UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

1/12/79

IN THE MATTER OF	§	
	§	
HOUSTON LIGHTING & POWER CO., ET AL	§	Docket Nos. 50-498A 50-499A
	§	
(SOUTH TEXAS PROJECT, UNITS 1 & 2)	§	

RESPONSE OF THE CITY OF AUSTIN TO THE DEPARTMENT OF JUSTICE'S FIRST SET OF INTERROGATORIES AND REQUESTS FOR PRODUCTION

Now comes the City of Austin and files this Response to the First Set of Interrogatories and Requests for Production of Documents from Department of Justice as follows:

F.1. (a) None, that any records indicate or current personnel are aware.

(b) None, that any records indicate or current personnel are aware.

(c) None, that any records indicate or current personnel are aware.

(d) None, that any records indicate or current personnel are aware.

(e) No such documents that any records indicate or current personnel are aware.

2. The City of Austin has never, to the best of its knowledge, refused to engage in interstate transmission or reception of electrical power.

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3. (a) None of which the City of Austin is aware, although there would be certain financial agreements as to percentage of ownership, and such governmental agency approval as would be necessary by regulation.

(b) None of which the City of Austin is aware.

(c) The City of Austin understands that there may be technical ways to operate the South Texas Project in such a manner but the City of Austin has not conducted any such detailed studies nor has the expertise to do so.

(d) The City of Austin does not have the technical expertise to make such a calculation.

4. The City of Austin has not made such a calculation.

5. (a) The staff of the City of Austin communicated with the Lower Colorado River Authority and San Antonio after May 4, 1976 in an attempt to restore the Texas Interconnected System to a more reliable mode of operation.

(b) The City of Austin is not aware of any documentation of the above discussions nor the participants of such discussions other than the general knowledge that such took place and that various levels of staff participated from time to time in connection with Docket No. 14 before the Public Utility Commission of Texas.

(c) None of which the City of Austin is aware.

6. (a) There were no such communications indicated in City of Austin documents nor any of which City of Austin staff is aware.

7. (a-d) The City of Austin is a member of the Electric Reliability Council of Texas and the Texas Interconnected System which historically have been engaged in intrastate commerce exclusively. In describing its interconnections the City of Austin must, by reference, communicate the nature of the interconnections. These communications are by their very nature frequent and no records are kept of such descriptions. However, R. L. Hancock explained the system to the Public Utilities Commission of Texas during the Docket 14 proceedings. A copy of that testimony is attached as Appendix A.

8. (a) The City of Austin has neither the staff or expertise to study properly said document, although if the dollar amount is in 1975 dollars, then certainly it needs to be adjusted for inflation.

(b) No overloads were experienced in the City of Austin system.

(c) Not applicable.

(d) None.

9. (a) Since Austin is not now regulated by the Public Utility Commission of Texas, any regulation under FERC would have additional costs involved. However, since FERC rules do not cover municipal owned utilities, any costs would probably be insignificant.

(b) Not applicable.

(c) Not applicable.

(d) Not applicable.

10. The City of Austin does not make such a contention.

11. (a) None

(b) None

(c) Not applicable.

12. For the formation of ERCOT, see Appendix A, which was provided in response to No. 7(a) above. Also, the ERCOT Agreement is attached as Appendix B. As to ERCOT relative power and authority as compared to other regional systems, Austin has no knowledge of the internal operations of other systems.

13. The purpose for the Texas Interconnected System is outlined in the TIS Agreement which is attached as Appendix C. Also attached is testimony of H. L. Peterson given before the Texas Utility Commission which in part deals with the formation of TIS. It is attached as Appendix D. The City of Austin has no documents relating to requests for membership in TIS.

14. (a) None that any records indicate or current personnel are aware.

(b) None that any records indicate or current personnel are aware.

(c) None that any records indicate or current personnel are aware.

(d) None that any records indicate or current personnel are aware.

15. (a) The City of Austin is not aware of any participation in inspections.

(b) The City of Austin is not aware of any participation in inspections.

(c) None.

(d) None.

16. (a) May 4, 1976 to May 2, 1977.

