(3) 1,513.88	$4,274.52	Avg. $3.23	(4) 4,214.90	$46,336.99	(5) 356,723.95	$55,324.75	$174,188.86

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	913,680.00	KWH x 0.0116	=	10,598.69 MMBTU
(pp)	Nat. Gas	1,302.46	MMBTU x 1.0	=	1,302.46 MMBTU
(qq1)	Steam/Hot Water	4,214.90	MMBTU x 1.0	=	4,214.90 MMBTU
(qq2)	Steam	-	LBS x 0.001390	=	- MMBTU
(rr)	Chilled Water	356,723.95	TON HRS x 0.012	=	4,280.69 MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	=	- MMBTU
(tt)	Other Fuel	-	x	=	- MMBTU

(uu) TOTAL ANNUAL BTU'S = 20,396.73 MMBTU

*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

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 20,396.73 / (a) 69,892.00

EUI = (vv) 0.291832148 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 174,188.86 / (a) 69,892.00

ECI = (ww) 2.49225744 $/Sq.Ft./Yr.

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	PETROLEUM ENGINEERING	69892
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
_X_ 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	348	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		___	
___ Maximize use of daylight		___	
_X_ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	6831	Subtotal	0
		Totals	7179.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	PETROLEUM ENGINEERING	69,892
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT 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

1.4 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 energy and water conservation measure retrofit implementation.
Briefly outline recommended retrofit options:
Reset schedule
Time of day schedule optimization
Economizer

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. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures:
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: $41,025.33

3.0 Estimate of annual energy and water cost savings for above measures: $7,179.00

4.0 Projected simple payback period for above measures in years: 5.7

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	12/17/2002
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	PHYSICAL PLANT	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
106326	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	11 Hrs	2780	78%	0 Hrs	0	0%	0 Hrs	0	0%	Central Bldg. Panel (f) Yes ___X___ No _____
Date (b) Occupied	SAT	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	EMS
1961	SUN	0 Hrs	0	0%	0 Hrs	0	0%	0 Hrs	0	0%	(g) Yes ___X___ No _____

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No ___
2. 9 month per year operation — Yes ___ No X
3. Summer Program Use — Yes ___ No X
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT PUA2

Building Name(s): PHYSICAL PLANT (a) Building Size(s)(Gross Sq. Ft.): 106326

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	131,860.00	$ 8,572.33	$ 0.07	105.14	$ 673.21	$ 6.40	244.35	$ 652.11	$ 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	$ 5.64	131.21	$ 397.63	$ 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	$ 340.64	$ 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	$ 358.04	$ 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	$ 318.60	$ 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	$ 203.84	$ 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	$ 252.84	$ 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	$ 7.52	104.30	$ 347.28	$ 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	$ 606.78	$ 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	$ 608.41	$ 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	$ 950.78	$ 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	$1,465.83	$ 2.22	272.49	$ 3,185.00	73,034.71	$12,142.47	$ 27,665.91
	(1)	Avg.	(2)			Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	1,416,600.00	$ 92,817.76	$ 0.07	1,992.30	########	$ 6.86	2,303.05	$6,502.78	$ 3.23	6,412.08	$70,492.00	542,680.58	$84,164.99	$267,591.31

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	1,416,600.00	KWH x 0.0116	=	16,432.56 MMBTU
(pp)	Nat. Gas	1,992.30	MMBTU x 1.0	=	1,992.30 MMBTU
(qq1)	Steam/Hot Water	6,412.08	MMBTU x 1.0	=	6,412.08 MMBTU
(qq2)	Steam	-	LBS x 0.001390	=	- MMBTU
(rr)	Chilled Water	542,680.58	TON HRS x 0.012	=	6,512.17 MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	=	- MMBTU
(tt)	Other Fuel	-	x	=	- MMBTU

(uu) TOTAL ANNUAL BTU'S = 31,349.11 MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. (uu) 31,349.11 / (a) 106,326.00 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.29483957 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. (nn) 267,591.31 / (a) 106,326.00 $/Sq.Ft./Yr.

