HARRY RANSOM CENTER RENOVATION
University of Texas at Austin

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ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
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Related Documents:
HRC_riser_diagram.pdf
HRC_Utexas_rate_model 2007.pdf

Executive Summary

The Electrical Systems Exiting Conditions and Building Load Summary incorporates a detailed look at all electrical components associated with the Harry Ransom Center. A narrative descriptions of pertinent electrical components is provided, as well as useful documentation such as a building riser diagram, sample emergency power cost calculation, and a University of Texas power systems rate model for the year 2007. Main distribution panels as well as associated breaker panel boards for the first and second floor renovation were analyzed for proper feeder and branch circuit sizing. Limited documentation of electrical systems on floors three through five as well as inadequate documentation of existing primary building electrical control devices resulted in the use of the building area method as prescribed in NEC 2005 to estimate overall building energy consumption. This estimated consumption was checked with building transformer sizes to verify the system can properly handle expected building loads; main busway feeder sizes were not documented during the renovation project and are unknown.

It was determined all distribution panels, feeders, and branch circuits were sized properly. The estimated overall building load was less than the sum kilovoltampere load of building transformers. It was also recorded that several areas of the building may have been illogically or improperly wired to control devices. Some lighting systems are not functioning properly, and the ability for the building occupant to control certain exterior and interior systems is either not possible or limited.

Electrical System Components

Related Documents:
HRC_riser_diagram.pdf
HRC_UTexas_rate_model 2007.pdf

Single Line Diagram
Please refer to the last page of this document for a Riser Diagram of the Harry Ransom Center. Due to insufficient exiting building conditions documentation during the renovation project, a detailed single line diagram cannot be created at this time.

Electrical System Overview
Electrical power is supplied to the Harry Ransom Center at 12,000 volts in three separate locations from the University of Texas Power Plant. These feeders, as well as a 12,000 Volt backup feed, enter the main building switchgear through the structure's basement. One feed enters the building's main 12KV primary 208Y/120 V secondary transformer, while the other two feeds are sent to the building's two 12KV primary 480Y/277 V secondary transformers. Should either of these two 408Y/277 V systems be interrupted due to a service line fault, transformer failure, or similar condition, an automatic tie breaker will allow for all power to be supplied solely through one of these feeders and associated transformer. In the unusual case that the University Power Plant fails, Austin Power, the city of Austin's local power corporation, provides a backup power supply for emergency systems under a special agreement with the Unversity of Texas at Austin.

Voltage System Overview
General lighting loads in the Ransom Center are powered through the building's main 208Y/120 V transformer, or through secondary step-down transformers connected to the main 480Y/277 system. Due to the Ransom Center's age, lighting systems in the building are generally incandescent or incandescent track systems. These incandescent systems as well as most fluorescent lighting are powered though 120V branch circuits. Some fluorescent lighting is powered at 277 Volts.

Emergency Power Systems
Emergency power systems follow all prescribed University of Texas Campus and Facilities Management requirements. The University's emergency power system encompasses many levels of backup and has been amazingly successful at preventing interruptions in building power supply. According to Juan Ontiueros of Campus Planning and Facilities Management, there have only been three campus building power failures in the past thirty years. Electricity from the University Power Plant enters two 12KV primary 480Y/277 V secondary transformers in the Ransom Center Basement at 12 kilovolts. The main building busways are designed to handle up to 1000 kilovolt Amperes, and an automatic transfer switch will allow one transformer to power the entire structure should there be an interruption from the other feed. In the rare chance that both feeders or transformers malfunction, emergency power is provided from Austin Energy through a 12 kilovolt feed to the building's life safety system, fire pump system, and emergency lighting panels.

Transformer Schedule
A transformer schedule was not supplied in construction documentation for the Ransom Center Renovation. Below is a basic summary of transformers in the structure. Please not that during the renovation project, none of the main building electrical distribution systems, including transformers, were replaced.

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation

DESIGNATION	KVA	PRI VOLTAGE	SEC VOLTAGE	PHASE	TYPE
1	500	12KV	208Y/120	3	DRY
2	1000	12KV	480Y/277	3	DRY
3	1000	12KV	480Y/277	3	DRY
4 - TE1	30	480Y/277	208Y/120	3	DRY
5-TE2	30	480Y/277	208Y/120	3	DRY
6-LALT	9	480Y/277	208Y/120	3	DRY
7	UNKNOWN - PROVIDED BY AUSTIN POWER	12KV	280Y/277	3	DRY

Overcurrent Protection
Lighting loads in the Harry Ransom Center are protected from fault current with twenty-ampere breakers. HVAC equipment is protected with three phase twenty, thirty, and ninety-Ampere breakers, and booster pumps are connected to a fifteen-Ampere single phase breaker. Ground wires are incorporated into all power feeds, and the four main busways are protected by 600/3 switches with 800 fusing.

Equipment Locations
Main switchgear and transformers are located in the basement of the Ransom Center. The life safety power system, fire pump system, and motor control center are also installed in the basement adjacent to the main switchgear. Alternate electrical service transformer and related equipment are located in an electrical vault adjacent to the Ransom Center basement.

Lighting System Overview
Lighting systems in the Ransom Center are primarily incandescent with fluorescent sources in non-gallery renovation spaces. Most of the interior lighting is supplied at 120 Volts to incandescent fixtures and electrified track with incandescent fixtures. For simplified power distribution, most of the fluorescent lighting in the renovated spaces is also powered at 120 Volts. Some areas, including parts of the second floor Reading Room, incorporate extensive fluorescent lighting, some of which is powered at 277 Volts. Exterior lighting includes metal halide and linear fluorescent sources.

ASHRAE/IESNA 90.1 Shutoff Requirements
Most electrical systems in the Ransom Center are controlled at the lobby security desk. The building is monitored twenty-four hours a day from this station, and most of the lighting control systems are located at this desk. First and second floor lighting, as well as special display lighting (Gutenberg Bible and First Photograph) are connected to dimming panels. All lighting systems in the theatre, including house lights, are controlled by the theatrical dimming system. Conference room lighting and easel wall feature lighting are controlled by local wall mounted dimming switches.

Power Factor Corrections
No power factor correction devices are incorporated into the electrical systems of the Ransom Center. There is no building electric utility charge, nor is an energy metering device installed, therefore at this time the need for power factor correction cannot be determined.

