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SUMMARY OF ELECTRIC SERVICE COSTS FOR TOTALLY AIR CONDITIONED SCHOOLS PREPARED FOR HOUSTON INDEPENDENT SCHOOL DISTRICT, MAY 31, 1967.

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THIS REPORT IS A COMPILATION OF DATA ON ELECTRIC AIR CONDITIONING COSTS, OPERATIONS AND MAINTENANCE. AIR CONDITIONING UNITS ARE COMPARED IN TERMS OF ELECTRIC VERSUS NON-ELECTRIC, AUTOMATIC VERSUS OPERATED, AIR COOLED VERSUS WATER COOLED, RECIPROCATING VERSUS CENTRIFUGAL COMPRESSORS, SPACE AND NOISE, REHEAT, MAINTENANCE AND ORIGINAL COST. DATA ARE PRESENTED SHOWING COMPARATIVE ELECTRIC COSTS OF BEFORE AND AFTER AIR CONDITIONING SERVICE INSTALLATIONS AND A TABULATION OF SERVICE COSTS FOR TOTALLY AIR CONDITIONED SCHOOLS. (GM)

Summary of Electric Service Costs for

Totally Air Conditioned Schools Prepared

For Houston Independent School District

May 31, 1967

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HOUSTON LIGHTING & POWER COMPANY
ELECTRIC BUILDING, HOUSTON, TEXAS 77001

May 29, 1967

Houston Independent School District
P. O. Box 1226
Houston, Texas

Attention: Mr. Glen Fletcher, Superintendent

Gentlemen:

The Houston Independent School District has recently received overwhelming approval for the installation of air conditioning in its several properties. With this approval goes the obligation and trust that equipment adequately designed for economical operation be chosen. In order to assist the Houston Independent School District in its choice, we have reviewed in detail the more than 30,000 tons of air conditioning served by our system and now installed in tax supported school districts. This review has pointed out many facts as the air conditioning now installed represents a wide range of design and equipment choice.

There are 21 independent school districts which have totally air conditioned schools in operation or presently under construction. Of these, the Spring Branch Independent School District has more than 7,460 tons of air conditioning now in operation and more than 580 tons under construction. This is closely followed by the Pasadena Independent School District with approximately 7,300 tons now in operation and 880 tons under construction. Some districts have as little as 100 tons in operation. It is well realized that the Houston Independent School District itself has considerable air conditioning in operation today, this being installed in many of its schools for the offices, auditoriums, cafetoriums, or other general occupancy areas. Also, the new administration building now under construction will have 650 tons of electric air conditioning.

The most obvious conclusion and that which stands out most prominently is the fact that of the approximate 31,636 tons of air conditioning now installed, 30,306 tons are electric. From this, it can be seen that only 1,330 tons are non-electric, and all of this with the exception of 40 tons is engine driven. Of this figure, 1,190 tons are installed in one school district. Of the air conditioning presently under construction or contracted for, 3,436 tons are electric; whereas, no engine drive or absorption is specified.

The fact that with the exception of 40 tons of absorption air conditioning installed in 1960 no absorption air conditioning has been installed is quite

significant. This decision has been made because of the higher original cost, the inability to economically design an automatic system due to the fact a boiler must be fired daily, and the fact that there were no other operating advantages or economies in this area of low cost electric service. This is a most important factor for the Houston Independent School District whose properties are for the most part within the city of Houston wherein the city code requires licensed operating engineers where boilers large enough for most absorption air conditioning are installed.

Attached are conclusions, recommendations, and remarks on a number of facets of air conditioning, such having been derived from the operating, installation, and maintenance data of the school air conditioning located in our service area. These data are available only to us as only we have available the electric service usages of all of the air conditioned schools in our service area. On many schools we have installed recording chart-type check meters so that the pattern and costs of operating air conditioning would be known and guess work or variables would be eliminated. These data, of course, are available to the Houston Independent School District who we sincerely urge to consider it in making the many choices which must be made when its properties are air conditioned. Various tabulations of typical electric service usage, etc. are also attached.

Our entire research staff and other facilities are available to the Houston Independent School District to assist in defining the parameters necessary when so great an air conditioning job is undertaken. We urge the District to make use of these data.

Sincerely,

M. M. Whitesides
Power Consultant

MMW:kh

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EPITOME

Since 1960 twenty-one of the independent school districts served by the Houston Lighting & Power Company have built new or have equipped existing schools for whole school air conditioning. Studies as to the choice of equipment-electric or non-electric, type of equipment-reciprocating or centrifugal, type of system-direct expansion or chilled water have been made. In order to equip Houston Lighting & Power Company to make recommendations based on fact and to equip the many consulting engineers, architects, and school districts to make choices based on such fact rather than assumptions, the Houston Lighting & Power Company has installed in more than 20 different schools recording chart-type meters which indicate the hours of usage of air conditioning as well as the energy cost of operating the systems. In countless other schools, electric service billing, both before and after air conditioning was installed, is available to us; and from this, too, valid conclusions have been drawn.

Listed below by category are conclusions, recommendations, and discussions of the many factors which must be considered in choosing an air conditioning system.

ELECTRIC VS. NON-ELECTRIC

Conclusion

Of the approximately 35,072 tons of air conditioning installed, under construction, or contracted for, 96.2 per cent are electric driven equipment. This includes:

	Electric		Non-Electric	
	Tons	Per Cent	Tons	Per Cent
Installed	30,306	86.4%	1,290	3.7% (Engine Drive)
			40	.1% (Absorption)
Under Construction or Contracted For	3,436	9.8%	0	0
Totals	33,742	96.2%	1,330	3.8%

Note: No tonnage installed in partially air conditioned schools is included in the above figures.

Recommendation

The Houston Independent School District will benefit by choosing electric drive air conditioning.

Discussion

This overwhelming choice of electric drive air conditioning is

not a happenstance. It made by the many consulting engineers who had a part in the design of the school air conditioning now installed only after exhaustive studies of economics - first cost, operating cost, and maintenance, ease of operation, reliability, and the many other factors which must be considered. This percentage of electric air conditioning to the total follows closely that percentage installed in commercial buildings where a free choice, i.e., the property was not owned or controlled by a facet of a competitive industry, was available. The only advantage ever claimed by those advocating any system other than electric drive is their belief that the cost would be less. No claim has ever been made that another system was as reliable, as easy to operate, or that automatic design could be had as readily. Unfortunately, as the overwhelming percentage of electric air conditioning installed will point out, non-electric air conditioning has not operated as economically as electric when all facets of the cost of air conditioning are considered.

ORIGINAL COST

Conclusion

Electric air conditioning costs less to install than any other type of air conditioning.

Recommendation

Houston Independent School District will benefit by installing electric air conditioning.

Discussion

Bid after bid received on like systems to be installed in this area by contractors in this area have repeatedly shown that engine drive air conditioning costs about $65 per ton more than electric drive air conditioning and that absorption air conditioning costs about $35 per ton more than electric air conditioning to install. This represents a large premium that would have to be paid for air conditioning with no higher quality. Comparative bids are known in the industry, and these figures may be easily verified. We urge you to do so. We also urge, in order to firmly establish these differentials, that a number of schools be designed utilizing various types of equipment so that comparative bids may be obtained on each type; and the School District may be adequately informed as to the cost differentials.

AUTOMATIC VS. OPERATED

Conclusion

Practically all of the air conditioning systems installed in schools in this area are designed for automatic operation.

Recommendation

Houston Independent School District will benefit by installing air conditioning systems designed for automatic operation.

Discussion

During the past five years industry has manufactured and installed more air conditioning than it has trained operators to operate. During the past few years the wages of an air conditioning operator have increased greatly due to the amount of education and training time necessary to obtain a license. In order to be relieved of the $500+ per month salary of an air conditioning operator (and this must be on a yearly basis whether the schools are used in the summer or not), the School District should install air conditioning systems designed to be operated with the fewest operators possible.

The code of the city of Houston requires that boilers above a certain size,which would be required for absorption air conditioning,be attended by licensed operators. Although some industries today have such boilers and do not have licensed operators, the Houston Independent School District could not afford to flagrantly violate a code requirement and could look forward to a strict enforcement of this code requirement by the inspection authorities. A copy of the boiler code is attached.

AIR COOLED VS. WATER COOLED EQUIPMENT

Conclusion

Although the greater portion of the air conditioning installed today is water cooled equipment, the majority of the air conditioning recently installed is air cooled equipment.

Recommendation

The Houston Independent School District will benefit by installing air cooled air conditioning equipment and by not installing cooling towers.

Discussion

In order to dissipate the heat removed from a building, either a cooling tower for water cooled air conditioning or an outdoor air cooled condenser must be installed. A cooling tower is higher in first cost, represents a maintenance problem as it must be drained during freezing weather, requires water treatment to cut down algae and mineral deposit within the pipes, and requires water costs not attributable to the air cooled equipment. Periodically, the tower must be replaced as must be the pump required to circulate the water. Frequently, spray and drift from the water tower are objectionable and damaging to anything around it. Also, with a cooling tower, annual acidizing of the condenser is a costly must for efficient operation. It should be pointed out, however, that water cooled air conditioning is somewhat more efficient than air cooled equipment.

On the other hand, an air cooled condenser needs no maintenance, does not have to be drained during freezing weather, does not require a circulating pump or water treatment, and is usually lower in first cost. The cost and trouble of yearly acidizing is also eliminated. Here again, it should be pointed out that the efficiency of an air cooled air

conditioning system is somewhat less than that of a water cooled system. However, when all of the air conditioning costs are considered - utility costs, maintenance, replacement, etc., the annual owning and operating costs of an air cooled air conditioning system are less than those of a water cooled system.

A large grocery chain, whose headquarters are in Houston, installs only air cooled equipment and is rapidly replacing with air cooled condensers where possible all previously installed cooling towers. This decision was born of experience and was forced on them due to the high cost of maintenance.

MAINTENANCE

Conclusion

The large majority of the systems installed in schools today are designed to be as maintenance free as possible.

Recommendation

A first consideration by the Houston Independent School District should be the choice of as near maintenance free equipment as possible.

Discussion

Due to the simplicity of design and operation as well as the wide variety of choice, there if little, if any, air conditioning equipment today that is as maintenance free or that requires as low cost maintenance as does modern electric air conditioning. Spring Branch Independent School District, which operates almost 8,000 tons of air conditioning, has two full-time air conditioning maintenance personnel for all routine maintenance. In order to simplify their maintenance problem, the Pasadena Independent School District standardized on several sizes and types of air conditioning items, maintains spares, and makes only minor maintenance adjustments in the field. When problems arise, equipment is replaced, and the faulty equipment is brought to the central shop for repair. This makes for low-cost maintenance.

The two districts which have engine driven equipment have found that after the first or possibly second year of engine operation a maintenance man must be in attendance at all times in order to assure operation. Some of the school districts have attempted to maintain their equipment with mechanics normally used for the maintenance of school buses. They have found that either the buses or the air conditioning receives maintenance, but that the mechanics are not able to do both. In Tomball, where a competitive fuel is free, engine air conditioning for total school air conditioning was installed in one of the schools, and a 50-ton engine driven compressor for partial air conditioning was installed in another school. They have experienced costly and inconvenient maintenance and are hoping to replace it with electric equipment.

Engine manufacturers will offer to furnish maintenance contracts based on a given cost per hour of operation. We know of no such contract which is not based on 1) a minimum number of operating hours per month; and

2) which does not have provisions for excalation after an initial period. Over the past several years, this escalation has caused the hourly maintenance cost to increase considerably.