ECI = (ww) 2.51670629 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	PHYSICAL PLANT	106326
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
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	
_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	535
Lighting Systems Operations	
_X_ Reduce illumination levels	
___ Maximize use of daylight	
_X_ Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	10481

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
___	
___	
___	
___	
Subtotal	0
Totals	11016.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	PHYSICAL PLANT	106326
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE 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

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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options: High efficiency lighting

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 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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

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: $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 years: 5.7

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/14/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	PSYCHOLOGY	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
39221	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	190	57%	4 Hrs	7	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	17	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
1964	SUN	6 Hrs	7	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): PSYCHOLOGY (a) Building Size(s) (Gross Sq. Ft.) 39221

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
Annual Totals	723,720	$47,107	Avg. $0.07	710.82	$4,834.35	Avg. $6.86	849.54	$2,398.71	Avg. $3.23	2,365.26	$26,002.73	200,181.28	$31,046.36	$111,388.79

(1) (2) (3) (4) (5)

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	723720	KWH x 0.0116	=	8395.152 MMBTU
(pp)	Nat. Gas	710.819214	MMBTU x 1.0	=	710.81921 MMBTU
(qq1)	Steam/Hot Water	2365.2565	MMBTU x 1.0	=	2365.2565 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	200181.281	TON HRS x 0.012	=	2402.1754 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 13873.403 MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 13873.40308 / (a) 39221

EUI = (vv) 0.353723849 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 111388.794 / (a) 39221

ECI = (ww) 2.840029422 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	PSYCHOLOGY	39221
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	4282		
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	223	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
_X_ Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	3841	Subtotal	0
		Totals	8346.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	PSYCHOLOGY	39221
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3537238 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.8400294 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Lighting retrofit

VFD installation on AHUs

Reset schedule

Economizer

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Install VFDs on AHU's fan motors

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $32,403.39

3.0 Estimate of annual energy and water cost savings for above measures: $8,346.00

4.0 Projected simple payback period for above measures in years: 3.9

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	12/16/2002
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	SCIENCE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
118544	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	2300	58%	4 Hrs	120	3%	0 Hrs	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	12 Hrs	230	6%	0 Hrs	0	0%	0 Hrs	0	0%	EMS (g) Yes X No
1951	SUN	12 Hrs	120	3%	0 Hrs	0	0%	0 Hrs	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.
Recommissioning - FY00

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT PUA2

Building Name(s) SCIENCE (a) Building Size(s)(Gross Sq. Ft.) 118544

ENERGY USE AND COST DATA For Year Ending 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	123,440.00	$ 8,024.94	$ 0.07	117.23	$ 750.56	$ 6.40	272.43	$ 727.05	$ 2.67	316.20	$ 3,501.60	62,096.80	$ 8,322.82	$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	$ 7,271.38	$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	33,351.50	$ 5,460.18	$24,097.03
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	29,318.22	$ 4,270.01	$24,356.29
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	$ 4,168.75	$25,204.11
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	$ 3,972.19	$21,760.28
March	106,320.00	$ 6,603.91	$ 0.06	230.93	$ 1,521.01	$ 6.59	68.94	$ 281.89	$ 4.09	782.45	$ 9,760.35	36,553.25	$ 5,345.42	$23,512.58
April	120,960.00	$ 7,780.16	$ 0.06	198.57	$ 1,492.68	$ 7.52	116.29	$ 387.18	$ 3.33	526.14	$ 6,749.20	44,291.28	$ 6,414.84	$22,824.06
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	$10,321.17	$22,561.77
June	106,080.00	$ 8,160.80	$ 0.08	120.47	$ 815.58	$ 6.77	220.08	$ 678.32	$ 3.08	329.88	$ 129.35	68,748.43	$13,809.42	$23,593.46
July	112,720.00	$ 7,359.66	$ 0.07	117.90	$ 892.21	$ 7.57	410.39	$1,060.04	$ 2.58	342.01	$ 3,241.47	79,584.56	$10,942.49	$23,495.86
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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5) 5.00		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	1,330,400.00	KWH x 0.0116	=	15,432.64 MMBTU
(pp)	Nat. Gas	2,164.96	MMBTU x 1.0	=	2,164.96 MMBTU
(qq1)	Steam/Hot Water	7,148.90	MMBTU x 1.0	=	7,148.90 MMBTU
(qq2)	Steam	-	LBS x 0.001390	=	- MMBTU
(rr)	Chilled Water	605,040.41	TON HRS x 0.012	=	7,260.48 MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	=	- MMBTU
(tt)	Other Fuel	-	x	=	- MMBTU