Important Design Requirements
Although life-threatening tasks do not occur in the Ransom Center, this building does contain some of the country's most valuable artwork and documents. It is important that security systems are well protected from power interruptions and that backup systems for security devices are activated immediately upon electrical service interruption. Presently, the University of Texas has an intricately designed electrical infrastructure that has consistently met all the demands placed on it by the Ransom Center. Although much of the building switchgear and other devices are twenty to thirty years old, redundant systems shall provide adequate protection from any electrical system failures due to mechanical age.

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation

During the electrical redesign phase of this report, an emphasis should be placed on simplifying building management systems. Currently lighting controls are disorganized and building response to lighting system problems is limited. There is also evidence that many of the lighting devices in the Ransom Center were not circuited properly or in a logical manner. Examples of this include exterior metal halide downlights that are wired into a dimming panel. The undesirable result of this may be concluded based upon reports by the center's building security managers: turning exterior lighting on and off seems to inadvertently dim the Gutenberg Bible Display and First Photograph lighting to full output. These systems should not be interconnected, and high light levels on sensitive artifacts is damaging. Other electrical systems, such as elevator doorway threshold lighting and recessed fixtures in the gallery light well seem to have been improperly wired and are no longer operational.

Electrical redesign of the Ransom Center should resolve these problems as well as provide a logical control system that integrates security and lighting systems. Additional areas of improvement should include a more comprehensive set of shutoff systems, 277 Volt power to fluorescent lighting systems, and more extensive dimming integration for increased building energy efficiency.

Building Load Caculations and Feeder Size Verification

HVAC and Related Equipment Schedule

H.V.A.C. / EQUIPMENT CONNECTION SCHEDULE

MARK	EQUIPMENT DESCRIPTION	H.P.	FLA	K.W.	VOLT	PH.	REMARKS	WSA	WIRE SIZE	WATT/PH.	DISC. SW.	BRKR	CKT.#
SPF-1	**NOT USED...**												
SPF-2	STAIRWELL PRESSURIZATION FAN	15	21		480	3	#2 FVNR STARTER @ MOTOR-NOTE 1 & 2	26.3	3#10, 3/4"C.	5813	30/3	30/3	DPE-43
SPF-3	STAIRWELL PRESSURIZATION FAN	15	21		480	3	#2 FVNR STARTER @ MOTOR-NOTE 1 & 2	26.3	3#10, 3/4"C.	5813	30/3	30/3	DPE-49
SPF-4	STAIRWELL PRESSURIZATION FAN	15	21		480	3	#2 FVNR STARTER @ MOTOR-NOTE 1 & 2	26.3	3#10, 3/4"C.	5813	30/3	30/3	DPE-55
SPF-5	STAIRWELL PRESSURIZATION FAN	15	21		480	3	#2 FVNR STARTER @ MOTOR-NOTE 1 & 2	26.3	3#10, 3/4"C.	5813	30/3	30/3	DPE-61
SPF-6	STAIRWELL PRESSURIZATION FAN	15	21		480	3	#2 FVNR STARTER @ MOTOR-NOTE 1 & 2	26.3	3#10, 3/4"C.	5813	30/3	30/3	DPE-67
SRF-1	SMOKE PURGE FAN	30	40		480	3	#3 FVNR STARTER @ MOTOR-NOTE 1 & 2	50.0	3#4, 1"C.	11072	100/3 - 3R	90/3	DPE-44
SRF-2	SMOKE PURGE FAN	30	40		480	3	#3 FVNR STARTER @ MOTOR-NOTE 1 & 2	50.0	3#4, 1"C.	11072	100/3 - 3R	90/3	DPE-50
SRF-3	SMOKE PURGE FAN	30	40		480	3	#3 FVNR STARTER @ MOTOR-NOTE 1 & 2	50.0	3#4, 1"C.	11072	100/3 - 3R	90/3	DPE-56
SRF-4	SMOKE PURGE FAN	30	40		480	3	#3 FVNR STARTER @ MOTOR-NOTE 1 & 2	50.0	3#4, 1"C.	11072	100/3 - 3R	90/3	DPE-68
FC-1	ELEVATOR ROOM FAN COIL UNIT	1/2	9.8		120	1		12.3	2#12, 3/4"C.	1176	$m	20/1	LEB-28
FC-2	ELEVATOR ROOM FAN COIL UNIT	1/2	9.8		120	1		12.3	2#12, 3/4"C.	1176	$m	20/1	LEB-30
FC-3	ELEVATOR ROOM FAN COIL UNIT	1/2	9.8		120	1		12.3	2#12, 3/4"C.	1176	$m	20/1	LEB-32
FC-4	ELEVATOR ROOM FAN COIL UNIT	1/2	9.8		120	1		12.3	2#12, 3/4"C.	1176	$m	20/1	LEB-34
HD-1	HOT DECK FAN	30	40		480	3	INTERFACE WITH VFD & #3 FVNR	50.0	3#4, 1"C.	11072	100/3	90/3	DPE-19
HD-2	HOT DECK FAN	30	40		480	3	INTERFACE WITH VFD & #3 FVNR	50.0	3#4, 1"C.	11072	100/3	90/3	DPE-25
HD-3	EXISTING HOT DECK FAN (RESOURCE)	30	40		480	3	INTERFACE WITH VFD & #3 FVNR	50.0	3#4, 1"C.	11072	100/3	90/3	DPE-31
HD-4	EXISTING HOT DECK FAN (RESOURCE)	30	40		480	3	INTERFACE WITH VFD & #3 FVNR	50.0	3#4, 1"C.	11072	100/3	90/3	DPE-37
BP-1	BOOSTER PUMP	1/4	5.8		120	1		7.3	2#12, 3/4"C.	696	$m	15/1	LEB-12
BP-2	BOOSTER PUMP	1/4	5.8		120	1		7.3	2#12, 3/4"C.	696	$m	15/1	LEB-14
BP-3	BOOSTER PUMP	1/4	5.8		120	1		7.3	2#12, 3/4"C.	696	$m	15/1	LEB-16
BP-4	BOOSTER PUMP	1/4	5.8		120	1		7.3	2#12, 3/4"C.	696	$m	15/1	LEB-18

NOTE 1 INTERFACE WITH FIRE ALARM CONTROL PANEL (FACP)

NOTE 2 PROVIDE A 1.5 KVA CONTROL POWER TRANSFORMER AND A 15A. GFI RECEPTACLE MOUNTED TO THE EQUIPMENT HOUSING IN A NEMA 3R ENCLOSURE