Although not school air conditioning and although the use factor would be in excess of that of a school, several apartment projects in Houston during the past four or five years experimented with engine dri en air conditioning due to favorable financing or hoped for operating economy. . tabulation is attached showing the 31 engines which have been removed and replaced wit1 electric drive and the reasons for the removal. These apartment owners found out that inoperative air conditioning resulted in vacant apartments. Although the Houston Independent School District would not lose students because of inoperative air conditioning, the failure of air conditioning equipment would result in an interruption of the learning process, irritability in the classrooms, and a general overall unsatisfactory teaching environment. This should be avoided at almost any cost.

The Houston Independent School District itself installed some absorption air conditioning in some science buildings. The problems and costs, not to consider the inconvenience, of maintaining this equipment are well known, and can be accurately determined by Houston Independent School District records.

RECIPROCATING VS. CENTRIFUGAL COMPRESSORS

Conclusion

The large percentage of school air conditioning installed today is reciprocating equipment.

Recommendation

Houston Independent School District will benefit in almost every case by installing reciprocating equipment.

Discussion

Almost all manufacturers offer hermetically sealed electric driven reciprocating equipment. It has the lowest first cost, an outstanding record of dependability and long life, as well as high efficiency. There are many reciprocating compressors in operation today which were installed before 1950 and which with only minor maintenance have given outstanding service. In the larger sizes, the small compact centrifugal units may prove to be the most economical in first cost. Either the reciprocating or the centrifugal compressor is fully modulating and easily adaptable to automatic operation. A 20-year life is not at all out of the ordinary for electric driven equipment; whereas, we know of no engine driven air conditioning nor absorption air conditioning operating today which has operated for 20 years.

TIME CLOCK VS. MANUAL OPERATION

Conclusion

School air conditioning which is time-clock operated has by far the lowest utility cost.

Recommendation

Houston Independent School District will benefit by installing air conditioning systems controlled and operated by time clocks.

Discussion

An air conditioning system designed for time-clock operation is normally a simple system. This requires very little added equipment, if any, and puts the control of operating hours in the hands of the central office. Time-clock operated systems are all equipped with an over-ride which enables the system to be turned on during off hours for non-scheduled uses. Several school districts operate their equipment with time clocks which are set to turn on the equipment in the morning in time to have the school conditioned for school opening and turn off the air conditioning at a pre-determined time after the schools close. These districts have by far the lowest utility operating cost per ton. Other districts which have manual control, i.e., control placed in the hands of the school personnel, without exception have a higher utility cost. Also, with manual control we find a large variance in the hours of air conditioning operation between one school and another within the same district. A time-clock operated system over that of a manually operated system will save Houston Independent School District many thousands of dollars each month the systems are operated and will provide a means whereby operating costs may be accurately predicted and controlled.

SPACE AND NOISE

Conclusion

The most desirable systems in use today are those which are adequately housed in a compact, noise conditioned area.

Recommendation

The Houston Independent School District will benefit by installing compact, quiet equipment.

Discussion

The most compact and normally the quietest air conditioning equipment available today is electric. Normal sound conditioning, such as acoustical tile, within an air conditioning equipment room is sufficient to isolate electric driven compressor noise from the rest of the building. This is not so with engine driven equipment. Even with absorption equipment which requires additional space and which its proponents claim has no moving parts, but which has three pumps all of which must run in order for it to operate, the evaporation of water in a vacuum cannot be accomplished without attendant noise. Decibel tests made on several absorption air conditioners in Houston today point out that there is very little difference, if any, between the noise level of an electric compressor as compared to an absorber. In addition to the noise of an absorption air conditioning unit must be added the noise of a boiler. This, too, is a space consuming piece of equipment; and as space is costly to provide, the cost of the added space is chargable to the engine or absorption equipment.

REHEAT

Conclusion

The large majority of school air conditioning installed today does not incorporate reheat.

Recommendation

The Houston Independent School District will benefit by not installing reheat.

Discussion

There are two reasons for installing reheat facilities in an air conditioning system. One is for control of humidity and the other is to permit individual room temperature control. It would seem folly indeed to install an air conditioning system so elaborate that precise humidity control was possible when the majority of those enjoying the air conditioning live in homes which do not have humidity control features incorporated in their air conditioning. Also, the provision that the temperature be controlled in each individual classroom is not a necessary provision. Experience has shown that it is far better to have an overall thermostat providing each classroom with approximately the same temperature and eliminating variables of whim or the difference in the physiological comfort of the teachers between classrooms. It is an established fact that the lower the temperature the higher the cost of air conditioning, and it would be advisable to operate any air conditioning system at the highest temperature that is acceptable to the greatest number. The few schools that do have reheat installed it initially to provide individual temperature control. The utility cost of these systems is considerably more than is the cost of the systems without reheat provisions. There is no doubt that an air conditioning system incorporating reheat is more sophisticated and offers a higher degree of control, but we do not believe this feature, due to the considerably higher operating cost and extra features which must be maintained, is advisable for the Houston Independent School District.

INDUSTRY CONSIDERATION

Conclusion

Where ever possible existing local industry was used for the installation of school air conditioning.

Recommendation

The Houston Independent School District should support local industry.

Discussion

As all revenues of the Houston Independent School District are from tax sources, each entity paying taxes will seek a portion of the business. It is the obligation and duty of the School District to see that no segment

of the industry receives favor over any other segment and that where costs are equal the business be divided accordingly. In this sense, it must again be pointed out that 96.2 per cent of the air conditioning installed in schools today is electric. This was done with the full knowledge that all segments of the tax paying industry were equally supported because all electric power is generated from locally purchased fuel. Subsidiaries of both local gas distribution companies have a large part in the furnishing or gas for fuel to the Houston Lighting & Power Company, which last year alone purchased more than $36 million worth of gas for conversion to electric energy. Thus it can be seen that the purchase of electric energy for air conditioning serves both the electric and gas industries equally and that neither the electric nor gas producers are slighted.

DISTRICT: GALENA PARK INDEPENDENT SCHOOL DISTRICT

SCHOOL: GALENA PARK HIGH SCHOOL

ADDRESS: 805 KEENE

COMPARISON OF ELECTRIC SERVICE
COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 125

Tons Air Conditioning Added 283

Year Added 1965

(1) Month	Billing Before Air Conditioning Year	Actual KVA	Billing KVA	KWH	Amount	Billing After Air Conditioning Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1964	Included below in October - 2 mo. bill				1966	384	384	37,500	$ 863.12	5,199	4,950	- 249		37,500	$ 863.12	$ 863.12
O		296	296	79,620	$1,016.49		555	555	77,400	1,389.94	2,274	1,875	- 399	259	- 2,220	373.45	373.45
N		337	169	48,840	617.45		384	384	87,600	1,202.55	550	648	98	215	38,760	585.10	585.10
D		264	132	50,670	574.35		225	225	48,600	699.81	139	195	56	93	- 2,070	125.46	125.46
J	1965	212	122	41,910	500.00	1967	207	207	41,100	622.01	135	177	42	115	- 810	122.01	122.01
F		230	122	36,450	463.01		222	222	53,100	725.81	158	73	- 85	100	16,650	262.80	262.80
M		245	122	44,850	519.92		210	210	45,300	654.97	452	1,046	594	88	450	135.05	135.05
A		272	136	46,500	552.10		234	234	42,900	674.71	1,312	2,913	1,601	98	- 3,600	122.61	122.61
M		276	276	56,320	828.63	1966	474	474	53,100	1,103.81	3,715	3,213	- 502	198	- 3,220	275.18	275.18
J		314	314	59,660	908.26		570	570	90,000	1,497.81	6,397	5,127	- 1,170	256	30,340	589.55	
J		265	265	20,460	569.18		417	417	59,100	1,058.96	7,870	8,094	+ 224	152	38,640	489.78	
A		80	80	11,490	230.90		384	384	47,400	930.19	7,597	6,840	- 757	304	35,910	699.29	
Totals				496,770	$6,780.29				684,100	$11,423.69	35,798	35,151	- 547		187,330	$4,643.40	$ 2,864.78

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.

All billing adjusted to current rate.

(1) Billing month does not coincide with calendar month.

DISTRICT: GALENA PARK INDEPENDENT SCHOOL DISTRICT

SCHOOL: NORTH SHORE JUNIOR HIGH SCHOOL

ADDRESS: 13801 HOLLY PARK

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 3

Tons Air Conditioning Added 350

Year Added 1966

Month (2)	Billing Before Air Conditioning: Year	Actual KVA	Billing KVA	KWH	Amount	Billing After Air Conditioning: Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S																	
O	1965	144	144	20,640	$ 389.70	1966	481	481	62,208	$ 1,176.82	2,274	1,875	- 399	337	41,568	$ 787.12	$ 787.12
N		136	68	19,600	268.65		507	254	68,256	877.29	550	648	98	186	48,656	608.64	608.64
D		132	66	22,800	287.33		507	254	42,624	703.64	139	195	56	188	19,824	416.31	416.31
J	1966	136	68	18,800	263.23	1967	107	54	27,936	291.60	135	177	42	- 14	9,136	28.37	28.37
F		132	66	22,480	285.16		118	59	27,936	311.62	158	73	- 85	- 7	5,456	26.46	26.46
M		136	68	24,000	298.46		109	55	27,360	301.72	452	1,046	594	- 13	3,360	3.26	3.26
A		136	68	22,320	287.08		115	58	26,208	298.42	1,312	2,913	1,601	- 10	3,888	11.34	11.34
M		128	128	21,920	374.37		484	484	74,304	1,263.27	3,715	(3)		356	52,384	888.90	888.90
J											6,397						
J											7,870						
A											7,597						
Totals	(8 Months)(1)			172,560	$2,453.98				356,832	$ 5,224.38	30,599	6,927	1,907		184,272		$ 2,770.40

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.

All billing adjusted to current rate..

(1) Air conditioning addition in full operation only 8 months.

(2) Billing months do not coincide with calendar months. October, 1966, billing period represents usage from August 22.through September 21.

(3) Total degree hours for May, 1967, not available at time of report.

DISTRICT: GALENA PARK INDEPENDENT SCHOOL DISTRICT

SCHOOL: GREEN VALLEY ELEMENTARY

ADDRESS: 13350 WOOD FORREST

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 5

Tons Air Conditioning Added 160

Year Added 1966

	Billing Before Air Conditioning					Billing After Air Conditioning											
Month (1)	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1965	19	19	3,600	$ 82.85	1966	11	11	3,600	$ 71.67	5,199	4,950	- 249	- 8	---	-$ 11.18	-$ 11.18
O	"	61	61	12,360	209.10		202	202	19,720	451.08	2,274	1,875	- 399	141	7,360	241.98	241.98
N		52	26	9,640	138.17		173	87	27,216	334.38	550	648	+ 98	61	17,576	196.21	196.21
D		46	23	8,520	126.08		43	22	10,512	132.39	139	195	+ 56	- 1	1,992	6.31	6.31
J	1966	44	22	8,240	122.69	1967	86	43	9,936	158.85	135	177	+ 42	21	1,696	36.16	36.16
F		49	25	9,120	133.15		43	22	10,368	131.45	158	73	- 85	3	1,248	- 1.70	- 1.70
M		49	25	10,120	139.92		40	20	9,936	125.77	452	1,046	+ 594	5	- 184	- 14.15	- 14.15
A		50	25	8,440	128.54		101	51	9,216	166.65	1,312	2,913	+ 1,601	26	776	38.11	38.11
M		45	45	8,000	155.56		173	173	22,176	427.81	(2)			128	14,176	272.25	272.25
J																	
J																	
A																	
Totals				78,040	$1,236.06				122,680	$2,000.05	10,219	11,877	1,658		44,640		$ 763.99

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. Degree Hours are shown by calendar month.

All billing adjusted to current rate.

(1) Billing month does not coincide with calendar month.

(2) Degree days not available at time of report.