(b-c) The testimony of H. L. Peterson provided in response to No. 13 above describes in detail these events, Appendix D.

17. (a) May 4, 1976 to May 2, 1977.

(b-c) The testimony of H. L. Peterson provided in response to Nos. 13 and 16 above detail the financial consequences. Appendix D.

18. (a) (1) ERCOT Agreement, Appendix B.

(2) TIS Agreement, Appendix C.

(3) Texas Power & Light Agreement of October 28, 1977, Appendix E.

(4) Texas Power & Light Agreement of March 20, 1978, Appendix F.

(5) Houston Light & Power Agreement, Appendix G.

(b) See 18(a) above.

19. (a) Immediately prior to its disconnection, TU employees notified Austin of the disconnection.

(b-d) There were probably numerous communications between City of Austin employees and HL&P and TU employees but there are no records of which Austin is aware as to whom the participants were or when or where these conversations took place.

20. (a) No.

21. (a) No.

22. (a) Attached is an agreement with the University of Texas at Austin which allows for a decrease in pricing for more electricity used by U.T. which may have the effect of decreasing generation. Appendix H.

(b) There may have been minor adjustments to Austin's service area when it was certified by the Texas Public Utility Commission.

(c) The City of Austin electric department has on numerous occasions responded to requests by companies, not all of whom identify themselves, as to electric rates and service, but the electric department has not actively sought companies to relocate. As part of the operation of City government, there may be City officials not connected with the electric utility that may have sought companies for relocation.

(d) Same as 22(c) above.

RESPECTFULLY SUBMITTED,

RICHARD C. BALOUGH
ASSISTANT CITY ATTORNEY
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AFFIDAVIT

R. L. Hancock, being duly sworn, says that he is the Director of the Electric Utility for the City of Austin, Texas, that the facts stated in the foregoing Answers to Interrogatories submitted on behalf of the City of Austin are, to the best of his information and belief, true and correct.

R. L. Hancock

R. L. HANCOCK

SUBSCRIBED AND SWORN before me this the 12th day of January, 1979.

Notary Public in and for
Travis County, Texas

UNITED STATES OF AMERICA
BEFORE THE
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	§	
	§	
HOUSTON LIGHTING & POWER COMPANY	§	
The City of San Antonio,	§	
The City of Austin, and	§	Docket Nos. 50-498A
Central Power and Light Company	§	50-499A
	§	
(South Texas Project,	§	
Unit Nos. 1 & 2)	§	

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Response of the City of Austin to the Department of Justice's First Set of Interrogatories and Requests for Production has been served on each of the following persons by deposit in the United States mail this 12th day of January, 1979.

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RICHARD C. BALOUGH
ASSISTANT CITY ATTORNEY
CITY OF AUSTIN

Appendix A

TESTIMONY OF R. L. HANCOCK
DIRECTOR ELECTRIC UTILITY
CITY OF AUSTIN

Q. For the record, would you please state your name, position and qualifications?

A. My name is R. L. Hancock, and I am the Director of the Electric Utility Department of the City of Austin. I have served in that capacity since 1971. Prior to that, I was the Assistant Director of the Electric Utility Department from 1967 to 1971 with various assignments in the Electric Transmission & Distribution and Generating area starting in 1949. I received a B. S. in Electrical Engineering in 1950 from the University of Texas and I am a registered professional engineer in the State of Texas. I am a member of the Technical Advisory Committee of the Electric Reliability Council of Texas (ERCOT), have served on the Texas Interconnected System (TIS) Administrative Committee since 1971 and was Chairman of the TIS Administrative Committee from May, 1975, to May, 1976.

Q. Mr. Hancock, what is the purpose of your testimony in this proceeding.

A. The purpose of my testimony is to outline briefly the history of utility interconnection in Texas, to describe the interconnection, to outline in general how an interconnected electric utility system functions and to discuss

how ERCOT and TIS have performed. My testimony will be restricted to that period of time prior to the separation of several utilities comprising ERCOT. (May 4, 1976). I believe such historical information is important to illustrate the close cooperation and mutual reliance of member systems in the planning, construction and operation of facilities to provide the public the most economical and reliable service possible. It is necessary to elaborate the details and complexity of operating an interconnected system to some extent in order that this record will reflect the impact of any disruption to the system.