Transformer Schedule

DESIGNATION	KVA	PRI VOLTAGE	SEC VOLTAGE	PHASE	TYPE
1	500	12KV	208Y/120	3	DRY
2	1000	12KV	480Y/277	3	DRY
3	1000	12KV	480Y/277	3	DRY
4 - TE1	30	480Y/277	208Y/120	3	DRY
5-TE2	30	480Y/277	208Y/120	3	DRY
6-LALT	9	480Y/277	208Y/120	3	DRY
7	UNKNOWN - PROVIDED BY AUSTIN POWER	12KV	280Y/277	3	DRY

Lighting Fixture and Ballast Schedule

Luminaire Schedule							
Type	Lamp		Ballast				Voltage
	Number	Type	PF	BF	Watts	Input Current	
A	3	F32-T8	0.98	0.96	93	0.35	277
B	2	F26-QUAD	0.99	1.00	51	0.43	120
C		NOT USED					
D		NOT USED					
E	2	F32-T8	0.99	0.88	63	0.23	277
FA	1	CDM70/PAR30L/M/FL (3000K)	1	0.95	85W	N/A	208
FB	1	CDM35/PAR30L/M/FL (3000K)	1	0.95	40W	N/A	208
FC	1	CDM35/PARso:/M/FL (3000K)	1	0.95	40W	N/A	208
FD		DELETED					
FE	1	75 EYC/60	1	N/A	75W	N/A	120
FE-1	1	75 EYC/60	1	N/A	75W	N/A	120
FE-2	1	75PAR16/CAP/NFL	1	N/A	75W	N/A	120
FE-3		DELETED					
FF	VARIES	50W R20	1	N/A	100W/lf	N/A	120
FG	1	50WPAR20/FL	1	N/A	50W	N/A	120
FH	1	F25T8/830	0.98	0.95	28W	0.24	120
FJ	1	BC-60B10 5LL (FROSTED CANDELABRA BASE, 200HR LIFE)	1	N/A	N/A	N/A	120
FK	2	40W BIAX/830	0.98	0.95	82	N/A	120
FL	VARIES	F25T8/830	0.98	0.95	8W/lf	0.24	120
FM	N/A	ELECTRIFIED TRACK	1	N/A	75W/lf	N/A	120
FN	1	Q50T4/CL/CD (2-pin, GY6.35, frosted)	1	N/A	50W	N/A	120
FP	1	90PAR/CAP/SPL/FL (MOUNTED TO ELECTRIFIED TRACK)	1	N/A	90W	N/A	120
FQ	1	50MR16/NFL/25 (MOUNTED TO ELECTRIFIED TRACK)	1	N/A	50W	N/A	120
FR	1	50PAR36/CAP/NSP (MOUNTED TO ELECTRIFIED TRACK)	1	N/A	50W	N/A	120
FS	N/A	ELECTRIFIED TRACK	1	N/A	N/A	N/A	120
FS-1	N/A	ELECTRIFIED MONOPOINT	1	N/A	N/A	N/A	120
FT	VARIES	50ALR18/NFL25-GBK	1	N/A	25W/lf	N/A	120
FU	2	F28T8/830	0.98	0.95	60W	0.26	120
FV	1	F32T8/830	0.98	0.90	34W	0.29	120
FW	2	F27TWIN TUBE /830	0.98	0.95	60W	0.46	120
FX		DELETED					
FY	2	F55TWIN TUBE /830	0.98	0.95	115W	-	277
FZ	VARIES	90PAR/CAP/SPL/SP	1	N/A	90W	N/A	120
FAA	1	FM11/H/SP10	0.95	0.95	11W	-	120

FAB	VARIES	100PAR38/H/FL25	1	N/A	100W	N/A	120
FAC	1	100PAR38/H/FL25	1	N/A	100W	N/A	120
FAD		DELETED					
FAE	1	Q250PAR38/FL30	1	N/A	250W	N/A	120
FAF	1	F32T8/830	0.98	0.90	34W	0.29	120
FAF-1	1	F32T8/830	0.98	0.90	34W	0.29	120
FAG	2	F32T8/830	0.98	0.88	63W	0.42	120
FAH	2	F32T8/830	0.98	0.88	63W	0.42	120
FAJ	N/A	ELECTRIFIED TRACK	1	N/A	75W/lf	N/A	120
FAK	150W	Q150DC-ETF (FROSTED)	1	N/A	150W	N/A	120
FAL	1	50AR70/25/FL	1	N/A	50W	N/A	120
FAM	2	F32DTT/830	0.98	0.95	65W	-	120
FAM-1	2	F32DTT/830	0.98	0.95	65W	-	120
FAN	1	100PAR38/HIR/FL25	1	N/A	100W	-	120
FAP	2	F32T8/830	0.98	0.88	63W	0.42	120
FAP-1	2	F32T8/830	0.98	0.88	63W	0.42	120
FAQ	2	F18DTT/830	0.99	0.95	35W	0.30	120
FAR	1	F32T8/830	0.98	0.90	34W	0.29	120
FAS	2	F40BIAX/830	0.98	0.95	48W	-	120
FAT	1	F32T8/830	0.98	0.90	34W	0.29	120
FAU		DELETED					
FAV		DELETED					
FAW	1	100PAR38/HIR/FL25	1	N/A	100W	N/A	120
FAX	2	F32T8/830	0.98	0.88	63W	0.42	120
FAY	N/A	ELECTRIFIED TRACK	1	N/A	75W/lf	N/A	120
FAZ	1	Q250PAR38/FL30 (TRACK MOUNTED)	1	N/A	250W	N/A	120
FBA	1	A19 (INSIDE FROST, LONG LIFE 3000HRS)	1	N/A	100W	N/A	120
FBB	1	A19 (INSIDE FROST, LONG LIFE 3000HRS)	1	N/A	100W	N/A	120
FBC	1	F32T8/830	0.98	0.90	34W	0.29	120
FBD	N/A	ELECTRIFIED TRACK	1	N/A	75W/lf	N/A	120
FBE	1	50AR70/25/FL	1	N/A	50W	N/A	120
FBF	2	F32T8/830	0.98	0.88	63W	0.42	120
FBG	2	F18WDTT/830	0.99	0.95	35W	0.30	120
X1	1	LED EXIT SIGN (SINGLE FACED)	1	N/A	-	-	120
X2	1	LED EXIT SIGN (DOUBLE FACED)	1	N/A	-	-	120

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation
Building Load Calculations

The Ransom Center renovations included a complete redesign of first and second floor spaces, but upgrades to the central building electrical system were limited. Due to limited scope of overall electrical system renovation, comprehensive documentation of all electrical systems was not provided. To demonstrate the ability to size electrical feeder loads, two main distribution panels as well as all subsequent panel boards were analyzed. These main distribution panels include lighting loads for the first and second floor renovations.