(uu) TOTAL ANNUAL BTU'S = 32,006.99 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 32,006.99 / (a) 118,544.00

EUI = (vv) 0.270000915 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 281,246.67 / (a) 118,544.00

ECI = (ww) 2.372508691 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	SCIENCE	118544
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
X	Reduced ventilation	___	Repair all leaks
X	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 16446		
Heating & Cooling System Operations		**Utility Plant & Distribution System Oper.**	
X	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 562	X	Pipe insulation repair
			Subtotal Subtotal 0
Lighting Systems Operations		**Other Measures (including water use)**	
X	Reduce illumination levels	___	
___	Maximize use of daylight	___	
X	Install high efficiency lamps	___	
___	Reduce or delete evening cleaning hours	___	
	Subtotal 11640		Subtotal 0
			Totals 28648.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	SCIENCE	118544
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

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-using systems: Fair

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: High efficiency lighting

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 conditions and/or site characteristics present an opportunity to apply solar heating and/or cooling systems, or solar domestic hot water heating systems. ____ Yes __X__ No

ENERGY AND WATER CONSERVATION MEASURE RETROFIT ASSESSMENT

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule/Adjust AHU's economizer operation setpoint

Recover condensate receiver vessel

Install VFDs on AHU motors

Decentralize AHU's by using service room cooling system

2.0 Estimate of installed cost of above measures: $79,438.03

3.0 Estimate of annual energy and water cost savings for above measures: $65,808.00

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

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	12/17/2002
Name of Energy Auditor	Organization and Phone Number of Auditor	Date

TEXAS TECH UNIVERSITY	SOUTHWEST COLLECTIONS	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
77943	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	1845	71%	0	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1996	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes No X
3. Summer Program Use — Yes No X
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.
Recommissioning - FY00

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) SOUTHWEST COLLECTIONS (a) Building Size(s) (Gross Sq. Ft. 77943

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	$ 1,000.67	$ 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
Annual Totals	1,196,480.00	$ 78,365.00	Avg. $ 0.07	1,396	$ 9,481.00	Avg. $ 6.86	1,688	$4,767.00	Avg. $ 3.23	4,700	$51,675.00	397,816	$61,698.00	##########

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	1,196,480.00	KWH x 0.0116	= 13,879.17	MMBTU
(pp)	Nat. Gas	1,396.00	MMBTU x 1.0	= 1,396.00	MMBTU
(qq1)	Steam/Hot Water	4,700.00	MMBTU x 1.0	= 4,700.00	MMBTU
(qq2)	Steam	-	LBS x 0.001390	= -	MMBTU
(rr)	Chilled Water	397,816.00	TON HRS x 0.012	= 4,773.79	MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	= -	MMBTU
(tt)	Other Fuel	-	x	= -	MMBTU

(uu) TOTAL ANNUAL BTU'S = 24,748.96 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 24,748.96 / (a) 77,943.00 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.3175264 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 205,985.00 / (a) 77,943.00 $/Sq.Ft./Yr.

ECI = (ww) 2.64276458 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	SOUTHWEST COLLECTIONS	77943
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
_X_ 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	412	___ 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
		Totals	412.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	SOUTHWEST COLLECTIONS	77943
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3175264 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.6427646 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Reset schedule

Time of day schedule optimization

Economizer

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

1.0 Describe proposed energy conservation measures:

Adjust AHU's reset schedule/Economizer operation setpoint

Update building utilities operation schedule

2.0 Estimate of installed cost of above measures: $208.33

3.0 Estimate of annual energy and water cost savings for above measures: $412.00

4.0 Projected simple payback period for above measures in years: 0.5

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/10/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	SPORT STUDIES CENTER	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
24264	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	310	78%	4 Hrs	8	2%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	20	5%	0	0	0%	0	0	0%	EMS (g) Yes X No
1961	SUN	6 Hrs	8	2%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) SPORT STUDIES CENTER (a) Building Size(s) (Gross Sq. Ft.) 24264