DISTRICT: GALENA PARK INDEPENDENT SCHOOL DISTRICT

SCHOOL: NORTH SHORE ELEMENTARY SCHOOL

ADDRESS: 14310 DUNCANNON DRIVE

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 1½

Tons Air Conditioning Added 170

Year Added 1966

	Billing Before Air Conditioning					Billing After Air Conditioning										
Month[1]	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1965	61	61	4,848	$ 130.68	1966	14	14	3,216	$ 69.65	5.199	4,950	- 249	- 47	- 1,632	$- 61.03	$- 61.03
O		66	66	11,568	210.44		230	230	30,720	562.80	2,274	1,875	- 399	164	19,152	352.36	352.36 [2]
N		60	30	12,432	162.28		230	115	33,600	416.12	550	648	+ 98	85	21,168	253.84	253.84 [2]
D		67	34	15,600	189.75		77	39	18,432	208.29	139	195	+ 56	5	2,832	18.54	18.54 [2]
J	1966	67	34	13,824	177.72	1967	72	36	18,864	214.87	135	177	+ 42	2	5,040	37.15	37.15 [2]
F		67	34	15,696	190.40		81	41	23,904	256.51	158	73	- 85	7	8,208	66.11	66.11 [2]
M		72	36	16,224	196.98		79	40	19,296	223.79	452	1,046	+ 594	4	3,072	26.81	26.81 [2]
A		70	35	14,064	180.85		86	43	17,280	214.63	1,312	2,913	+1,601	8	3,216	33.78	33.78 [2]
M		62	62	12,912	213.53		246	246	27,504	588.40		[4]		184	14,592	374.87	374.87 [2]
J																	
J																	
A																	
Totals				117,168	$ 1,652.63				192,816	$ 2,755.06	10,219	11,877	1,658		75,648	$1,102.43	$1,102.43 [3]

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. Degree Hours are shown by calendar month.

All billing adjusted to current rate.

[1] Billing month varies from calendar month. October, 1966, billing period represents usage from August 22 through September 21.

[2] Billing months, October through June, as marked, represent period school is in session.

[3] Cost of electric service for air conditioning during above eight school months: $1,163.46

[4] Total degree hours for May, 1967, not available at time of report.

COMPARISON OF ELECTRIC SERVICE
COSTS BEFORE AND AFTER AIR CONDITIONING

DISTRICT: GALENA PARK INDEPENDENT SCHOOL DISTRICT

SCHOOL: PYBURN ELEMENTARY SCHOOL

ADDRESS: 12302 COULSON

Tons Air Conditioning Previously Installed 1½

Tons Air Conditioning Added 135

Year Added 1966

	Billing Before Air Conditioning					Billing After Air Conditioning											
Month(1)	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1965	8	8	2,000	$ 45.41	1966	8	8	2,480	$ 54.42	5,199	4,950	- 249	---	480	$ 9.01	$ 9.01
O		66	66	10,920	206.04		157	157	7,896	212.87	2,274	1,875	- 399	91	- 3,024	6.83	6.83
N		62	31	10,280	149.21		203	102	26,640	366.55	550	648	+ 98	71	16,360	217.34	217.34
D		56	28	11,080	150.13		187	94	19,296	364.79	139	195	+		8,216	154.66	154.66
J	1966	54	27	9,000	134.53	1967	101	52	20,448	237.87	135	177	+ 42	25	11,448	103.34	103.34
F		54	27	8,800	133.18		94	47	21,456	238.67	158	73	- 85	20	12,656	105.49	105.49
M		52	26	10,280	141.71		96	48	20,448	233.56	452	1,046	+ 594	22	10,168	91.85	91.85
A		56	28	9,560	139.83		120	60	20,016	249.46	1,312	2,913	+ 1,601	32	10,456	109.63	109.63
M		54	54	9,320	177.20		252	252	25,344	562.02				198	16,024	384.82	384.82
J																	
J																	
A																	
Totals				81,240	$1,277.24				164,024	$ 2,460.21	10,219	11,877	1,658		82,784		$ 1,182.97

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.
All billing adjusted to current rate.

(1) Billing month varies from calendar month. October, 1966, billing period represents usage from August 23 through September 22.

(2) Added air conditioning not in full operation until after September 15. Therefore, total includes only approximately seven months of air conditioning.

DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

SCHOOL: PASADENA HIGH SCHOOL

ADDRESS: 210 SOUTH SHAVER

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 170

Tons Air Conditioning Added 612

Year Added 1966

	Billing Before Air Conditioning					Billing After Air Conditioning											
Month[1]	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1965	514	514	86,400	$ 1,389.42	1966	1,272	1,272	221,760	$ 3,443.48	5,199	4,950	- 249	758	135,560	$ 2,054.06	$ 2,054.06
O		463	463	104,310	1,434.26		1,320	1,320	313,600	4,137.70	2,274	1,875	- 399	857	209,290	2,703.44	2,703.44
N		509	255	137,268	1,345.55		1,216	608	211,200	2,375.94	550	648	+ 98	353	73,932	1,030.39	1,030.39
D		538	269	129,120	1,311.35		952	476	206,400	2,145.42	139	195	+ 56	207	77,280	834.07	834.07
J	1966	540	270	105,120	1,150.25	1967	648	355	155,200	1,617.04	135	177	+ 42	85	50,080	466.79	466.79
F		528	264	149,760	1,443.68		896	448	219,200	2,190.14	158	73	- 85	184	69,440	746.46	746.46
M		530	265	141,600	1,389.90		1,160	580	212,800	2,344.78	452	1,060	+ 594	315	71,200	954.88	954.88
A		590	295	148,320	1,480.43		1,184	592	278,400	2,807.22	1,312	2,913	+1,601	297	130,080	1,326.79	1,326.79
M																	
J																	
J																	
A																	
Totals			1,001,898	$ 10,944.84				1,818,560	$21,061.72		10,220	11,877	1,658		816,662		$10,116.88

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. Degree hours are shown by calendar month.

All billing adjusted to current rate.

Air Conditioning installed 8 months only.

[1] Billing does not coincide with calendar month.

DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

SCHOOL: JACKSON INTERMEDIATE SCHOOL

ADDRESS: 201 EAST JACKSON STREET

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 15

Tons Air Conditioning Added 307

Year Added 1966

	Billing Before Air Conditioning					Billing After Air Conditioning										
(1) Month	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1964	137	137	21,870	$ 387.00	1966	441	441	74,304	$ 1,198.00	5,199	4,950	- 249	304	52,434	$ 811.00	$ 811.00
O		139	139	25,920	417.00		553	469	84,024	1,306.00	2,274	1,875	- 399	330	58,104	889.00	889.00
N		128	64	27,630	316.00		389	389	55,728	994.00	550	648	98	325	28,098	678.00	678.00
D		134	67	29,610	334.00		283	283	41,472	739.00	139	195	56	216	11,862	405.00	405.00
J	1965	137	69	28,980	333.00	1967	194	194	44,496	626.00	135	177	42	125	15,516	293.00	293.00
F		137	69	32,400	356.00		173	173	45,360	600.00	158	73	- 85	104	12,960	244.00	244.00
M		129	65	31,140	342.00		274	274	39,960	715.00	452	1,046	594	209	8,820	373.00	373.00
A		144	72	27,990	331.00		454	454	72,792	1,207.00	1,312	2,913	1,601	382	44,802	876.00	876.00
M																	
J																	
J																	
A																	
Totals (8 Months)			225,540	$ 2,816.00				458,136	$ 7,385.00		10,219	11,877	1,658		232,596		$ 4,569.00

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.

All billing adjusted to current rate.

Air Conditioning installed only eight months.

(1) Billing months do not coincide with calendar months.

DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

SCHOOL: SOUTH HOUSTON INTERMEDIATE SCHOOL

ADDRESS: 1502 MAIN

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 15

Tons Air Conditioning Added 345

Year Added 1966

(1) Month	Billing Before Air Conditioning: Year	Actual KVA	Billing KVA	KWH	Amount	Billing After Air Conditioning: Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1965	206	206	33,440	$ 568.62	1966	582	582	93,120	$1,536.95	5,199	4,950	- 249	376	59,680	$ 968.33	$ 968.33
O		214	214	40,480	628.31		566	566	113,600	1,651.70	2,274	1,875	- 399	352	73,120	1,023.39	1,023.39
N		210	105	39,840	460.48		499	250	72,000	895.86	550	648	+ 98	145	32,160	435.38	435.38
D		190	95	40,800	451.98		470	240	59,840	798.48	139	195	+ 56	145	19,040	346.50	346.50
J	1966	184	92	32,960	394.36	1967	326	240	42,560	681.40	135	177	+ 42	148	9,600	287.04	287.04
F		214	107	47,200	513.34		509	255	54,080	781.95	158	73	- 85	148	6,880	268.61	268.61
M		178	89	41,920	450.57		511	271	59,520	842.81	452	1,046	+ 594	182	17,600	392.24	392.24
A		206	103	37,280	440.13		288	240	87,680	987.09	1,312	2,913	+1,601	137	50,400	546.96	546.96
M																	
J																	
J																	
A																	
Totals				313,920	$3,907.79				582,400	$8,176.24	10,219	11,877	1,658		268,480		$4,268.45

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.

All billing adjusted to current rate.

** Air Conditioning installed only 8 months.

(1) Calendar month does not coincide with billing month.

DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

SCHOOL: FREEMAN ELEMENTARY SCHOOL

ADDRESS: 2323 THETA

COMPARISON OF ELECTRIC SERVICE
COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 0

Tons Air Conditioning Added 160

Year Added 1966

	Billing Before Air Conditioning					Billing After Air Conditioning											
Month (1)	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1965	103	103	16,560	$ 299.75	1966	317	317	42,720	$ 765.11	5,199	4,950	- 249	214	26,160	$ 465.36	$ 465.36
O		105	105	18,640	316.85		326	326	51,200	833.14	2,274	1,875	- 399	221	32,560	516.29	516.29
N		88	44	17,600	218.30		274	137	31,680	434.52	550	648	+ 98	93	14,080	216.22	216.22
D		86	48	16,320	215.63		270	135	27,680	405.66	139	195	+ 56	87	11,360	190.03	190.03
J	1966	96	48	13,200	194.49	1967	126	63	25,440	287.56	135	177	+ 42	15	12,240	93.07	93.07
F		96	48	19,120	234.60		229	115	23,040	346.76	158	73	- 85	67	3,920	112.16	112.16
M		96	48	17,600	224.30		282	141	26,720	408.05	452	1,046	+ 594	93	9,120	183.75	183.75
A		100	50	16,400	219.17		304	152	44,160	540.30	1,312	2,913	+1601	102	27,760	321.13	321.13
M																	
J																	
J																	
A																	
Totals (8 Months)			135,440	$1,923.09					272,640	$4,021.10	10,219	11,877	1658		137,200		$ 2,098.01

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.
All billing adjusted to current rate.
Air conditioning installed only 8 Months.

(1) Billing month does not coincide with calendar month.

DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

SCHOOL: L. F. SMITH ELEMENTARY

ADDRESS: 206 NORTH PEREZ

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 0

Tons Air Conditioning Added 145

Year Added 1966

	Billing Before Air Conditioning					Billing After Air Conditioning											
Month[1]	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1965	104	104	17,640	$ 308.57	1966	278	278	46,240	$ 763.34	5,199	4,950	- 249	174	28,600	$ 454.77	$ 454.77
O		107	107	19,680	326.89		293	293	55,840	850.88	2,274	1,875	- 399	186	36,160	523.99	523.99
N		100	50	18,840	235.70		118	59	25,120	291.75	550	648	+ 98	9	6,280	56.05	56.05
D		99	50	19,560	240.58		285	143	25,600	421.00	139	195	+ 56	93	6,040	180.42	180.42
J	1966	90	45	15,000	202.19		112	56	31,840	332.78	135	177	+ 42	11	16,840	130.59	130.59
F		94	47	19,800	237.71		112	56	31,520	330.61	158	73	- 85	9	11,720	92.90	92.90
M		96	48	19,020	233.92		306	153	28,960	458.76	452	1,046	+ 594	105	9,940	224.84	224.84
A		99	50	16,800	221.88		278	139	45,440	549.42	1,312	2,913	+1,601	89	28,640	327.54	327.54
M																	
J																	
J																	
A																	
Totals (8 Months)			146,340	$2,007.44				290,560	$3,998.54		10,219	11,877	1,658		144,220		$ 1,991.10

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.