Building load area method calculations per NEC 2005 table 220.12 were used to estimate the overall electrical demand placed on the Ransom Center. The existing main busway feeder sizings were not provided in renovation documents, and consequently the estimated overall building loads were compared to the voltampere capacity of three primary building transformers that power the structure. Verification that estimated building loads were less than the transformer current capacity was tested.

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation

Distribution Panel Feeder Sizing

PANELBOARD SCHEDULE

Designation "LTA" — 120/208 V. 3ph 4 w. — Surface Mtd NEMA 1 Enclosure
225 Amp Mains — 150 Amp Main Lugs Only

	ckt#	description	load v/a	trip	pole	Ph	pole	trip	load v/a	description	ckt#	
*	1	LIGHT TRACK	1000	20	1	A	1	20	1000	LIGHT TRACK	2	*
*	3	LIGHT TRACK	1000	20	1	B	1	20	1000	LIGHT TRACK	4	*
*	5	LIGHT TRACK	1000	20	1	C	1	20	1000	LIGHT TRACK	6	*
*	7	LIGHT TRACK	1000	20	1	A	1	20	1000	LIGHT TRACK	8	*
*	9	LIGHT TRACK	1000	20	1	B	1	20	1000	LIGHT TRACK	10	*
*	11	LIGHT TRACK	1000	20	1	C	1	20	1000	LIGHT TRACK	12	*
*	13	LIGHT TRACK	1000	20	1	A	1	20	1000	LIGHT TRACK	14	*
*	15	LIGHT TRACK	1000	20	1	B	1	20	1000	LIGHT TRACK	16	*
*	17	LIGHT TRACK	1000	20	1	C	1	20	1000	LIGHT TRACK	18	*
*	19	LIGHT TRACK	1000	20	1	A	1	20	1000	LIGHT TRACK	20	*
*	21	LIGHT TRACK	1000	20	1	B	1	20	1000	LIGHT TRACK	22	*
*	23	LIGHT TRACK	1000	20	1	C	1	20	1000	LIGHT TRACK	24	*
*	25	LIGHT TRACK	1000	20	1	A	1	20	1000	LIGHT TRACK	26	*
*	27	LIGHT TRACK	1000	20	1	B	1	20	1000	LIGHT TRACK	28	*
*	29	LIGHT TRACK	1350	20	1	C	1	20	1000	LIGHT TRACK	30	*
*	31	LIGHT TRACK	1350	20	1	A	1	20	1000	LIGHT TRACK	32	*
*	33	LIGHT TRACK	1350	20	1	B	1	20	1000	LIGHT TRACK	34	*
*	35	LIGHT TRACK	1350	20	1	C	1	20	1000	LIGHT TRACK	36	*
*	37	SPARE		20	1	A	1	20	1000	LIGHT TRACK	38	*
*	39	SPARE		20	1	B	1	20	1000	LIGHT TRACK	40	*
	41	SPACE		20	1	C	1	20		SPACE	42	

* MOTORIZED CIRCUIT BREAKER

(PROVIDE THIS PANEL AS SPECIFIED IN SECTION 16915)

LTA	**208/120**
Load Type	**VA**
Lighting	39,400
demand factor	1.25
Total Load	**49250**

I = 49250/(1.73*208)
136.9 amps
4 #1/0, rated at 150A, oversized
#6 ground, overized
2" conduit, acceptable

PANELBOARD SCHEDULE

Designation "LTB" — 120/208 V. 3ph 4 w. — Surface Mtd NEMA 1 Enclosure
225 Amp Mains — 225 Amp Main Lugs Only

	ckt#	description	load v/a	trip	pole	Ph	pole	trip	load v/a	description	ckt#	
*	1	LIGHT TRACK	1350	20	1	A	1	20	1350	LIGHT TRACK	2	*
*	3	LIGHT TRACK	1350	20	1	B	1	20	1350	LIGHT TRACK	4	*
*	5	LIGHT TRACK	1350	20	1	C	1	20	1350	LIGHT TRACK	6	*
*	7	LIGHT TRACK	1350	20	1	A	1	20	1350	LIGHT TRACK	8	*
*	9	LIGHT TRACK	1350	20	1	B	1	20	1350	LIGHT TRACK	10	*
*	11	LIGHT TRACK	1350	20	1	C	1	20	1350	LIGHT TRACK	12	*
*	13	LIGHT TRACK	1350	20	1	A	1	20	1350	LIGHT TRACK	14	*
*	15	LIGHT TRACK	1350	20	1	B	1	20	1350	LIGHT TRACK	16	*
*	17	LIGHT TRACK	1000	20	1	C	1	20	1350	LIGHT TRACK	18	*
*	19	LIGHT TRACK	1000	20	1	A	1	20	1350	LIGHT TRACK	20	*
*	21	LIGHT TRACK	1000	20	1	B	1	20	1350	LIGHT TRACK	22	*
*	23	LIGHT TRACK	1000	20	1	C	1	20	1350	LIGHT TRACK	24	*
*	25	LIGHT TRACK	1000	20	1	A	1	20	1000	LIGHT TRACK	26	*
*	27	LIGHT TRACK	1000	20	1	B	1	20	1000	LIGHT TRACK	28	*
*	29	LIGHT TRACK	1000	20	1	C	1	20	1000	LIGHT TRACK	30	*
*	31	LIGHT TRACK	1000	20	1	A	1	20	1000	LIGHT TRACK	32	*
*	33	LIGHT TRACK	1350	20	1	B	1	20	1800	LIGHT TRACK	34	*
*	35	LIGHT TRACK	1350	20	1	C	1	20	1800	LIGHT TRACK	36	*
*	37	LIGHT TRACK	1350	20	1	A	1	20	1800	LIGHT TRACK	38	*
*	39	LIGHT TRACK	1350	20	1	B	1	20	1800	LIGHT TRACK	40	*
	41	SPACE		20	1	C	1	20		SPACE	42	