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

	ELECTRICITY			NATURAL GAS			WATER			PURCHASED THERMAL				TOTAL
MONTH	KWH	COST $	$/KWH	MMBTU	COST $	$/MMBTU	MGAL	COST $	$/MGAL	STEAM-HOT WATER MMBTU	STEAM-HOT WATER COST	CHILLED WATER TON HRS	CHILLED WATER COST	ENERGY COSTS*
	(aa)	(bb)	(cc)	(dd)	(ee)	(ff)	(gg)	(hh)	(ii)	(jj)	(kk)	(ll)	(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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	160320	KWH x 0.0116	=	1859.712 MMBTU
(pp)	Nat. Gas	510.300901	MMBTU x 1.0	=	510.3009 MMBTU
(qq1)	Steam/Hot Water	1463.26161	MMBTU x 1.0	=	1463.2616 MMBTU
(qq2)	Steam	0	LBS x 0.001390	=	0 MMBTU
(rr)	Chilled Water	123841.784	TON HRS x 0.012	=	1486.1014 MMBTU
(ss)	Propane or Butane	0	GAL x 0.095475	=	0 MMBTU
(tt)	Other Fuel	0	x	=	0 MMBTU

(uu) TOTAL ANNUAL BTU'S = 5319.3759 MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 5319.375917 / (a) 24264 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.219229143 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 50739.5059 / (a) 24264 $/Sq.Ft./Yr.

ECI = (ww) 2.0911435 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT PUA3

TEXAS TECH UNIVERSITY	SPORT STUDIES CENTER	24264
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	
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
		Totals	101.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	SPORT STUDIES CENTER	24264
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.2192291 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.0911435 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Regular condition

1.4 Describe physical condition of building energy and water-using systems: Regular 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 schedule

Economizer

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

1.0 Describe proposed energy conservation measures:

Adjust AHU's reset schedule

Adjust AHU's economizer operation setpoint

2.0 Estimate of installed cost of above measures: $208.33

3.0 Estimate of annual energy and water cost savings for above measures: $101.00

4.0 Projected simple payback period for above measures in years: 2.1

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	12/13/2002
Name of Energy Auditor	Organization and Phone Number of Auditor	Date

TEXAS TECH UNIVERSITY	STUDENT REC. CENTER	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
130546	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	2611	60%	0	2611	60%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	2611	60%	0	2611	60%	0	0	0%	EMS (g) Yes X No
1980	SUN	0 Hrs	1305	30%	0	1305	30%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): STUDENT REC. CENTER — (a) Building Size(s) (Gross Sq. Ft. 130,546

ENERGY USE AND COST DATA — For Year Ending: 8/31/2005 — ** Metered X — Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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	$ 36,426.99
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	$ 35,915.82
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	$ 40,262.55
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	$ 37,175.58
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	$ 37,012.63
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
Annual Totals	① 3,655,680	$ 237,674.00	Avg. $ 0.07	② 2,325	$ 15,770.00	Avg. $ 6.86	③ 2,828	$7,984.00	Avg. $ 3.23	④ 7,873.00	$86,549.00	⑤ 666,298	$103,337.00	$451,315.00

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo)	Electricity	3,655,680	KWH x 0.0116	=	42,406 MMBTU
(pp)	Nat. Gas	2,325	MMBTU x 1.0	=	2,325 MMBTU
(qq1)	Steam/Hot Water	7,873	MMBTU x 1.0	=	7,873 MMBTU
(qq2)	Steam	-	LBS x 0.001390	=	- MMBTU
(rr)	Chilled Water	666,298	TON HRS x 0.012	=	7,996 MMBTU
(ss)	Propane or Butane	-	GAL x 0.095475	=	- MMBTU
(tt)	Other Fuel	-	x	=	- MMBTU

(uu) TOTAL ANNUAL BTU'S = 60,599 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 60,599 / (a) 130,546 — MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.46420008 — MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 451,315 / (a) 130,546 — $/Sq.Ft./Yr.

ECI = (ww) 3.45713388 — $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	STUDENT REC. CENTER	130546
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**Water Systems Operations**	
___ Reduced ventilation		___ Repair all leaks	
_X_ 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	12708		
Heating & Cooling System Operations		**Utility Plant & Distribution System Oper.**	
_X_ 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	903	___ 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
		Totals	13611.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	STUDENT REC. CENTER	130546
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.4642001 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 3.4571339 $/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 energy and water conservation measure retrofit implementation.