Q. What is the Electric Reliability Council of Texas, or ERCOT, as it is commonly called?

A. The Electric Reliability Council of Texas (ERCOT) was organized in mid-1970. It is associated with the National Electric Reliability Council (NERC) formed in 1968 "to augment the reliability and adequacy of bulk power supply in the electric utility systems of North America". NERC consists of nine regional reliability councils.

Q. Could you describe briefly the history of ERCOT?

A. ERCOT represents a broadening of TIS, which was originally composed of nine larger electric generating and transmitting systems that chose to interconnect for their mutual benefit. The history then of ERCOT can be traced directly to the development of the Texas Interconnected

System. TIS was an outgrowth of a serious need for additional generating capacity in the Gulf Coast area that developed in conjunction with the war effort in 1942. This led to the interconnection of five major generating utilities in the South Texas area that became further interconnected with electric generating facilities in the north part of the State of Texas through the facilities of the Lower Colorado River Authority.

During the years of the war effort, and subsequent to that period, the various advantages of the interconnection led to the continued development of the Texas Interconnected System and the subsequent development of the Electric Reliability Council of Texas.

Q. Would you tell us the purpose of ERCOT and outline how it achieves that purpose?

A. The purpose of ERCOT is to promote the reliable operation of power systems by

1) exchanging information concerning the planning and operation of generating, transmission and distribution facilities;

2) exchanging information pertinent to materials, supplies, equipment and manpower available to others in the restoration of electric service disrupted by

hurricanes, cyclones, tornados, floods, riots, enemy attack and disorders;

3) maintaining direct communication channels for the purpose of rendering total aid to victims in the event of enemy attack, thereby providing maximum civil defense for all members of the council;

4) providing a means of exchanging information and system data and for making necessary regional studies designed to increase the reliability of such power systems under all normal and abnormal circumstances;

5) creating a vehicle for the reporting where appropriate for information to regulatory agencies.

Q. Who may be a member of ERCOT?

A. Membership in ERCOT is available to any entity, corporate or otherwise, including agencies of the federal government or federally-owned or financed systems and state, municipal or other government-owned or financed entities, which owns, controls and operates an electric power system in Texas, all or part of which consists of facilities for the generation, transmission or distribution of electric energy in purely intrastate commerce and serving the public. ERCOT

is now comprised of 87 electric utilities. These utilities include municipally-owned systems, electric cooperatives, state agencies, and investor-owned utilities.

Q. Mr. Hancock, what is the general geographical coverage of ERCOT?

A. ERCOT embraces those utilities that supply electric service to over two-thirds of the State of Texas ranging geographically from Wichita Falls to Brownsville and from Houston to the Big Bend area encompassing many of the major cities, such as Houston, Dallas, San Antonio, Fort Worth, Austin, Corpus Christi, Waco, Wichita Falls, Abilene, San Angelo and numerous other cities and rural areas. Exhibit RLH - 1 shows localities within the service area of ERCOT members.

Q. How are these systems interconnected?

A. The bulk power generation and transmission system interconnecting the ERCOT members are those facilities owned by Central Power & Light Company, City of Austin, City Public Service Board of San Antonio, Dallas Power & Light Company, Houston Lighting & Power Company, Lower

Colorado River Authority, Texas Electric Service Company, Texas Power & Light Company, West Texas Utilities Company, and the Texas Municipal Power Pool represented by Brazos Electric Power Cooperative, Inc. and composed of the cities of Denton, Garland, Bryan and Greenville. The major transmission network within ERCOT is shown on Exhibit RLH - 2.

Q. Have you prepared an exhibit indicating the relative sizes of the utilities owning these transmission facilities?

A. Yes, my Exhibit RLH - 3 reflects this information which was obtained from the latest annual reports, where available, or by communication with the applicable utility.