• MOTORIZED CIRCUIT BREAKER

(PROVIDE THIS PANEL AS SPECIFIED IN SECTION 16915)

LTB	**208/120**
Load Type	**VA**
Lighting	51,600
demand factor	1.25
Total Load	**64500**

I = 429000/(1.73*208)
179.2 amps
4 #4/0 rated at 230, oversized
#2 ground, oversized
2-1/2" conduit, acceptable

PANELBOARD SCHEDULE

Designation "LTC" — 120/208 V. 3ph 4 w. — Surface Mtd NEMA 1 Enclosure
225 Amp Mains — 150 Amp Main Lugs Only

	ckt#	description	load v/a	trip	pole	Ph	pole	trip	load v/a	description	ckt#	
*	1	LIGHT TRACK	1000	20	1	A	1	20	1800	LIGHT TRACK	2	*
*	3	LIGHT TRACK	1000	20	1	B	1	20	1800	LIGHT TRACK	4	*
*	5	LIGHT TRACK	1000	20	1	C	1	20	1800	LIGHT TRACK	6	*
*	7	LIGHT TRACK	1000	20	1	A	1	20	1800	LIGHT TRACK	8	*
*	9	SPARE		20	1	B	1	20	1800	LIGHT TRACK	10	*
*	11	SPARE		20	1	C	1	20	1800	LIGHT TRACK	12	*
*	13	SPARE		20	1	A	1	20	1800	LIGHT TRACK	14	*
*	15	SPARE		20	1	B	1	20	1800	LIGHT TRACK	16	*
*	17	SPARE		20	1	C	1	20	1800	LIGHT TRACK	18	*
*	19	SPARE		20	1	A	1	20	1800	LIGHT TRACK	20	*
*	21	SPARE		20	1	B	1	20	1800	LIGHT TRACK	22	*
*	23	SPARE		20	1	C	1	20	1800	LIGHT TRACK	24	*
*	25	SPARE		20	1	A	1	20	1800	LIGHT TRACK	26	*
*	27	SPARE		20	1	B	1	20	1800	LIGHT TRACK	28	*
*	29	SPARE		20	1	C	1	20	1800	LIGHT TRACK	30	*
*	31	SPARE		20	1	A	1	20	1800	LIGHT TRACK	32	*
*	33	SPARE		20	1	B	1	20		SPARE	34	*
*	35	SPARE		20	1	C	1	20		SPARE	36	*
*	37	SPARE		20	1	A	1	20		SPARE	38	*
*	39	SPARE		20	1	B	1	20		SPARE	40	*
	41	SPACE		20	1	C	1	20		SPACE	42	

* MOTORIZED CIRCUIT BREAKER

(PROVIDE THIS PANEL AS SPECIFIED IN SECTION 16915)

LTC	**208/120**
Load Type	**VA**
Lighting	32,800
demand factor	1.25
Total Load	**41000**

I = 41000/(1.73*208)
113.9 amps
4 #1/0, rated at 150A, oversized
#6 ground, oversized
2" conduit, acceptable

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation

GRX-EX	**208/120**
Load Type	**VA**
Lighting	8,725
demand factor	1.25
Total Load	**10906.25**

I = 10906.3/(1.73*208)
30.3 amps
5 #8, rated at 50A, oversized
No ground (Lutron dimming rack)
1-1/2" conduit, acceptable

GRX-A	**208/120**
Load Type	**VA**
Lighting	23,540
demand factor	1.25
Total Load	**29425**

I = 29425/(1.73*208)
81.8 amps
5 #3, rated at 100A oversized
no ground (Lutron dimming rack)
1" conduit, acceptable

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation
Distribution Panel Feeder Sizing for previously listed feeders

REPLACEMENT PANELBOARD SCHEDULE

Designation "LDA" — 120/208 V. 3ph 4 wire — Surface Mtd NEMA 1 Enclosure
600 Amp Mains — 600 Amp Main Lugs Only

ckt#	description	load v/a	trip	pole	Ph	pole	trip	load v/a	description	ckt#
1	EXISTING PANEL "2LE–2"		100	3	A	3	100		EXISTING PANEL "1LE–2"	2
3	----------		----	----	B	----	----		----------	4
5	----------		----	----	C	----	----		----------	6
7	EXISTING PANEL "1LE"		100	3	A	3	100		EXISTING PANEL "2LE"	8
9	----------		----	----	B	----	----		----------	10
11	----------		----	----	C	----	----		----------	12
13	EXISTING PANEL "1LH"		100	3	A	3	150		EXISTING PANEL "1LG"	14
15	----------		----	----	B	----	----		----------	16
17	----------		----	----	C	----	----		----------	18
19	PANEL "LTA"	14350	150	3	A	3	150	12800	PANEL "LTC"	20
21	----------	14350	----	----	B	----	----	10000	----------	22
23	----------	12700	----	----	C	----	----	10000	----------	24
25	PANEL "LTB"	17600	225	3	A	3	50	3250	DIMMING PANEL	26
27	----------	18750	----	----	B	----	----	2700	GRX–EX	28
29	----------	15250	----	----	C	----	----	2775	----------	30
31	DIMMING PANEL GRX–A	9210	100	3	A				SPACE	26
33	----------	7870	----	----	B				SPACE	28
35	----------	6460	----	----	C				SPACE	30
37	SPACE				A				SPACE	26
39	SPACE				B				SPACE	28
41	SPACE				C				SPACE	30

Distribution Panel Feeder Sizing

LDA	**208/120**
Load Type	**VA**
Lighting	156,065
demand factor	1.25
Total Load	**195081.25**

I = 195081.3/(1.73*208)
526.0 amps
(2) Sets of:

4 #350KCM	oversized (8 total # 350 KCM)
#1 Ground	oversized (2 total)
3" Conduit	Acceptable (2 total)