Briefly outline recommended retrofit options:

Reset schedule

Time of day schedule optimization

Economizer

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

1.0 Describe proposed energy conservation measures:

Adjust AHU's reset schedule/Economizer operation setpoint

Update building utilities operation schedule

Install VFDs on AHU motors

2.0 Estimate of installed cost of above measures: $15,190.33

3.0 Estimate of annual energy and water cost savings for above measures: $13,611.00

4.0 Projected simple payback period for above measures in years: 1.1

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/14/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	UNIVERSITY GREENHOUSE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
21464	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	80	89%	0 Hrs	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	
1973	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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 ___
4. Building has exterior floodlighting — Yes X No ___

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) UNIVERSITY GREENHOUSE (a) Building Size(s) (Gross Sq. Ft.) 21464

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	STEAM-HOT WATER COST (kk)	CHILLED WATER TON HRS (ll)	CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
Annual Totals	411,900	$26,791	Avg. $0.07	385.94	$2,621.82	Avg. $6.86	464.92	$1,312.71	Avg. $3.23	1,294.41	$14,230.20	109,550.78	$16,990.36	$61,945.73

① ② ③ ④ ⑤

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	411900	KWH x 0.0116	=	4778.04	MMBTU
(pp) Nat. Gas	385.941136	MMBTU x 1.0	=	385.94114	MMBTU
(qq1) Steam/Hot Water	1294.40518	MMBTU x 1.0	=	1294.4052	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	109550.777	TON HRS x 0.012	=	1314.6093	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU

(uu) TOTAL ANNUAL BTU'S = 7772.9956 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 7772.995634 / (a) 21464 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.362141056 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 61945.73158 / (a) 21464 $/Sq.Ft./Yr.

ECI = (ww) 2.886029239 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	UNIVERSITY GREENHOUSE	21464
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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	0	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
___ Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
___ Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	0	Subtotal	0
		Totals	0.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	UNIVERSITY GREENHOUSE	21464
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3621411 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.8860292 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope: Regular condition

1.4 Describe physical condition of building energy and water-using systems: Regular 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:

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

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 measures: $0.00

4.0 Projected simple payback period for above measures in years: #DIV/0!

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/28/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	UNIVERSITY POLICE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
32709	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	?	64%	4 Hrs	?	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	?	0%	0	?	0%	0	0	0%	EMS (g) Yes X No
	SUN	6 Hrs	?	0%	0	?	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes No X
3. Summer Program Use — Yes No X
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.
Recommissioning FY-03

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	4/28/2003
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	UNIVERSITY POLICE	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
32709	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	?	64%	4 Hrs	?	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	?	0%	0	?	0%	0	0	0%	EMS (g) Yes X No
	SUN	6 Hrs	?	0%	0	?	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation	Yes X	No	5. List year and type of major building modifications and additions.
2. 9 month per year operation	Yes	No X	Recommissioning FY-03
3. Summer Program Use	Yes	No X	
4. Building has exterior floodlighting	Yes X	No	

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): UNIVERSITY POLICE (a) Building Size(s) (Gross Sq. Ft.) 32709

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	ELECTRICITY $/KWH (cc)	NATURAL GAS MCF (dd)	NATURAL GAS COST $ (ee)	NATURAL GAS $/MCF (ff)	WATER MGAL (gg)	WATER COST $ (hh)	WATER $/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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			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
Annual Totals	262,520	$17,416	Avg. $0.07	(2) 0.00	$0.00	Avg. N/A	(3) 0.00	$0.00	Avg. N/A	(4) 0.00	$0.00	(5) 0.00	$0.00	$0.00 $17,416.16

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	262520	KWH x 0.0116	=	3045.232	MMBTU
(pp) Nat. Gas	0.00	MMBTU x 1.03	=	0	MMBTU
(qq1) Steam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	0	TON HRS x 0.012	=	0	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU

(uu) TOTAL ANNUAL BTU'S = 3045.232 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. MMBTU/Sq.Ft./Yr.

EUI = (uu) 3045.232 / (a) 32709

EUI = (vv) 0.093100737 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. $/Sq.Ft./Yr.