All billing adjusted to current rate.

Air Conditioning Installed Only 8 Months.

[1] Billing month does not coincide with calendar month.

DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

SCHOOL: WILLIAMS ELEMENTARY

ADDRESS: 1522 SCARBOROUGH LANE

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 15

Tons Air Conditioning Added 142.5

Year Added 1966

	Billing Before Air Conditioning					Billing After Air Conditioning										
Month[1]	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1965	60	60	8,064	$ 177.70	1966	295	295	38,304	$ 735.07	5,199	4,950	- 249	235	30,240	$ 557.37	$ 557.37
O		66	66	11,592	210.60		295	295	51,264	822.87	2,274	1,875	- 399	229	39,672	612.27	612.27
N		207	104	21,672	335.89		274	274	22,608	591.92	550	648	+ 98	170	936	256.03	256.03
D		189	95	15,696	281.90		203	203	20,016	473.17	139	195	+ 56	108	4,320	191.27	191.27
J	1966	71	36	12,024	168.52	1967	148	148	14,256	351.64	135	177	+ 42	112	2,232	183.12	183.12
F		49	25	14,544	169.10		69	69	13,824	230.22	158	73	- 85	44	- 720	61.12	61.12
M		53	27	13,968	168.19		68	68	13,824	228.72	452	1,046	+ 594	41	- 144	60.53	60.53
A		75	38	12,816	176.89		223	223	21,888	515.85	1,312	2,913	+1,601	185	9,072	338.96	338.96
M																	
J																	
J																	
A																	
Totals (8 months)			110,376	$1,688.79				195,984	$3,949.46		10,219	11,877	1,658		85,608		$2,260.67

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. Degree hours are shown by calendar month.

All billing adjusted to current rate.

Air Conditioning installed only 8 months

[1] Billing month does not coincide with calendar month.

DISTRICT: SPRING BRANCH INDEPENDENT SCHOOL DISTRICT

SCHOOL: MEMORIAL SENIOR HIGH SCHOOL

ADDRESS: 935 ECHO LANE

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 190

Tons Air Conditioning Added 435

Year Added 1964

Month (1)	Billing Before Air Conditioning Year	Actual KVA	Billing KVA	KWH	Amount	Billing After Air Conditioning Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1963	650	650	131,328	$ 1,898.00	1965	1,054	1,054	139,968	$ 2,562.00	5,199	5,883	+ 684	404	8,640	$ 664.00	$ 664.00
O		657	657	170,880	2,176.00		1,106	1,106	218,304	3,171.00	2,274	1,704	- 570	449	47,424	995.00	995.00
N		317	317	175,104	1,695.00		1,063	532	200,448	2,189.00	550	930	+ 380	215	25,344	494.00	494.00
D		311	311	142,848	1,467.00		994	497	167,616	1,914.00	139	150	+ 11	186	24,768	447.00	447.00
J	1964	622	311	155,136	1,551.00	1966	899	462	112,320	1,497.00	135	27	- 108	151	-42,816	- 64.00	- 64.00
F		585	311	161,280	1,592.00		553	462	158,400	1,799.00	158	0	- 158	151	- 2,880	207.00	207.00
M		596	311	157,824	1,569.00		531	462	127,872	[illegible]2.00	452	348	- 104	151	-29,952	23.00	23.00
A		588	311	134,400	1,410.00		933	467	153,792	1,776.00	1,312	1,425	+ 113	156	19,392	366.00	366.00
M		634	634	167,800	2,121.00		1,063	1,063	196,416	2,958.00	3,715	3,213	- 502	429	28,616	837.00	837.00
J		611	611	139,008	1,891.00		1,071	1,071	224,640	3,161.00	6,397	5,127	-1,270	460	85,632	1,270.00	
J		397	397	99,840	1,305.00		449	449	86,400	1,292.00	7,870	8,094	+ 224	52	-13,440	- 13.00	
A		233	233	52,224	736.00		359	359	65,088	1,013.00	7,597	6,840	- 757	126	12,864	277.00	
Totals				1,687,672	$19,411.00				1,851,264	$24,914.00	35,798	33,741	-2,057		163,592	$ 5,503.00	$ 3,969.00

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.
All billing adjusted to current rate.

(1) Billing month does not coincide with calendar month. At this location each billing period represents the usage during the preceding calendar month.

DISTRICT: SPRING BRANCH INDEPENDENT SCHOOL DISTRICT

SCHOOL: LANDRUM JUNIOR HIGH SCHOOL

ADDRESS: 2200 RIDGECREST STREET

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 82

Tons Air Conditioning Added 355

Year Added 1964

	Billing Before Air Conditioning					Billing After Air Conditioning										
Month(1)	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1963	216	216	32,256	$ 576.00	1965	441	441	29,952	$ 830.00	5,199	5,883	+ 684	225	- 2,304	$ 254.00	$ 254.00
O		317	317	62,064	929.00		648	648	112,032	1,764.00	2,274	1,704	- 570	331	49,968	835.00	835.00
N		281	143	57,312	636.00		599	386	77,760	1,139.00	550	930	+ 380	243	20,448	503.00	503.00
D		230	143	61,344	663.00		553	386	71,136	1,094.00	139	150	+ 11	410	9,792	431.00	431.00
J	1964	226	143	57,168	635.00	1966	219	219	43,488	656.00	135	27	- 108	76	-13,680	21.00	21.00
F		206	143	54,000	613.00		216	216	56,160	738.00	158	0	- 158	73	2,160	125.00	125.00
M		209	143	47,664	570.00		196	196	47,232	647.00	452	348	- 104	53	- 432	77.00	77.00
A		202	143	45,648	557.00		360	360	54,432	942.00	1,312	1,425	+ 113	217	8,784	385.00	385.00
M		288	288	63,648	896.00		510	510	73,440	1,296.00	3,715	3,213	- 502	222	9,792	400.00	400.00
J		289	289	54,432	835.00		605	605	98,784	1,610.00	6,397	5,127	-1,270	316	44,352	775.00	
J		215	215	37,728	611.00		533	533	35,712	1,075.00	7,870	8,094	+ 224	318	- 2,016	464.00	
A		115	115	20,304	343.00		92	92	23,040	327.00	7,597	6,840	- 757	23	2,736	- 16.00	
Totals				593,568	$ 7,864.00				723,168	$12,118.00	35,798	33,741	-2,057		129,600	$ 4,254.00	$ 3,031.00

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. Degree Hours are shown by calendar month.

All billing adjusted to current rate.

(1) Billing months do not coincide with calendar months.

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

DISTRICT: SPRING BRANCH INDEPENDENT SCHOOL DISTRICT

SCHOOL: RUMMEL CREEK ELEMENTARY

ADDRESS: 705 BRITMORE

Tons Air Conditioning Previously Installed 6

Tons Air Conditioning Added 152

Year Added 1964

	Billing Before Air Conditioning					Billing After Air Conditioning											
(1) Month	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	(2) A/C Cost 9 Months
S	1963	140	140	13,728	$ 336.00	1965	193	193	13,824	$ 416.00		5883	+ 684	53	96	$ 80	$
O		113	113	18,720	329.00			264	44,064	728.00		1704	- 570	151	25,344	399	399
N		106	53	20,640	252.00		235	118	31,248	422.00	550	930	+ 380	65	10,608	170	170
D		96	48	18,720	232.00		396	198	28,080	520.00	139	150	+ 11	150	9,360	288	288
J	1964	101	51	21,888	258.00	1966	158	79	17,280	269.00	135	27	- 108	28	- 4,608	11	11
F		106	53	26,304	291.00		107	54	27,360	299.00	158		- 158	1	1,056	8	8
M		114	57	27,456	305.00		107	54	24,048	277.00	452	348	- 104	- 3	- 3,408	- 28	- 28
A		101	51	19,872	244.00		216	108	24,048	358.00	1,312	1,425	+ 113	57	4,176	114	114
M		106	106	21,216	336.00		225	225	28,368	563.00	3,715	3,213	- 502	119	7,152	227	227
J		115	115	18,432	330.00		245	245	40,320	674.00	6,397	5,127	-1,270	130	21,888	344	344
J		28	28	6,816	121.00		228	228	13,104	386.00	7,870	8,094	+ 224	200	6,288	265	
A		5	5	4,416	75.00		36	36	5,616	125.00	7,597	6,840	- 757	31	1,200	50	
Totals				218,208	$3,109.00				297,360	$ 5,037.00	35,798	33,741	-2,057		79,152	$ 1,928	$ 1,533

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. These are shown by calendar month.

All billing adjusted to current rate.

(1) Billing month varies from calendar month. October, 1965 billing period represents usage from September 1 through October 1.

(2) Houston Lighting & Power Company billing periods October, 1965 through June, 1966 represent usage during nine months school session.

DISTRICT: SPRING BRANCH INDEPENDENT SCHOOL DISTRICT

SCHOOL: WESTWOOD ELEMENTARY SCHOOL

ADDRESS: 2100 SHADOWDALE DRIVE

COMPARISON OF ELECTRIC SERVICE COSTS BEFORE AND AFTER AIR CONDITIONING

Tons Air Conditioning Previously Installed 5

Tons Air Conditioning Added 128

Year Added 1964

	Billing Before Air Conditioning					Billing After Air Conditioning											
Month (1)	Year	Actual KVA	Billing KVA	KWH	Amount	Year	Actual KVA	Billing KVA	KWH	Amount	*Monthly Degree Hours (35 Year Avg.)	Monthly Degree Hours After A/C	Net Change Monthly Degree Hours	A/C Billing KVA	KWH	A/C Cost 12 Months	A/C Cost 9 Months
S	1963	82	82	15,636	$ 262.00	1965	179	179	10,080	$ 300.00	5,199	5,883	+ 684	97	- 5,556	$ 38.00	$ 38.00
O		73	73	15,840	250.00		219	219	35,568	603.00	2,274	1,704	- 570	146	19,728	353.00	353.00
N		67	67	13,944	228.00		187	94	23,184	331.00	550	930	+ 380	27	9,240	103.00	103.00
D		77	77	14,400	246.00		145	73	21,024	285.00	139	150	+ 11	- 4	6,624	39.00	39.00
J	1964	77	77	14,400	246.00		114	63	13,680	220.00	135	27	- 108	- 14	- 720	- 26.00	- 26.00
F		67	67	12,864	221.00		102	63	21,456	273.00	158	0	- 158	- 4	8,592	52.00	52.00
M		67	67	12,768	220.00		118	63	18,432	252.00	452	348	- 104	- 4	5,664	32.00	32.00
A		66	66	10,848	206.00		81	63	22,608	281.00	1,312	1,425	+ 113	- 3	11,760	75.00	75.00
M		77	77	12,864	236.00		199	199	26,352	510.00	3,715	3,213	- 502	122	13,488	274.00	274.00
J		86	86	15,648	268.00		223	223	35,856	610.00	6,397	5,127	- 1,270	137	20,208	342.00	
J		24	24	5,280	105.00		192	192	10,944	324.00	7,870	8,094	+ 224	168	5,664	219.00	
A		31	31	5,568	117.00		104	104	7,920	214.00	7,597	6,840	- 757	73	2,352	97.00	
Totals				150,060	$ 2,605.00				247,104	$ 4,203.00	35,798	33,741	- 2,057		97,044	$ 1,598.00	$ 940.00

*Degree Hours - The deviation of actual hourly temperature readings above 72° for each hour in the year. Degree Hours are shown by calendar month.