PLEASE NOTE THAT NO LOAD DATA WAS PROVIDED FOR EXISTING PANELS 1LA, 1LC, 1LE, 1LE-2 TO BE REPLACED

PANELBOARD SCHEDULE

Designation "LTD" — 120/208 V. 3ph 4 w. — Surface Mtd NEMA 1 Enclosure
225 Amp Mains — 225 Amp Main Lugs Only

	ckt#	description	load v/a	trip	pole	Ph	pole	trip	load v/a	description	ckt#	
*	1	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	2	*
*	3	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	4	*
*	5	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	6	*
*	7	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	8	*
*	9	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	10	*
*	11	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	12	*
*	13	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	14	*
*	15	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	16	*
*	17	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	18	*
*	19	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	20	*
*	21	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	22	*
*	23	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	24	*
*	25	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	26	*
*	27	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	28	*
*	29	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	30	*
*	31	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	32	*
*	33	SPARE		20	1	B	1	20		SPARE	34	*
*	35	SPARE		20	1	C	1	20		SPARE	36	*
*	37	SPARE		20	1	A	1	20		SPARE	38	*
*	39	SPARE		20	1	B	1	20		SPARE	40	*
	41	SPACE		20	1	C	1	20		SPACE	42	

* MOTORIZED CIRCUIT BREAKER

(PROVIDE THIS PANEL AS SPECIFIED IN SECTION 16915)

LTD	**208/120**
Load Type	**VA**
Lighting	48,000
demand factor	1.25
Total Load	**60000**

I = 60000/(1.73*208)
166.7 amps
4 #4/0, rated at 230A, oversized
#2 Ground, oversized
2-1/2" Conduit, acceptable

PANELBOARD SCHEDULE

Designation "LTE" — 120/208 V. 3ph 4 w. — Surface Mtd NEMA 1 Enclosure
225 Amp Mains — 225 Amp Main Lugs Only

	ckt#	description	load v/a	trip	pole	Ph	pole	trip	load v/a	description	ckt#	
*	1	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	2	*
*	3	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	4	*
*	5	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	6	*
*	7	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	8	*
*	9	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	10	*
*	11	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	12	*
*	13	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	14	*
*	15	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	16	*
*	17	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	18	*
*	19	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	20	*
*	21	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	22	*
*	23	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	24	*
*	25	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	26	*
*	27	LIGHT TRACK	1500	20	1	B	1	20	1500	LIGHT TRACK	28	*
*	29	LIGHT TRACK	1500	20	1	C	1	20	1500	LIGHT TRACK	30	*
*	31	LIGHT TRACK	1500	20	1	A	1	20	1500	LIGHT TRACK	32	*
*	33	SPARE		20	1	B	1	20		SPARE	34	*
*	35	SPARE		20	1	C	1	20		SPARE	36	*
*	37	SPARE		20	1	A	1	20		SPARE	38	*
*	39	SPARE		20	1	B	1	20		SPARE	40	*
	41	SPACE		20	1	C	1	20		SPACE	42	

* MOTORIZED CIRCUIT BREAKER

(PROVIDE THIS PANEL AS SPECIFIED IN SECTION 16915)

LTE	**208/120**
Load Type	**VA**
Lighting	48,000
demand factor	1.25
Total Load	**60000**

I = 60000/(1.73*208)
166.7 amps
4 #4/0, rated at 230A, oversized
#2 Ground, oversized
2-1/2" Conduit, acceptable

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation

GRX-B	**208/120**
Load Type	**VA**
Lighting	10,880
demand factor	1.25
Total Load	**13600**

I = 13600/(1.73*208)
37.8 amps
5 #8, rated at 50A, oversized (note: not to exceed 25A per feeder)
No ground (Lutron dimming rack)
1" conduit, acceptable

GRX-F	**208/120**
Load Type	**VA**
Lighting	2,925
demand factor	1.25
Total Load	**3656.25**

I = 3656*(1.73*208)
10.2 amps
5 #10, rated at 35A, oversized (note: not to exceed 25A per branch circuit feeder)
No ground (Lutron dimming rack)
3/4" conduit, acceptable

Distribution panel sizing for previously listed feeders

REPLACEMENT PANELBOARD SCHEDULE

Designation "LDB" — 120/208 V. 3ph 4 wire — Surface Mtd NEMA 1 Enclosure
400 Amp Mains — 400 Amp Main Lugs Only

ckt#	description	load v/a	trip	pole	Ph	pole	trip	load v/a	description	ckt#
1	EXISTING PANEL "2LF"		100	3	A	3	100		EXISTING PANEL "1LF"	2
3	----------		---	---	B	---	---		----------	4
5	----------		---	---	C	---	---		----------	6
7	EXISTING PANEL "2LF-2"		100	3	A	3	100		EXISTING PANEL "1LF-2"	8
9	----------		---	---	B	---	---		----------	10
11	----------		---	---	C	---	---		----------	12
13	PANEL "LTD"	18000	225	3	A	3	50	3450	DIMMING PANEL GRX-B	14
15	----------	15000	---	---	B	---	---	3880	----------	16
17	----------	15000	---	---	C	---	---	3550	----------	18
19	PANEL "LTE"	18000	225	3	A	3	30	1450	DIMMING PANEL GRX-F	20
21	----------	15000	---	---	B	---	---	550	----------	22
23	----------	15000	---	---	C	---	---	925	----------	24
25	SPACE				A				SPACE	26
27	SPACE				B				SPACE	28
29	SPACE				C				SPACE	30

LDB	**208/120**
Load Type	**VA**
Lighting	109,805
demand factor	1.25
Total Load	**137256.25**

I = 137256/(1.73*208)
381.4 amps
(2) Sets of:
4 #250KCM
#1 Ground
3" Conduit

*Existing feeder data is not provided, selected sizes are assumed

PLEASE NOTE: NO LOAD DATA WAS PROVIDED FOR EXISTING PANELS 1LF, 1LD, 1LB TO BE REPLACED

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation

Primary Busway Sizing Check
Because the size of primary busway wiring as well as associated loads of lighting, mechanical, receptacle, and special equipment were not provided in the Random Center renovation documentation, the building area method was used to estimate the total voltampere load of all electrical systems. This was then compared to the primary transformer sizing to verify overall estimated load does not exceed the system's designed size. Please note that there are three transformers: one 12KV primary 208Y/120V secondary sized at 500 KVA, and two 12KV primary 480Y/277V secondary sized at 1000KVA each. The 480Y/277 V transformers are designed with the ability for each transformer to handle all electrical loads in case the other feeder and/or transformer fails.