ECI = (nn) 17416.16476 / (a) 32709

ECI = (ww) 0.532457879 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	UNIVERSITY POLICE	32709
Facility Name	Building Name(s)	Building Size(s) (GSF)

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
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	
___ Reset of air & water temperatures	
___ Unoccupied reset or shut down of system	
___ Shut down non-critical exhaust systems	
Subtotal	0
Lighting Systems Operations	
___ Reduce illumination levels	
___ Maximize use of daylight	
___ Install high efficiency lamps	
___ Reduce or delete evening cleaning hours	
Subtotal	0

System Changes	% Cost Savings
Water Systems Operations	
___ Repair all leaks	
___ 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	
___ Pipe insulation repair	
Subtotal Subtotal	0
Other Measures (including water use)	
*** Noisy chiller area.	
Ear protection higly recommended.	
Subtotal	0
Totals	0.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	UNIVERSITY POLICE	32709
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.0931007 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 0.5324579 $/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 energy and water conservation measure retrofit implementation. Briefly outline recommended retrofit options:

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

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 measures: $0.00

4.0 Projected simple payback period for above measures in years: #DIV/0!

PRELIMINARY WATER AND ENERGY AUDIT

PUA 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.

Jeremy Dickson	Texas Tech University-Physical Plant / 806 742 1696	12/13/2002
Name of Energy Auditor	Organization and Phone Number of Auditor	Date

TEXAS TECH UNIVERSITY	WEST HALL	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
74388	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	0		0	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	0 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
1938	SUN	0 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

III. UNIQUE BUILDING CHARACTERISTICS

1. Year round, 24 hour per day operation — Yes X No
2. 9 month per year operation — Yes No X
3. Summer Program Use — Yes No X
4. Building has exterior floodlighting — Yes X No

5. List year and type of major building modifications and additions.

Form PUA 1

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s): WEST HALL (a) Building Size(s) (Gross Sq. Ft.) 74388

ENERGY USE AND COST DATA For Year Ending: 8/31/2005 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MMBTU (dd)	NATURAL GAS COST $ (ee)	$/MMBTU (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	PURCHASED THERMAL STEAM-HOT WATER COST (kk)	PURCHASED THERMAL CHILLED WATER TON HRS (ll)	PURCHASED THERMAL CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (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
Annual Totals	952,000	$62,304	Avg. $0.07	1,514	$10,294	Avg. $6.86	1,812	$5,116	Avg. $3.23	5,045	$55,458	426,944	$66,215	$199,387

(1) (2) (3) (4) (5)

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	952,000.00	KWH x 0.0116	=	11,043.20	MMBTU
(pp) Nat. Gas	1,514.00	MMBTU x 1.0	=	1,514.00	MMBTU
(qq1) Steam/Hot Water	5,045.00	MMBTU x 1.0	=	5,045.00	MMBTU
(qq2) Steam	-	LBS x 0.001390	=	-	MMBTU
(rr) Chilled Water	426,944.00	TON HRS x 0.012	=	5,123.33	MMBTU
(ss) Propane or Butane	-	GAL x 0.095475	=	-	MMBTU
(tt) Other Fuel	-	x	=	-	MMBTU

(uu) TOTAL ANNUAL BTU'S = 22,725.53 MMBTU

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. (uu) 22,725.53 / (a) 74,388.00 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.305499919 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. (nn) 199,387.00 / (a) 74,388.00 $/Sq.Ft./Yr.

ECI = (ww) 2.680365113 $/Sq.Ft./Yr.

*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

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	WEST HALL	74388
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
_X_ 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	399	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
_X_ Reduce illumination levels		___	
___ Maximize use of daylight		___	
_X_ Install high efficiency lamps		___	
___ Reduce or delete evening cleaning hours		___	
Subtotal	7324	Subtotal	0
		Totals	7723.0

Form PUA 3

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	WEST HALL	74388
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT RECOMMENDATIONS

1.0 Basic Building Data

1.1 Annual Energy Use: 0.3054999 BTU/Sq.Ft./Yr.

1.2 Annual Energy Cost: 2.6803651 $/Sq.Ft./Yr.

1.3 Describe physical condition of building envelope:

1.4 Describe physical condition of building energy and water-using systems:

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 schedule

Time of day schedule optimization

Economizer

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

1.0 Describe proposed energy conservation measures:

Adjust AHU's reset schedule/Economizer operation setpoint

Update building utilities operation schedule

2.0 Estimate of installed cost of above measures: $43,650.92

3.0 Estimate of annual energy and water cost savings for above measures: $7,723.00

4.0 Projected simple payback period for above measures in years: 5.7

PRELIMINARY WATER AND ENERGY AUDIT

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	Texas Tech University-Physical Plant / 806 742 1696	11/23/2005
Name of Energy Auditor	Organization and Phone Number of Auditor	Date
TEXAS TECH UNIVERSITY	TEXAS TECH PLAZA	Texas Tech university/Lubbock, Tx
Facility Name	Building Name(s)	Building/Campus Address