All billing adjusted to current rate.

(1) Billing months do not coincide with calendar months.

SCHOOL DISTRICT: ALIEF INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator(1) Part Time	Operator(1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Alief Elementary & District Administration Offices 12141 Highstar	16 10 48,200	Comp. Comp.	1964 1967	100	76	E E	Custodian		100			76	24		$ 7,115.37 * 5,213.54	All electric kitchen Summer School

Totals for District:

Tons installed with initial construction 100
Tons added later 76
Total tons installed: Electric 176 Gas 0
Total tons under contract: Electric 300 Gas 0

(1) The district employs 0 full time and 0 part time men for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT: BARBERS HILL INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator: Part Time	Operator: Full Time	Central Chilled Water Tons: 2 Pipe	Central Chilled Water Tons: 4 Pipe	Central Chilled Water Tons: Double Duct	Direct Exp.	Control: Manual Hrs.	Control: Time Clock Hrs.	Actual Electric Service Billing 12 Months / 9 Months	Remarks
Barbers Hill High	92,000	Comp.	Under Const.	190		Elec.		Custodian		190 (Reheat in Auditorium only)				X		Under construction All electric kitchen

Totals for District:

Tons installed with initial construction 0
Tons added later 0
Total tons installed: Electric 0 Gas 0
Total tons under construction: Electric 190 Gas 0

(1) The District plans to employ NO full-time and NO part-time men for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT: BRAZOSPORT INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator: Part Time	Operator: Full Time	Central Chilled Water Tons: 2 Pipe	Central Chilled Water Tons: 4 Pipe	Central Chilled Water Tons: Double Duct	Direct Exp.	Control: Manual Hrs.	Control: Time Clock Hrs.	Actual Electric Service Billing 12 Months / 9 Months	Remarks
Clute Jr. High & Elementary 400 East Main	51 64,000	Conv.	1965		272 T	Elec.		Custodian	250			22*		8	$ 8,066.61 * 5,686.08	Summer Use: Elementary: 6 Tons, 1 Mo. Junior High: 6 Tons, 2 Mos.
Velasco Elementary 500 North Avenue B	48 27,000	Conv.	1965		157 T	Elec.		Custodian	135			22*		8	7,402.18 * 5,999.25	Summer Use: 25 Tons
Oran M. Roberts Elementary 110 South Cedar	26 30,000	Conv.	1965		162 T	Elec.		Custodian	150			12*	8		4,851.41 * 3,775.73	Summer Use: 12 Tons, 1 Mo.
Elizabeth Ney Elementary 302 Winding Way	36 37,000	Conv.	1965		170 T	Elec.		Custodian	160			10*		8	5,801.70 * 4,542.94	Summer Use: 7½ Tons, 1 Mo.
Terrill W. Ogg Elementary 400 West Marion	30 37,000	Conv.	1965		182 T	Elec.		Custodian	165			17*	8		4,204.10 * 3,143.19	Summer Use: 22 Tons, 1 Mo.
Jane Long Elementary 1201 West 11th Street	34 27,000	Conv.	1965		150 T	Elec.		Custodian	135			15*	8		4,568.65 * 3,132.08	Summer Use: 15½ Tons, 1 Mo.
A. B. Beutel Elementary 200 Ligustrum	39 37,000	Conv.	1965		189 T	Elec.		Custodian	175			14*	8		5,795.17 * 4,492.92	Summer Use: 15 Tons, 1 Mo.
Stephen F. Austin Elementary 7351 Stephen F. Austin	17 22,400	Conv.	1965		89 T	Elec.		Custodian	75			14*	8		2,722.62 * 1,966.67	Summer Use: 75 Tons, 1 Mo.
Lake Jackson Jr. High & Elementary 138 Oyster Creek Street	52 51,000	Conv.	1966		244 T	Elec.		Custodian	220			24*	8		10,406.82 * 8,117.81	Summer Use: 24 Tons, 1 Mo.
Freeport Jr. High & Elementary 331 West Sixth Street	71 64,000	Conv.	1965		328 T	Elec.		Custodian	250			78*	8		10,432.81 * 8,023.35	Summer Use: Elementary: 14 Tons, 1 Mo. Jr. High: 64 Tons, 2 Mos.
Brazosport Senior High 1800 West Second Street	73 101,400	Conv.	1963		507 T	Elec.		Custodian	450			57*	8		29,049.98 *22,751.35	Summer Use: Summer School: 292 Tons- 3 Mos.

*Office & Miscellaneous

SCHOOL DISTRICT: BRAZOSPORT INDEPENDENT SCHOOL DISTRICT

School & Address	Number Classrooms Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time

Totals for District:

Tons installed with initial construction 0
Tons added later 2450
Total tons installed: Electric 2450 Gas 0
Total tons under contract: Electric 0 Gas 0

(1) The District employs 1 full-time and 1 part-time man for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT CLEAR CREEK INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator(1) Part Time	Operator(1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months 9 Months	Remarks
Seabrook Jr. High 2401 Meyer	24 60,000	Comp.	1966	200		E	Custodian							7 A.M. to 4 P.M.		New school, insufficien billing.
Webster Jr. High 322 South Walnut	37 104,000	Conv.	1963 1965		156 60	E	Custodian		60	150 (Reheat)		20		"	$15,833.62	
Webster Elementary 215 South Walnut	20 44,000	Conv.	1961 1965		40 (2) 70	G E	Custodian			70 (Reheat)		22		"	6,346.34	
Seabrook Elementary 1506 Anders	20 51,000	Conv.	1961		87	E	Custodian		55			32		"	7,549.88	
Clear Lake City Ele. 1707 Fairwind	24 52,000	Comp.	1965	145		E	Custodian		135			10		"	9,914.36	Has electric heating 170 KW and electric kitchen 125 KW.
El Lago Elementary 1708 Lake Oak	20 45,000	Comp.	1965	106		E	Custodian		96			10		"	10,679.56	Has electric heating and electric kitchen.
Kemah Elementary 802 Miller	21 47,500	Conv.	1965		120	E	Custodian		100			20		"	$ 6,559.08	

Totals for District:

Tons installed with initial construction		451		
Tons added later		533		
Total tons installed:	Electric	944	Gas	40
Total tons under contract:	Electric	100	Gas	0

(1) The district employs 1 full time and 0 part time men for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

(2) Four 10 Ton absorption units

District has approximately 1,000 tons electric air conditioning in schools served by Community Public Service Company.

SCHOOL DISTRICT: CYPRESS-FAIRBANKS INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Numt Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator(1) Part Time	Operator(1) Full Time	Central Chilled Water Tors 2 Pipe	4 Pipe	Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Cypress-Fairbanks High School 22602 Hempstead	36 92,000	Conv.	1962 1965		200 12 200	Gas Elec. Gas		Custodian	150	250 (20% Reheat)		12 T	9		$	12 tons electric for administrative area Summer School High School
Arnold Junior High School 22602 Hempstead	21 58,850	Conv.	1962		200	Gas		Custodian	100	100 (Reheat)		5 T	9			
Lampkin Elementary 22602 Hempstead	24 43,000	Conv.	1962		150 5	Gas Elec.		Custodian	100	50 (Reheat)			9		18,472.86 * 14,589.44	All of aboved served from same meter
Berta Dean Junior High 14023 Vanewall Creek	20 60,310	Conv.	1962	170		Elec.		Custodian	170				9		9,427.20 * 7,489.01	Both schools at this address served from one meter
Bane Elementary 14023 Vanewall Creek	24 30,000	Conv.	1962	80 32		Gas Elec.		Custodian	80			32 T	9			5 tons-administrative area . elec., 27 tons also elec.
Post Elementary 7600 Equador	20 31,000	Conv.	1965		100	Gas		Custodian	100				9		2,515.14 * 2,175.83	
Matzke Elementary Jones Road	24 42,000	Compact	1966	00		Gas		Custodian	100			6 T	9		4,011.91 (Nov.'66-May'67)	6 tons electric-administrative area. new school seven months billing
Carverdale School 5514 Clara	30 51,000	Conv.	1962 1965	35	160	Elec. Gas		Custodian	160 35				9		5,618.71 * 4,552.82	Headstart Summer

Totals for District:

Tons installed with initial construction 417
Tons added later 1027
Total tons installed: Electric 254 Gas 1190
Total tons under contract: Electric 0 Gas 0

(1) The district employs 2 full time and 0 part time men for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

NOTE: District has a contract with an engine manufacturer for engine maintenance, the cost of which was approximately $3,650 last year. This contract includes engine maintenance alone; and maintenance of other parts of the air conditioning systems such as compressors, cooling towers, plumbing, and air handlers must be done by the school maintenance personnel or by outside air conditioning contractors. An electric motor, by comparison, requires practically no maintenance. Therefore, air conditioning contractors in Houston have consistently estimated that the per ton maintenance cost of the entire electric system, including the motor which drives the compressor, is approximately the same as that of an engine system, exclusive of the engine. As a result, the above mentioned engine maintenance cost of approximately $3,650 is an added annual expense chargeable to the engine-driven systems which does not exist with electric equipment.

SCHOOL DISTRICT: DEER PARK INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months *9 Months	Remarks
Deer Park Senior High	78 207,500	Conv.	1964 1965	17	217 899	Elec.		Custodian	890	135 (Reheat)		108		6 a.m.to 6 p.m.	$46,060.18 *35,155.87	Offices, library and gyms operated during summer.
San Jacinto Elementary District Maintenance Shops & Bus Garage 601 East Eighth	43 85,450	Conv.	1965	6	312	Elec.		Custodian	300			18		6 a.m.to 6 p.m.		
Deer Park Junior High 410 East Ninth	43 132,000	Comp.	1966	380		Elec.		Custodian		380 (Reheat)			6 a.m.to 6 p.m.		8,344.22 *Not available	All-electric kitchen - billed for 8 months only students in class since January 1967.
Deepwater Junior High	43 132,000	Comp.	1964	380		Elec.		Custodian		380 (Reheat)			6 a.m.to 6 p.m.		31,586.35 *25,171.03	All-electric kitchen - Summer school 1966 in Jr. High-offices, libraries & gyms in both schools operated during summer.
Deepwater Elementary 3620 Meadowlake	46 76,250	Conv.	1965	18	310	Elec.		Custodian	50	260 (Reheat)		18		6 a.m.to 6 p.m.		
Carpenter Elementary 5002 Pasadena Blvd.	42 84,650	Conv.	1965	18	315	Elec.		Custodian	300			33		6 a.m.to 6 p.m.	13,536.67 *9,977.46	Summer school 1966
Lynchburg Elementary	10 12,500	Conv.	1965	2	75	Elec.		Custodian	75			2		6 a.m.to 6 p.m.	3,248.91 *2,330.75	Office, library & gym operated during summer.