BUILDING LOAD SUMMARY	
Area Floor 1 (sq.ft)	16,329
Area Floor 2 (Sq.ft)	17,676
Area Floors 3-7 (sq.ft)	85250
Total Building Area (sq.ft):	**119,255**
Electrical load - mechanical systems	**8.0 VA/sq.ft.**
asumed mechanical load	
Lighting load	**3.5 VA/sq.ft.**
referenced from NEC 2005 table 220.12	
"offiec building"	
Receptacle load	**0.5 VA/sq.ft.**
assumed recptacle load	
Total Building Electrical Load:	**1431 KVA**
Existing 480Y/277 transformer size:	(2) at 1000 KVA
Existing 208Y/120 transformer size:	(1) at 500 KVA

As demonstrated above, the estimated overall building load of 1431KVA is less than the transformer loading (should one 408Y/277 transformer or feeder fail) of 1500KVA. From this calculation it can be assumed that main busways were properly sized.

ELECTRICAL SYSTEMS EXISTING CONDITIONS
BUILDING LOAD SUMMARY
Harry Ransom Center Renovation
Utility Rate Structure

Electrical power for the Harry Ransom Humanities Research center is provided by the University of Texas Power Plant, a 120 megawatt natural gas facility with backup turbines. The University of Texas does not have a rate structure in place for the Ransom Center. The building is considered an education facility, and consequently energy consumption is charged to the State of Texas. "Industrial" buildings have a rate structure in place, and the remaining power plant energy consumption (specifically, all energy not consumed by industrial buildings) is paid for by the State of Texas. Although an energy conservation initiative is under way at the University, the Ransom Center does not currently have an energy meter located on site. All energy consumed for educational facilities is charged at a flat rate, without demand or time of day charges. Utility costs vary from year for year, and are calculated based upon the costs for labor, fuel (natural gas), system maintenance, and infrastructure modernization/improvement projects. Approximately 80% of all power supplied by the University Power Plant is billed to the State of Texas as direct operating cost, zero profit.

Please refer to the attached page at the end of this document titled "Average Rate Projections" for further understanding of how the University of Texas at Austin manages their campus energy systems.

Austin Energy provides emergency power to the University of Texas campus under a complex and confidential rate plan. Twenty-five megawatts of power is reserved from Austin Energy for use at the University of Texas. A fee of $48,000 per month is charged for the right to use this backup power. Should the energy be needed, a fee of $0.1193 per kilowatt-hour is charged for all energy consumed. Additional fees apply if more than the allotted 25megawatts are needed as emergency power.

A sample of how emergency electricity fees would be calculated for energy consumed by Austin Power's facilities is provided below:

Example calculation for Standby		
	Amounts Used	
KWh	312,393	
KW	39,883	
	Per Contract	
	39,883	KW
	-500	KW
	39,383	
	15	X Days Used
	590,745	
	30.4	divided by Average Days/Month
	19,432	
	$ 11.64	$/KW
	$ 226,193.15	
	$48,000	plus Monthly Standby charge for 25 MW
	$ 274,193.15	Total KW Charge
	312,393	
	$ 0.0107	$/KWH
	$ 3,342.61	
	Total Bill	
	$ 274,193.15	
	$ 3,342.61	
	$ 277,535.76	

Limited documentation at this time can be provided for the utility rate structure at the Harry Ransom Center. Rates vary from year to year and relate to the operations of the University Power Plant. These documents cannot be released due to their sensitive nature.

A detailed rate structure for Austin Energy's emergency energy rate structure cannot be supplied at this time because the agreement exists between the University of Texas and Austin Energy, not the Harry Ransom Center. This document involves 25 megawatts of power and cannot be disclosed due to the sensitivity of its content. Please refer to the above paragraphs for all rate structure information, including the provided sample calculation of an emergency energy fee from Austin Power. These paragraphs as well as their listed document references represent all information willingly supplied by the University of Texas at Austin on behalf of Juan Ontiueros from University of Texas Campus Planning and Facilities Management.

TARGET IN
SWITCHBOAR
BY FACTOR

(4) EXTEND EXI

(5) 30 KVA –
PRIMARY FE

(6) REPLACE TH
600 FUSING

ROOF

7th FLOOR

6th FLOOR

5th FLOOR

4th FLOOR

3rd FLOOR

2nd FLOOR

1st FLOOR

BASEMENT

FINISHED GRADE

EXISTING BUSWAY BHN

EXISTING BUSWAY BLN

EXISTING BUSWAY BHS

EXISTING BUSWAY BLS

EXISTING BUS–PLUG
(TYPICAL OF 8)

2LF–2 2LF 2LD 2LB 2HB

2HA 2LA 2LC 2LE 2LE–2 REPLACEMENT PANEL
(TYPICAL)

HE2 LE2 TE2

4#2, #8 GRD., 1/4"C.

5#10, 3/4"C.

5#8, 1"C.

5#500 KCM, 3 1/2"C.

4#4/0, #2 GRD., 2 1/2"C.

4#4/0, #2 GRD., 2 1/2"C.

400/3
400AF

2– 3"C. EACH WITH
4 #350 KCM, #1 GRD

5#3, 1 1/2"C.

5#8, 1"C.

4#1/0, #6 GRD., 2"C.

4#4/0, #2 GRD., 2 1/2"C.

4#1/0, #6 GRD., 2"C.

LTE LTD SDR 1LF 1LD 1LB LDB 1HB

1HA LDA 1LA 1LC 1LE 1LE–2 LTA LTB LTC

GRX–F DIMMER PANEL

GRX–B DIMMER PANEL

THEATRICAL DIMMING PANEL

GRX–EX DIMMER PANEL

GRX–A DIMMER PANEL

HE1 LE1 TE1

4#4/0, #2 GRD.
2 1/2"C.

3#12, 3/4"C.

3#500 KCM, 1/0 GRD., 3"C.

2–3 1/2"C. EACH WITH
4#350 KCM, #2 GRD.

2–3 1/2"C. EACH WITH
4#600 KCM, 1/0 GRD.

4#2, #8 GRD., 1 1/4"C.

3#500 KCM, 1/0 GRD., 3"C.