Texas Tech University
Name and Address of Owner

I. BASIC BUILDING DATA

Building Size (a)	OPERATING SCHEDULE Time Period: Hrs/Occupants/% GSF									BASIC HVAC CONTROL DATA
75797	Days	(c) Daylight			(d) Evening			(e) Night			
	M - F	12 Hrs	150	5%	4 Hrs	0	0%	0	0	0%	Central Bldg. Panel (f) Yes X No
Date (b) Occupied	SAT	6 Hrs	0	0%	0	0	0%	0	0	0%	EMS (g) Yes X No
2000	SUN	6 Hrs	0	0%	0	0	0%	0	0	0%	

II. MAJOR ENERGY USING SYSTEMS

Primary Heat Source (h)	Primary Cooling Source (i)	Space Terminal Heat (j)	Space Terminal Cooling (k)	Domestic Hot Water Source (l)	Interior Lighting System (m)	Special Building Systems & Facilities (n)
Steam Boiler	Centrifugal Chillers	Fan and Coil	Fan and Coil	Heat Exchanger	Fluorescent	

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
4. Building has exterior floodlighting	Yes X	No

5. List year and type of major building modifications and additions.

PRELIMINARY WATER AND ENERGY AUDIT

PUA2

Building Name(s) TEXAS TECH PLAZA (a) Building Size(s) (Gross Sq. Ft.) 75797

ENERGY USE AND COST DATA For Year Ending: 8/30/2002 ** Metered X Best Estimate X

MONTH	ELECTRICITY KWH (aa)	ELECTRICITY COST $ (bb)	$/KWH (cc)	NATURAL GAS MCF (dd)	NATURAL GAS COST $ (ee)	$/MCF (ff)	WATER MGAL (gg)	WATER COST $ (hh)	$/MGAL (ii)	PURCHASED THERMAL STEAM-HOT WATER MMBTU (jj)	STEAM-HOT WATER COST (kk)	CHILLED WATER TON HRS (ll)	CHILLED WATER COST (mm)	TOTAL ENERGY COSTS* (nn)
September	207,360	$13,187.06	$0.06	14.00	$145.19	$10.37	111.00	$201.07	$1.81					$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	164,960	$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
	(1)		Avg.	(2)		Avg.	(3)		Avg.	(4)		(5)		
Annual Totals	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

ANNUAL ENERGY CONSUMPTION IN BTU'S:

(oo) Electricity	2073760	KWH x 0.0116	=	24055.616	MMBTU
(pp) Nat. Gas	3213	MCF x 1.03	=	3309.39	MMBTU
(qq1) Steam/Hot Water	0	MMBTU x 1.0	=	0	MMBTU
(qq2) Steam	0	LBS x 0.001390	=	0	MMBTU
(rr) Chilled Water	0	TON HRS x 0.012	=	0	MMBTU
(ss) Propane or Butane	0	GAL x 0.095475	=	0	MMBTU
(tt) Other Fuel	0	x	=	0	MMBTU
		(uu) TOTAL ANNUAL BTU'S =		27365.006	MMBTU

*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.

ENERGY UTILIZATION INDEX (EUI)

EUI = Total Annual BTU's / Building Gross Sq. Ft. = (uu) 27365.006 / (a) 75797 MMBTU/Sq.Ft./Yr.

EUI = (vv) 0.361030199 MMBTU/Sq.Ft./Yr.

ENERGY COST INDEX (ECI)

ECI = Annual Energy Costs / Building Gross Sq. Ft. = (nn) 163040.93 / (a) 75797 $/Sq.Ft./Yr.

ECI = (ww) 2.151020885 $/Sq.Ft./Yr.