TOTALS FOR DISTRICT:

Tons installed with initial construction 821
Tons added later 2128
Total tons installed: ELECTRIC 2949 GAS 0
Total tons under contract: ELECTRIC 45 GAS 0

(1)
The District employs 2 full time & 2 part time men for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT: GALENA PARK INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months *9 Months	Remarks
Galena Park Senior High 805 Keene	54 150,818	Conv.	1965		408 T	Elec.		Custodian	408			5 Office		6 a.m. 4 p.m.	$ 11,423.69 * 8,751.43	Summer School
Northshore Senior High 13501 Holly Park	61 121,957	Conv.	1966		425 T	Elec.		Custodian	425					6 a.m. 4 p.m.	13,423.63 *11,014.23	25 tons office & miscellaneous
Northshore Junior High 13801 Holly Park	46 70,905	Conv.	1966		353 T	Elec.		Custodian	350			3 Office		6 a.m. 4 p.m.	6,024.92 * 5,411.08	
Fidelity High & Elem. 2501 16th Street	40 80,034	Conv.	1966		303 T	Elec.		Custodian	300			3 Office		6 a.m. 4 p.m.	5,282.99 * 4,481.95	Summer School Headstart
Galena Park Junior High and Elementary 1801 Third Street	62 124,142	Conv.	1966		143 T	Elec.		Custodian	140			3 Office		6 a.m. 4 p.m.	7,587.22 * 6,547.23	Athletic Stadium & Maintenance Shops
Woodland Acres Jr. High and Elementary 12945 Myrtle Lane	39 45,122	Conv.	1966		217 T	Elec.		Custodian	214			3 Office		6 a.m. 4 p.m.	4,523.79 * 4,206.80	Summer School Headstart
Cimarron Elementary 800 Cimarron	32 941	Conv.	1966		177 T	Elec.		Custodian	175			2 Office		6 a.m. 4 p.m.	3,450.85 * 3,114.70	
Cloverleaf Elementary 1025 Frankie	35 49,593	Conv.	1966		167 T	Elec.		Custodian	165			2 Office		6 a.m. 4 p.m.	2,731.35 * 2,578.35	
Green Valley Elementary 13350 Wood Forest	19 27,000	Conv.	1966		165 T	Elec.		Custodian	160			5 Office-Misc.		6 a.m. 4 p.m.	2,315.10 * 2,097.39	
Jacinto City Elementary 10901 Burman	38 57,305	Conv.	1966		233 T	Elec.		Custodian	223			10 Office-Misc.		6 a.m. 4 p.m.	5,684.80 * 5,038.10	

SCHOOL DISTRICT: GALENA PARK INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months *9 Months	Remarks
McArthur Elementary 1709 North Main	21 26,568	Conv.	1966		119 T	Elec.		Custodian	117			2 Office		6 a.m. 4 p.m.	2,040.36 * 1,882.28	
Northshore Elementary 14310 Duncannan	28 37,150	Conv.	1966		172 T	Elec.		Custodian	170			2 Office		6 a.m. 4 p.m.	3,163.89 * 2,861.29	
Pyburn Elementary 12302 Coulson	31 35,038	Conv.	1966		138 T	Elec.		Custodian	136			2 Office		6 a.m. 4 p.m.	2,736.72 * 2.550.60	

TOTALS FOR DISTRICT:

Tons Installed With Initial Construction 0

Tons Added Later 3,020

Total Tons Installed: Electric 3,020 Gas 0

Total Tons Under Contract: Electric 0 Gas 0

(1) The District Employs 1 full time and 2 part time men for routine Air Conditioning and Refrigeration Maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT: GALVESTON INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	(1) Operator Part Time	Operator Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actua. Electric Service Billing 12 Months *9 Months	Remarks (2)
Sam Houston Junior High 1515 - 43rd Street	28 88,000	Compact	1966	235 T		Elec.	Custodian Only			225 (Reheat)		10	8		$ 19,899.17 *14,477.09	Summer tons 112 - 8 hours Summer School - 8 weeks
Weis Junior High 7300 Avenue S	16 85,000	Compact	1966	240 T		Elec.	Custodian Only			174 (Reheat)		20	8		15,913.67 *12,350.17	Summer tons 87 - 8 hours
Rosenberg Elementary 1028 Avenue H	33 47,500	Compact	1966	194 T		Elec.	Custodian Only			174 (Reheat)		20	8		12,090.26 * 9,150.84	Summer tons 87 - 8 hours Summer School - 8 Weeks
San Jacinto Elementary 1114 - 21st Street	33 47,500	Compact	1966	194 T		Elec.	Custodian Only			225 (Reheat)		15	8		13,166.51 *10,086.93	Summer tons 112 Summer School - 8 Weeks

TOTALS FOR DISTRICT:

Tons Installed with Initial Construction 863

Tons Added Later 0

Total Tons Installed: Electric 863 Gas 0

Total Tons Under Contract: Electric 0 Gas 0

(1) The District employs 1 full time and 1 part time man for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

(2) All four schools have total electric kitchens.

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

SCHOOL DISTRICT: GOOSE CREEK INDEPENDENT SCHOOL DISTRICT

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator(1) Part Time	Operator(1) Full Time	Central Chilled Water Tons: 2 Pipe	4 Pipe	Double Duct	Direct Exp.	Control: Manual Hrs.	Control: Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Robert E. Lee High School 1809 Market Street Road	92 286,600	Conv.	1964		665 T	Elec.		Custodian	40	550 (Reheat)		75 T		Monday 6:00a.m. thru Friday 4:00p.m.	$ 39,058.94 * 30,557.14	Summer hours same as school year 350 tons
Sterling High School Baker Road	70 225,000	Compact	1966	700 T		Elec.		Custodian		750 (Reheat)				24 hours per day 7 days per week	* 29,411.19	New school in service 9 months only
Harlem Elementary 2623 Broad Street	15 30,000	Compact	1967	100 T		Elec.		Custodian	100					Monday 7:30a.m. thru Friday 4:00p.m.		Insufficient billing

Totals for District:

Tons installed with initial construction 665
Tons added later 800
Total tons installed: Electric 1465 Gas 0
Total tons under contract: Electric 0 Gas 0

(1) The district employs 1 full time and 0 part time men for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT: HUFFMAN COMMON SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 months * 9 months	Remarks
Huffman Elementary 24314 Whitesail Drive	13 19,500	Compact	1966	100 T		Elec.	Custodian		100				Monday 7:30 a.m. thru Friday 3:30 p.m.		$ 2,487.20 * 2,431.81	Billing for 10 month period

TOTALS FOR DISTRICT:

Tons Installed with Initial Construction 100

Tons added later 0

Total tons installed, Electric 100 Gas 0

Total tons under contract: Electric 200 Gas 0

(1) The district employs 0 full-time and 0 part-time men for routine air conditioning and refrigeration maintenance. Major maintenance done by outside firms.

SCHOOL DISTRICT: HUMBLE INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons: 2 Pipe	Central Chilled Water Tons: 4 Pipe	Central Chilled Water Tons: Double Duct	Direct Exp.	Control: Manual Hrs.	Control: Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Humble High School 1605 Wilson Road	27 103,000	Compact	1964	275 T	62 T	Elec.	Custodian			322 (Reheat)		15 Office		8	$11,265.15 * 8,977.73	62 tons, 19,275 sq. feet added in May, 1967 not reflected in billing

TOTALS FOR DISTRICT:

Tons installed with initial construction 275

Tons added later 62

Total Tons installed: Electric 337 Gas 0

Total Tons under contract: Electric 450 Gas 0

(1) The district employs 0 full-time and 0 part-time men for routine air conditioning and refrigeration maintenace. Major maintenance performed.

SCHOOL DISTRICT: KATY INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Katy Elementary 5720 Sixth Street	22 35,000	Compact	1965	140	----	Elec.		Custodian	----	125 (Reheat)	----	15		7 A.M. to 4 P.M.	$6,131.37 * 4,695.19	Full Summer Use.

(1) The district employs 0 full-time and 0 part-time men for routine air conditioning and refrigeration maintenance.

TOTALS FOR DISTRICT

Tons installed with initial construction: 140

Tons added later 0

Total Tons installed: Electric 140 Gas 0

Total Tons Under Contract: Electric 0 Gas 0

SCHOOL DISTRICT: KLEIN INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Month * 9 Month	Remarks
Klein High School 16715 Stubiner Airline	29 80,000	Compact	1967	75 T	108 T	Elec.		Custodian			75	108	8		$ 6,306.92 * 4,728.31	Individaul room thermostats
Klein Junior High 16605 Stubiner Airline	15 65,000	Compact	1967	160 T		Elec.		Custodian		160			8			Individual room thermostats To open September 1967 all electric kitchen.

(1) The District employs 0 full-time and 0 part-time men for routine air conditioning and refrigeration maintenance. Major maintenance done by outside firms.

TOTALS FOR DISTRICT

Tons Installed with Initial Construction 235

Tons Added Later 108

Total Tons Installed: Electric 343 Gas 0

Total Tons Under Contract: Electric 0 Gas 0

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

SCHOOL DISTRICT: LAMAR CONSOLIDATED INDEPENDENT SCHOOL DISTRICT

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	As Billed Electric Utility Cost 12 Months	Remarks
Lamar Junior & Senior High	56 / 40,000	Compact	1966	740 T		Elec.		Custodian Only	125	440 (Reheat)	X	175		11	$ 11,468.29	Summer hours 5- 220 Tons
Deaf Smith Elementary	30	Compact	1966	135 T		Elec.		Custodian Only	110			25		10	6,462.89 (9-66 thru 1-67)	Summer hours 8 - 25 Tons

TOTALS FOR DISTRICT:

Tons Installed with Initial Construction 875

Tons Added Later 0

Total Tons Installed: Electric 875 Gas 0

Total Tons Under Contract: Electric 0 Gas 0

(1) The District employs 1 full-time and 0 part-time men for routine air conditioning and refrigeration maintenance.

SCHOOL DISTRICT: LA PORTE INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months *9 Months	Remarks
La Porte High 403 East J	52 78,000	Conv.	1964		311	E		Custodian		300 (Reheat)		11	24		$13,776.74 *10,631.29	Summer school 7 weeks
La Porte Junior High & Elementary 417 South Broadway	53 41,000 23,000	Conv.	1965		153	E		Custodian		150 (Reheat)		3	24		6,619.31 *5,537.82	Has three additional portable classrooms. Elementary is not air conditioned
La Porte Intermediate 633 South Broadway	27 24,300	Conv.	1966		150	E		Custodian		150 (Reheat)			24		4,658.70 *3,935.20	Has elementary school cafeteria on this service.
Dewalt Elementary 610 West Madison	10 11,400	Conv.	1963		100	E		Custodian	100				24		1,942.11 *1,305.22	Four grades (1-4) only
Bayshore Elementary 301 Bay Oaks Drive	20 40,500	Comp.	1966	155		E		Custodian		150 (Reheat)		5	24		4,577.26 *4,267.91	Has all-electric kitchen 136.4 KW
Baker Elementary 3201 Underwood	21 16 61,300	Comp.	1963 1967	155	100	E		Custodian		250 (Reheat)		5	24		5,417.02 *4,407.69	Has all-electric kitchen 140 KW

TOTALS FOR DISTRICT

Tons installed with initial construction 310
Tons added later 814
Total tons installed: ELECTRIC 1124 GAS 0
Total tons under contract: ELECTRIC 0 GAS 0

(1) School District has one man and one helper for routine air conditioning maintenance.