30/3–3R
15 AF

12 KV
3ø

ALTERNATE
POWER

1000
KVA

DPALT

TALT

LALT

MCC
(1200A)

EXISTING
MOTOR CONTROL
CENTER

DPE
(2)

DPE
(1)

ATS

800/3
AUTOMATIC
TRANSFER
SWITCH

LIFE SAFETY
POWER SYSTEM

1

FIRE PUMP
SYSTEM

HEB LEB TEB

BHN BHS

1000
KVA

TIE
BRKR

1000
KVA

EXISTING 277/480 V. SWITCHGEAR

BLN BLS

500
KVA

EXISTING 120/208 V.
SWITCHGEAR

AVERAGE RATE PROJECTIONS

√ = Data Updated Monthly

FY. 2006-07

	ELECTRICITY		STEAM		CHILLED WATER		TOTALS	
√ Swing Gas Rate (NYMEX)	8.92	mmbtu (excludes $0.08 trans. Cost & $0.055 GLO markup cost)						
Blended Gas Cost/MMBTU:	7.500	mmbtu (calculated w/NYMEX + $0.055 GLO Markup + $0.08 trans. cost)						
√Projected Gas Consump -mmbtu's	4,516,000	mmbtu						
Prev. 12 mos. Consumption								
√ Chill Stations Consumption	102,946,000	Kwh	161,321,765	lbs	n/a		< to compute C.S. util. costs	
√ Auxiliary Consumption	55,080,576	Kwh	151,630,515	lbs	29,837,097	ton hrs	< to compute est. income	
E&G Consumption	181,083,424	Kwh	542,096,083	lbs	108,962,256	ton hrs	< to compute est. income	
E&G+Aux Consumption	236,164,000	Kwh	693,726,598	lbs	138,799,353	ton hrs	< to compute est. income	
√ Total Projected Consumption	339,110,000	Kwh	855,048,363	lbs	138,799,353	ton hrs	< to compute rates	
UMS gas rate/mcf (excl. trans.) =	9.214	MCF						

FY. 2006-07 — PRORATION OF BUDGETED EXPENDITURES TO GENERATED UTILITIES

Cost/Budget Category	$	%	$	%	$	%	(updated w/ budget changes) $	%
DIRECT COSTS								
Water to Generation-Budget	119,677	12.1%	125,251	12.7%	745,071	75.3%	990,000	100.0%
Standby Elec - Budget	564,091	56.4%	0	0.0%	435,909	43.6%	1,000,000	100.0%
Debt Service - Budget	990,224	23.3%	1,168,720	27.5%	2,090,946	49.2%	4,249,890	100.0%
Labor- Direct - Budget-18/acct	3,022,491	35.7%	3,163,276	37.4%	2,279,164	26.9%	8,464,931	100.0%
Labor- Direct - Budget-E&G/14 acct	0	31.4%	0	32.9%	0	35.7%	0	100.0%
Labor- Direct - Budget-E&G/19 acct	0	31.4%	0	32.9%	0	35.7%	0	100.0%
M&O/R&R - Direct - Budget	1,537,755	24.5%	1,609,382	25.6%	3,128,870	49.9%	6,276,008	100.0%
Direct Costs	6,234,239		6,066,629		8,679,960		20,980,828	
INDIRECT COSTS								
Labor -Indirect-18/acct	1,028,686	24.3%	1,076,601	25.4%	2,125,698	50.2%	4,230,985	100.0%
Labor -Indirect-E&G 14/acct	0	24.3%	0	25.4%	0	50.2%	0	100.0%
Labor -Indirect-E&G 19/acct	0	24.3%	0	25.4%	0	50.2%	0	100.0%
M&O/R&R/Indirect Costs	295,509	24.3%	309,274	25.4%	610,647	50.2%	1,215,430	100.0%
Indirect Costs	1,324,196	24.3%	1,385,875	25.4%	2,736,345	50.2%	5,446,416	
FUEL COST								
Fuel (gas) to Gen. @ Est. Avg. Rate	8,234,866	24.3%	8,618,437	25.4%	17,016,697	50.2%	33,870,000	100.0%
Chill. Sta. Electricity Consump. Costs							0	
Chill. Sta. Steam Consump. Costs							0	
Total Chill. Sta. Gen. Util. Costs					17,016,697		17,016,697	
Less: Chilling Stations Unbilled Cost								
TOTAL GENERATION COST	**15,793,301**	**26.2%**	**16,070,941**	**26.7%**	**28,433,002**	**47.2%**	**60,297,244**	

Auxiliary Enterprise Rate							60,297,244	ck
Direct Costs-Excl. Fuel	$ 0.026	/ kwh	0.0087	/ lb	$ 0.063	/ ton hr	0	ck
Indirect Costs	$ 0.006	/ kwh	0.0020	/ lb	$ 0.020	/ ton hr		
Energy Rate	**$ 0.032**	/ kwh	**0.0107**	/ lb	**$ 0.082**	/ ton hr		
Fuel Rate	**$ 0.035**	/ kwh	**0.0124**	/ lb	**$ 0.123**	/ ton hr		
Total Rate	**$ 0.067**	/ kwh	**0.0232**	/ lb	**$ 0.205**	/ ton hr		
total rate ck>			**23.20**	/ klb				
E & G Rate								
Energy Rate	**$ 0.032**	/ kwh	**0.0107**	/ lb	**0.082**	/ ton hr		
Less salaries paid by E&G	$ (0.000)	/ kwh	$ -	/ lb	(0.000)	/ ton hr		
Energy Rate	**$ 0.032**	/ kwh	**0.0107**	/ lb	**$ 0.082**	/ ton hr		
Fuel Rate	**0.035**	/ kwh	**0.0124**	/ lb	**$ 0.123**	/ ton hr		
Total Rate	**0.067**	/ kwh	**0.0232**	/lbs	**$ 0.205**	/ ton hr		
			23.20	/ klb				
Est. Aux % of Consumption (avg.)	**23.3%**		**21.9%**		**21.5%**		< %'s auto-adjusted	
Est. E&G% of consumption (avg.)	**76.7%**		**78.1%**		**78.5%**		monthly from Aux vs. E&G	
	100.0%		100.0%		100.0%		consump comparison	
								% of Budget
Estimated Auxiliary Income (annual)	3,690,399		3,517,828		6,113,621		13,321,848	22.1%
Estimated E & G Income (Annual)	12,132,589		12,576,629		22,337,262		47,046,481	78.0%
Total Income	15,822,988		16,094,457		28,450,884		60,368,329	100.1%
E & G Labor (directly paid fr. "14")	0		0		0		0	0.0%
E & G Labor (directly paid fr. "19")	0		0		0		0	0.0%
Totals (Budgeted Generation $)	15,822,988		16,094,457		28,450,884		60,368,329	100.1%
+Surplus/(Deficit) (annualized)							71,085	0.1%