Form PUA 2

PRELIMINARY WATER AND ENERGY AUDIT

PUA3

TEXAS TECH UNIVERSITY	TEXAS TECH PLAZA	75797
Facility Name	Building Name(s)	Building Size(s) (GSF)

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		**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.**	
X 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	326	___ Pipe insulation repair	
		Subtotal Subtotal	0
Lighting Systems Operations		**Other Measures (including water use)**	
___ Reduce illumination levels		*** Noisy chiller area.	
___ Maximize use of daylight		Ear protection higly recommended.	
___ Install high efficiency lamps			
___ Reduce or delete evening cleaning hours			
Subtotal	0	Subtotal	0
		Totals	326.0

PRELIMINARY WATER AND ENERGY AUDIT

PUA4

TEXAS TECH UNIVERSITY	TEXAS TECH PLAZA	75797
Institution Name	Building Name	Building Size (GSF)

ENERGY AND WATER CONSERVATION MEASURE RETROFIT 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-using systems: Good 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: Lighting retrofit (Require further evaluation)

AHUs' reset schedule

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

1.0 Describe proposed energy conservation measures: Retrofit (efficiency/illumination level) existing lighting system

Adjust AHU's reset schedule

2.0 Estimate of installed cost of above measures: $98.00

3.0 Estimate of annual energy and water cost savings for above measures: $326.00

4.0 Projected simple payback period for above measures in years: 0.3

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 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

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	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	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	YEAR	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	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

FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
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	General Purpose Building	17400	327705	19673

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 USE	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	AREA (SF)	UTILITY USE	COST/YEAR
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 USE	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

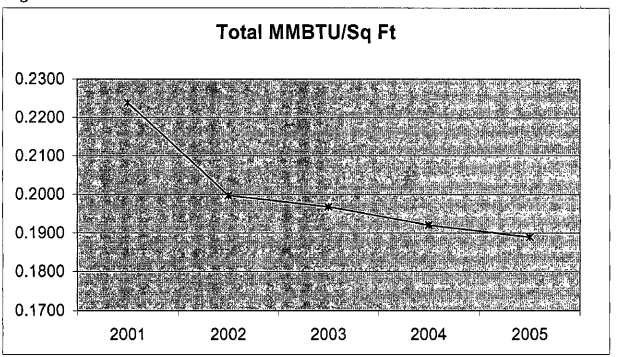
FACILITY NAME	FACILITY TYPE	AREA (SF)	UTILITY USE	COST/YEAR
ADMINISTRATION	General Purpose Building	175428	3800	19227
AGRICULTURAL ED & COMMUNICATION	General Purpose Building	25204	546	2762
AGRICULTURAL PAVILION	General Purpose Building	7263	157	796
AGRICULTURAL PLANT SCIENCES	General Purpose Building	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 UPDATE

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 Economizer setpoint adjustment	02/14/03 (Completed)
Lighting retrofit	August 2003 (Completed)

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

Art	
Measures	**Completion date**
Reset schedule adjustment Economizer setpoint adjustment	02/21/03 (Completed)
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 Economizer setpoint adjustment	03/21/03 (Completed)
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 Economizer set point adjustment (AHU 6)	09/05/03 (Completed)
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 Economizer set point adjustment	04/02/04 (Completed)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Preliminary Utility Audits – Phase III

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

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

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

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

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

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

Energy Awareness Plan

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

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/Philosophy	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 HP)

AHU	Equipment use (Hours x week)	HP
BASE	55.00	20
A01E	55.00	40
A01W	76.00	40
A02E	60.00	40
A02W	50.00	40
A03E	120.00	50
A03W	75.00	50
A04E	60.00	30
A04W	60	40
TOTAL	611.00	290

Old Daily Operation Schedule (Hours):	24
New Daily Operation Schedule (Hours):	12
Fan Electricity Consumption (KWH/Semester)	167535
Building Electricity Consumption Cost ($/KWH)	0.05
Building Steam Consumption (MMBTU/Semester)	2579.28
Building Steam Consumption Cost ($/MMBTU)	7.48
Building Chilled Water Consumption (TON-Hour/Semester)	157533.66
Building Chilled Water Consumption Cost ($/TON-Hour)	0.11
Total Building Savings ($/Semester)	7345.42

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

* 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

BUILDING	MEASURE	BUDGET	COST 2003
Administration	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
Mechanical Engineering	Recommissioning	Physical Plant Overhead	$98.00
	Lighting retrofit	Loanstar Loan	$51,828.83

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 unit	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 Labs	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
			$35,090.00

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:

1) Improve overall fuel efficiency of fleet vehicles by replacing older, inefficient vehicles with newer, more efficient vehicles.
2) 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