SCHOOL DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator: Part Time	Operator: Full Time	Central Chilled Water Tons: 2 Pipe	Central Chilled Water Tons: 4 Pipe	Central Chilled Water Tons: Double Duct	Direct Exp.	Control: Manual Hrs.	Control: Time Clock Hrs.	Actual Electric Service Billing 12 Months / * 9 Months	Remarks
Pasadena High School 21. South Shaver	75 226,691	Conv.	1966		763 T	Elec.		Custodian	628			135	Monday 7am thru Friday 4pm		$ 25,963.86 * 22,323.92	District Maintenance Shop Served Through Same Meter
Sam Rayburn Senior High 2211 Burke	85 204,639	Conv.	1966	100 T	485 T	Elec.		Custodian	510			75	"		24,956.50 * 20,096.01	
South Houston Senior High & Pearl Hall Elementary 3820 South Shaver	115 289,782	Conv.	1966		1,155 T	Elec.		Custodian	815			140	"		38,940.77 * 28,600.89	1966 Summer School at South Houston High School
Beverly Hills Intermediate 1015 Fuqua	31 73,477	Conv.	1965	10 T	228 T	Elec.		Custodian	200			38	"		9,376.50 * 7,698.64	
Jackson Intermediate 201 East Jackson	50 81,615	Conv.	1966		322 T	Elec.		Custodian	300			22	"		10,048.55 * 7,314.68	
Parkview Intermediate 3003 Dabney Drive	37 73,477	Conv.	1965	55 T	174 T	Elec.		Custodian	147			83	"		9,434.34 * 7,133.09	
Queens Intermediate 1112 Queens	36 71,300	Conv.	1965		223 T	Elec.		Custodian	185			38	"		8,454.91 * 6,728.45	
San Jacinto Intermediate 3102 San Augustine	35 84,091	Conv.	1966		260 T	Elec.		Custodian	220			40	"		10,989.09 * 8,313.13	1966 Summer School
South Houston Intermediate 1502 Main	52 88,869	Conv.	1966		360 T	Elec.		Custodian	225			135	"		10,432.03 * 8,497.10	
Southmore Intermediate 1028 East Southmore	44 96,877	Conv.	1966		260 T	Elec.		Custodian	225			135	"		* 10,973.73	School Separated from Larger Service. Only 9 months billing available.

SCHOOL DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Bailey Elementary 2707 Lafferty	30 38,015	Conv.	1966		142 T	Elec.		Custodian	115			27	Monday 7am thru Friday 4pm		$ 2,219.50 * 1,894.28	
Fisher Elementary 2220 Grunewald	35 40,575	Conv.	1966		160 T	Elec.		Custodian	120			40	"		4,020.58 * 3,625.00	
Freeman Elementary 2323 Theta	35 41,482	Conv.	1966		160 T	Elec.		Custodian	120			41	"		4,817.14 * 4,332.24	
Gardens Elementary 1021 East Harris	39 53,566	Conv.	1966		180 T	Elec.		Custodian	140			40	"		3,625.22 * 3,329.18	Eight New Classrooms Added. Six Portable Classrooms Not Included.
Garfield Elementary 10301 Hartsook	32 42,007	Conv.	1966		144 T	Elec.		Custodian	120			25	"		7,871.24 * 6,330.03	Six New Classrooms Added.
Genoa Elementary 12900 Almeda-Genoa	24 36,674	Conv.	1966		135 T	Elec.		Custodian	120			15	"		3,125.87 * 2,798.25	
Golden Acres Elementary 5233 Holly	22 31,732	Conv.	1966		130 T	Elec.		Custodian	110			20	"		1,635.10 * 1,357.99	
Jessup Elementary 9301 Almeda-Genoa	26 35,254	Conv.	1966		142 T	Elec.		Custodian	120			22	"		8,719.97 * 6,691.66	25 H.P. Water Well Pump
Kruse Elementary & Old Administration Building 102 East Broadway	27 38,387[1]	Conv.	1966		190 T	Elec.		Custodian	155			35	"		4,593.07 * 3,61[illegible].25	Old Administration Building in use all year.
Mae Smythe Elementary 2202 Pasadena Boulevard	29 46,741	Conv.	1966		165 T	Elec.		Custodian	140			25	"		7,954.29 * 6,549.29	Eight Portable Classrooms Added.

[1] Square footage of Old Administration Building not included.

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

SCHOOL DISTRICT: PASADENA INDEPENDENT SCHOOL DISTRICT

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Meador Elementary 10701 Seaford	35 40,575	Conv.	1966		160 T	Elec.		Custodian	120			40	Monday 7am thru Friday 4pm		$ 4,600.28 * 4,205.39	
Parks Elementary 3302 San Augustine	38 42,475	Conv.	1966		155 T	Elec.		Custodian	120			35	"		8,729.59 * 7,067.02	Six Portable Classrooms Added
Pomeroy Elementary 920 Burke	26 35,056	Conv.	1966		148 T	Elec.		Custodian	118			30	"		7,570.52 * 5,148.38	1966 Summer School
Red Bluff Elementary 500 Bearle	29 46,741	Conv.	1966		160 T	Elec.		Custodian	120			40	"		7,295.15 * 5,505.32	Six Portable Classrooms Added
Richey Elementary 600 South Richey	27 41,530	Conv.	1966		135 T	Elec.		Custodian	118			18	"		2,591.09 * 2,230.72	
South Houston Elementary 802 Main Street	26 44,233	Conv.	1965		145 T	Elec.		Custodian	120			25	"		5,125.71 * 3,914.16	1966 Summer School (Under Title I)
L. F. Smith Elementary 206 Perez	35 41,482	Conv.	1966		165 T	Elec.		Custodian	120			46	"		4,650.17 * 4,146.76	
South Shaver Elementary 2020 South Shaver	27 41,717	Conv.	1966		147 T	Elec.		Custodian	118			29	"		2,622.81 * 2,312.37	Four Portable Classrooms Added
Williams Elementary 1522 Scarborough Lane	26 35,056	Conv.	1966		142 T	Elec.		Custodian	113			30	"		5,650.94 * 4,367.52	

TOTALS FOR DISTRICT

Tons Installed with Initial Construction 165

Tons Added Later 7,135

Total Tons Installed: Electric 7,300 Gas -0-

Total Tons Under Contract: Electric 880 Gas -0-

(1) The District employs 5 full-time and 0 part-time men for routine air conditioning and refrigeration maintenance.

SCHOOL DISTRICT: ROYAL INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms Square Ft. In Bldg.	Type Bldg.	Year /C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months *9 Months	Remarks
Royal High School 2520 Durkin	36 130,000 (115,000)	Compact	Con-tracted	540 T		Elec.	Custodian		382 (1 unit)			158 (13 units)	Not decided			Under construction

Totals for District:

Tons Installed with Initial Construction 0

Tons Added Later 0

Total Tons Installed: Electric 0 Gas 0

Total Tons Under Contract: Electric 540 Gas 0

(1) The district employs no full time and no part time men for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT: SANTA FE INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months *9 Months	Remarks
Santa Fe Sr.,Jr. High and Elementary 13340 Highway 6	75 / 88,000	Compact	1966	238T		Elec.	Custodian			238			Monday 6:30a.m. thru Friday 5:00p.m.		$ 11,010.94 *8,327.22	

Totals for District:

Tons Installed with Initial Construction 238

Tons Added Later 0

Total Tons Installed: Electric 238 Gas 0

Total Tons Under Contract: Electric 0 Gas 0

(1) The district employs no full time and 1 part time man for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT: SHELDON INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms	Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months *9 Months	Remarks
C. E. King High School 8540 C. E. King Parkway	21	61,325	Compact	1964	200 T		Elec.	Custodian				200 (2 units)		24 hours per day 7 days per week		$ 13,385.67 *10,275.40	Each room individually controlled. All Electric Kitchen

Totals for District:

Tons Installed with Initial Construction 200

Tons Added Later 0

Total Tons Installed: Electric 200 Gas 0

Total Tons Under Contract: Electric 150 Gas 0

(1) The district employs no full time and 1 part time man for routine air conditioning and refrigeration maintenance. Major maintenance performed by independent firms.

SCHOOL DISTRICT: SPRING BRANCH INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator: Part Time	Operator: Full Time	Central Chilled Water Tons: 2 Pipe	Central Chilled Water Tons: 4 Pipe	Central Chilled Water Tons: Double Duct	Direct Exp.	Control: Manual Hrs.	Control: Time Clock Hrs.	Actual Electric Service Billing 12 Months / * 9 Months	Remarks
Memorial Senior High 935 Echo Lane	97 210,948	Conv.	1964	190 T	435 T	Elec.	Custodian		605			20 Office-Misc.		9	$ 24,553.01 * 19,699.70	
Spring Branch Senior High 9016 Westview	100 174,753	Conv.	1964	250 T	460 T	Elec.	Custodian		667			43 Office-Misc.		9	28,655.73 * 21,437.56	
Springwoods Senior High 2045 Gessner	70 194,748	Compact	1964	510 T		Elec.	Custodian		460	50				9	21,431.85 * 17,477.89	All Electric Kitchen
Landrum Junior High 2200 Ridgecrest	71 163,254	Conv.	1964	82 T	355 T	Elec.	Custodian		417			20 Office-Mis..		9	11,893.58 * 9,982.13	
Memorial Junior High 12550 Vindon	33 156,000	Conv.	1964	300 T	275 T	Elec.	Custodian		575					9	14,593.67 * 12,582.25	All Electric Kitchen
Spring Branch Junior High 940 Piney Point	60 143,254	Conv.	1964	85 T	300 T	Elec.	Custodian		360			25 Office-Misc.		9	13,434.57 * 10,844.18	
Spring Forest Junior High 14240 Memorial	38 101,061	Compact	1967	240 T		Elec.	Custodian			240				9	New School	All Electric Kitchen
Spring Oaks Junior High 2200 Shadowdale	38 101,964	Compact	1967	240 T		Elec.	Custodian			240				9	New School	All Electric Kitchen
Springwoods Junior High 9820 Neuns	44 152,944	Conv.	1964	110 T	275 T	Elec.	Custodian		375			10 Office-Misc.		9	14,917.22 * 11,862.18	All Electric Kitchen

SCHOOL DISTRICT: SPRING BRANCH INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOL

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Bunker Hill Elementary 12050 Taylor Crest	28 43,302	Conv.	1964	20 T	140 T	Elec.	Custodian Only		152 T			8 T Office		9	$ 2,732.77 * 2,429.75	Individual room control
Edgewood Elementary 8655 Emore	24 34,756	Conv.	1964	6 T	128 T	Elec.	Custodian Only		128 T			6 T Office		9	4,097.01 * 3,562.91	Individual room control
Frostwood Elementary 12214 Memorial	24 34,665	Conv.	1964	20 T	128 T	Elec.	Custodian Only		143 T			5 T Office		9	3,624.76 * 2,959.81	Individual room control
Hollybrook Elementary 3602 Hollister	30 45,625	Conv.	1964	7.5 T	146 T	Elec.	Custodian Only		146 T			7.5 T Office		9	4,117.25 * 3,402.82	Individual room control
Houseman Elementary 6902 Houseman	36 47,577	Conv.	1964	6 T	164 T	Elec.	Custodian Only		164 T			6 T Office		9	3,488.57 * 3,105.46	Individual room control
Hunter Creek Elementary 10630 Beinhorn	23 35,396	Conv.	1964	7 T	125 T	Elec.	Custodian Only		125 T			7 T Office		9	2,966.82 * 2,445.08	Individual room control
Meadow Wood Elementary 14230 Memorial	26 39,630	Conv.	1964	16 T	130 T	Elec.	Custodian Only		130 T			16 T Office		9	4,603.96 * 3,788.41	Individual room control
Pine Shadows Elementary 9950 Meunes	26 39,125	Conv.	1964	21 T	152 T	Elec.	Custodian Only		152 T			6 T Office		9	2,969.08 * 2,666.33	Individual room control
Memorial Drive Elementary 11202 Smithdale	23 35,964	Conv.	1964	16 T	125 T	Elec.	Custodian Only		135 T			6 T Office		9	3,226.70 * 2,622.84	Individual room control
Ridgecrest Elementary 2000 Ridgecrest	32 47,225	Conv.	1964	6 T	152 T	Elec.	Custodian Only		152 T			6 T Office		9	3,588.22 * 3,088.85	Individual room control
Rummel Creek Elementary 705 Brickmore	32 44,300	Conv.	1964	6 T	152 T	Elec.	Custodian Only		152 T			6 T Office		9	4,934.58 * 4,179.69	Individual room control
Shadow Oak Elementary 1335 Shadowdale	36 47,100	Conv.	1964	5 T	164 T	Elec.	Custodian Only		164 T			5 T Office		9	5,075.54 * 3,632.61	Individual room control
Spring Branch Elementary 1700 Campbell	45 58,816	Conv.	1964	6 T	155 T	Elec.	Custodian Only		155 T			6 T Office		9	4,029.46 * 3,133.97	Individual room control
VAlley Oaks Elementary 8390 Westview	38 48,864	Conv.	1964	21 T	170 T	Elec.	Custodian Only		185 T			6 T Office		9	4,447.66 * 3,611.70	Indvidual room control
Bendwood Elementary 12712 Kimberly Lane	24 36,000	Conv.	1964		148 T	Elec.	Custodian Only		143 T			5 T Office		9	3,680.01 * 2,984.76	Individual room control

SCHOOL DISTRICT: SPRING BRANCH INDEPENDENT SCHOOL DISTRICT — TABULATION OF TOTALLY AIR CONDITIONED SCHOOL

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator(1) Part Time	Operator(1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months * 9 Months	Remarks
Westwood Elementary 2100 Shadowdale	24 37,844	Conv.	1964	5 T	128 T	Elec.		Custodian Only	128			5 Office			$ 4,115.72 * 3,404.30	Individual room control
Woodview Elementary 9747 Cedardale	24 37,706	Conv.	1964	17 T	128 T	Elec.		Custodian Only	140			5 Office			3,396.66 * 2,919.72	Individual room control
Wilchester Elementary 13618 St. Mary's	26 39,420	Compact	1967	155 T		Elec.		Custodian Only	150			5 Office				Individual room control
Wilchester Senior High 901 Yorkchester	79 188,000	Compact	1967	581 T		Elec.		Custodian Only	25		531	25 Office				Individual room control

TOTALS FOR DISTRICT:

Tons Installed with Initial Construction 2,928.5

Tons Added Later 4,535

Total Tons Installed: Electric 7,463.5 Gas 0

Total Tons Under Contract: Electric 581 Gas 0

(1)
The district employs 2 full-time and 0 part-time men for routine air conditioning and refrigeration maintenance. Major maintenance by independent contractors.

SCHOOL DISTRICT: TOMBALL INDEPENDENT SCHOOL DISTRICT

TABULATION OF TOTALLY AIR CONDITIONED SCHOOLS

School & Address	Number Classrooms / Square Ft. In Bldg.	Type Bldg.	Year A/C Inst.	Inst. With Initial Const.	Added Later	Elec. or Gas	Operator (1) Part Time	Operator (1) Full Time	Central Chilled Water Tons 2 Pipe	Central Chilled Water Tons 4 Pipe	Central Chilled Water Tons Double Duct	Direct Exp.	Control Manual Hrs.	Control Time Clock Hrs.	Actual Electric Service Billing 12 Months *9 Months	Remarks
Tomball High 723 W. Main	25	Comp.	1959	100		Gas		Custodian	100				8		4,080.05 *3,261.98	Has football field on this service.

Totals for District:

Tons Installed with Initial Construction 100

Tons Added Later 0

Total Tons Installed: Electric 0 Gas 100

Total Tons Under Contract: Electric 0 Gas 0

50 tons gas engine also installed in partially air conditioned elementary school about 1960.

(1) All maintenance performed by independent contracting firms.

SUMMARY OF AIR CONDITIONING BY SCHOOL DISTRICT
TOTALLY AIR CONDITIONED SCHOOLS ONLY

School District	Tons Installed Initially		Tons Installed Added Later		Tons Under Construction or Contract		District Total	
	Electric	Gas	Electric	Gas	Electric	Gas	Electric	Gas
Alief	100	0	76		300		476	0
Barbers Hill		0			190		190	0
Brazosport	0	0	2450				2450	0
Clear Creek	411	40	533		100		1044	40
Cypress-Fairbanks	237	180	17	1010			254	1190
Deer Park	821	0	2128		45		2994	0
Galena Park	0	0	3020				3020	0
Galveston	863	0					863	0
Goose Creek	665	0	800				1465	0
Huffman	100	0			200		300	0
Humble	275	0	62		450		787	0
Katy	125	0	80				205	0
Klein	235	0	108				343	0
La Porte	310	0	814				1124	0
Lamar Consolidated	875	0					875	0
Pasadena	165	0	7135		880		8180	0
Royal					540		540	0
Santa Fe	238	0					238	0
Sheldon	200	0			150		350	0
Spring Branch	2928	0	4535		581		8044	0
Tomball	0	100						100
Total Tons (1)	8548	320	21758	1010	3436		33742	1330

(1) Does not include 4827 tons of electric air conditioning and 60 tons of gas air conditioning in Houston I. S. D. or 1044 tons of electric air conditioning and 50 tons of gas air conditioning in other district schools which are not fully air conditioned.

GAS ENGINE AIR CONDITIONING
REPLACED BY ELECTRIC DRIVE

Project	Type Units	Number & Tons	Date Installed	Date Removed	Reason for Removal
la Paree Apartments	Chrysler	2 @ 75	7/62	12/63	Engines undersized & downtime
	GMC	3 @ 75	1/64	11/64	Excessive maintenance + downtime
rclay Apartments	Ready Power	2 @ 75	3/62	3/63	Excessive maintenance & oil consumption & operating labor. Units were replaced when equipment room burned.
rt Village Apartments	Bell & Gossett	2 @ 50	9/62	7/66	Exc. main. & downtime
teau Dijon Apartments	Ready Power	1 @ 60	7/61	2/67	Exc. main. & downtime
	Ready Power	1 @ 40	10/62	2/67	" " "
		5 @ 60	10/62	2/67	" " "
		3 @ 75	10/62	2/67	" " "
vell Apartments	Waukesha	1 @ 50	1/63	6/66	" " "
tic Lane Apartments	Waukesha	2 @ 75	9/63	6/66	" " "
		2 @ 75	10/64	6/66	" " "
k Twain Apartments	Waukesha	1 @ 80	10/64	6/66	" " "
dowdale Apartments	Ready Power	1 @ 35	3/62	6/66	" " "
tward Place Apartments	Waukesha	1 @ 120	8/65	2/67	" " "
ld Inn	Waukesha	1 @ 60	12/63	5/66	" " "
		1 @ 70	12/63	5/66	" " "
dsor Plaza Bowling Alley	Ready Power	1 @ 76	8/60	4/66	" " "
		(This installation was on its third engine.)			
al Arts Building	Ready Power	1 @ 40	1958	7/63	" " "

Total Number Engines Removed 31

Total Tons Replaced by Electric Drive 1931

JMC 4/20/67

and shall notify the owner or user of such boiler or boilers, in writing, who shall acknowledge receipt of such notice by signing a duplicate copy of such notice. No owner, user or person shall use, or authorize, or permit to be used, any boiler condemned or pronounced unsafe or dangerous by the inspector, nor shall such owner, user, or person take down, remove, obliterate, or in any manner interfere with, or authorize or permit anyone to take down, remove, obliterate, or in any manner interfere with any such notice without the authority of the inspector.

(B) The inspector shall have the authority to order the owner or user to make such repairs, changes, or alterations of any boiler or boilers and appurtenances thereto, not exempt in Section 24, as may be necessary to meet the requirements of this ordinance.

SECTION 9: No person shall have the direct charge, control, supervision, act as, or perform the duties of the chief engineer of any boiler or boilers operated or used for the purpose of generating steam within the City of Houston, not exempt in Section 24, the aggregate amount of heating surface of which exceeds two thousand (2,000) square feet, who is not the holder of a First Grade Engineer's License, then and there in full force and effect issued to such person by the Board and the inspector, as provided for in Section 4.

(A) No owner, user or person shall operate or use, or cause or permit to be operated or used, any boiler or boilers for the purpose of generating steam within the City of Houston, not exempt in Section 24, the aggregate amount of heating surface of which exceeds two thousand (2,000) square feet, unless such boiler or boilers are in direct charge, control, and supervision of a person who is the holder of a First Grade Engineer's License, then and there in full force and effect, issued to such person by the Board and the inspector, as provided for in Section 4.

(B) Provided, however, that any person who is the holder of a Second Grade Engineer's License, then and there in full force and effect, issued to such person by the Board and the inspector, may act as assistant, watch,

or relief engineer, of any such boiler or boilers, under the direct charge and supervision of a person acting as chief engineer, who is the holder of a First Grade Engineer's License, which is in full force and effect, issued to such person by the Board and the inspector, as provided for in Section 4.

(C) No person shall have the direct charge, control, supervision, act as, or perform the duties of chief engineer of any boiler or boilers operated or used for the purpose of generating steam within the City of Houston, not exempt in Section 24, the aggregate amount of heating surface of which exceeds five hundred (500) square feet, who is not the holder of at least a Second Grade Engineer's License, then and there in full force and effect, issued to such person by the Board and the inspector, as provided for in Section 4.

(D) No owner, user or person shall operate or use, or cause or permit to be operated or used, any boiler or boilers used for the purpose of generating steam within the City of Houston, not exempt in Section 24, the aggregate amount of heating surface of which exceeds five hundred (500) square feet, unless such boiler or boilers are in direct charge, control and supervision of a person who is the holder of at least a Second Grade Engineer's License, then and there in full force and effect issued to such person by the Board and the inspector, as provided for in Section 4.

(E) Provided, however, that any person who is the holder of a Third Grade Engineer's License, then and there in full force and effect, issued to such person by the Board and the inspector, as provided for in Section 4, may act as assistant, watch or relief engineer, under the direct charge and supervision of a chief engineer who is the holder of at least a Second Grade Engineer's License, issued to such chief engineer by the Board and the inspector of the City of Houston, as provided for in Section 4, of a boiler or boilers the aggregate amount of heating surface of which does not exceed two thousand (2000) square feet.

(F) No person shall have direct charge, control, supervision, act as, or perform the duties of chief engineer of any boiler or boilers operated or used for the purpose of generating steam within the City of Houston, not exempt in Section 24, having an aggregate amount of heating surface of five hundred (500) square feet or less who is not the holder of at least a Third Grade Engineer's License, then and there in full force and effect, issued to such person by the Board and the inspector, as provided for in Section 4.

(G) No owner, user or person shall operate or use, or cause or permit to be operated or used any boiler or boilers for the purpose of generating steam within the City of Houston, not exempt in Section 24, having an aggregate amount of heating surface of five hundred (500) square feet or less, unless such boiler or boilers are in direct charge, control and supervision of a person who is the holder of at least a Third Grade Engineer's License, then and there in full force and effect, issued to such person by the Board and the inspector as provided for in Section 4.

(H) Provided, however, that the owner or user of any low pressure heating boiler, or boilers, used for the purpose of generating steam within the City of Houston, not exempt in Section 24, the aggregate amount of heating surface of which does not exceed seven hundred fifty (750) square feet and used for heating purposes only, the safety valve or valves of which are set and sealed to discharge at a pressure not to exceed fifteen (15) pounds per square inch, may apply to the inspector for a permit to operate themselves, or to have in charge a competent, careful and trustworthy person instead of a licensed engineer. Any such person to be recommended by two (2) citizens, and one (1) of whom shall be a steam user or licensed engineer, and if such person be found competent by the inspector, the permit shall be granted upon the payment of a fee of two dollars and fifty cents ($2.50) and such permit shall expire December 31st of each year unless sooner suspended or revoked for cause and shall apply to that specific plant or building as named in the permit. Renewal of such permits may be granted without