Q. How are the affairs of ERCOT administered?

A. The affairs of the Council are administered by an Executive Board of 12 representatives elected by the council. The ERCOT council consists of one representative from each member utility. The 12 member Executive Board is elected from the council members with at least six representatives from the investor-owned sector, at least two representatives from the municipal sector and at least two representatives from the cooperative systems. Exhibit RLH - 4 indicates the Board and officers October 1, 1975, through September 30.

1976, and Exhibit RLH - 5 indicates the current Board and officers from October 1, 1976, through September 30, 1977.

Responsible to the Board is an Executive Director and a Technical Advisory Committee that addresses many of the technical and report problems handled through ERCOT. Problems relating to the operation, construction, planning and coordination of the major electric generating facilities and the transmission system interconnecting members of ERCOT are administered through a special Administrative Committee with standing committees for long range system planning and for system operations.

The administrative Committee is composed of one representative from each of the ten utilities listed on Exhibit RLH - 3 and appointed by their respective management. Exhibit RLH - 6 is a tabulation of the Administrative Committee members and the subcommittee members.

Q. Would you elaborate on the responsibilities of the Administrative Committee?

A. The responsibilities of the Administrative Committee are to

1) determine an established general policy with regard to the coordination of planning and operation of the bulk power backbone of the systems;

2) to review and evaluate criteria and procedures affecting the reliability of bulk power supply facilities;

3) to direct the activities of the planning subcommittee and the operating subcommittee and such other subcommittees as may be appointed from time to time.

Q. What are the duties of the major subcommittees referred to?

A. The duties of the Planning Subcommittee are to perform and evaluate studies, load flow and stability studies, review basic plans for development of the various systems; make such recommendations as it deems appropriate to the Administrative Committee. These studies include installed generation reserves, abnormal system conditions, major outage contingencies, statistical studies, transmission facilities, and future generating facilities.

The duties of the Operating Subcommittee are to make such recommendations as it deems appropriate to the Administrative Committee covering the coordination of all phases of interconnected system operation. These studies include relay settings, communication facilities, allocation

of spinning reserve requirements, system dispatching procedures, load frequency tieline control, load shedding procedures, and coordination of maintenance schedules.

Q. Mr. Hancock, have certain planning standards been adopted to maintain continued reliability of service to the public?

A. Yes, in order to meet our responsibility to provide reliable service to the public, criteria has been established for planning associated with the bulk power system.

The planning criteria approved by the Administrative Committee provides

1) sufficient generating capacity will be provided as nearly as practicable to insure a reserve of at least 15% of the forecasted maximum hour demand of the system and

2) projected system planning will include simulated testing to insure the system will not experience cascading breakup and collapse initiated by the occurrence of contingencies such as:

   a. Loss of all generating capacity in any generating station.

   b. Loss of any two generating units.

c. Outage of any circuit or generating unit during scheduled maintenance or any other transmission line or generating unit.

d. Outage of any single or double circuit transmission line, generating unit, transformer or bus.

e. Simultaneous outage of overhead transmission lines, parallel to each other, for a substantial distance having a spacing between circuits of less than the height of the structure.

f. Any fault cleared by normal operation of backup relays.

g. Loss of any large load or concentrated load area.

Q. What do you mean by "cascading breakup and collapse"?

A. Cascading and collapse is an extremely severe system upset that can result in the total loss of electric system to a large geographical area. An example is the North East "black-out" that occurred in the New York area in the 1960's resulting in a sustained "black-out" with all of the attendant impact on the public well being.

A cascading collapse is generally triggered by an abnormal event such as the loss of a generator, transmission line

or power plant that for one reason or the other creates changes that cause the loss of other generators, plants and lines and rapidly results in the total loss of electric service. Restoration is restrained by the magnitude of the events, the need for identification of the initial cause, the communication problems and technical problems associated with "dead plant" start up. In addition to an extremely adverse impact on the health and welfare of the public there is increased probability of damage to utility equipment that can become expensive and require long lead time to repair.

Q. How can proper planning help avoid such problems as you have mentioned?

A. Proper planning takes abnormal events into consideration and designs the system so that it has the capability of accommodating certain contingencies without collapse, disruption of service, or diminished reliability. It is important to acknowledge that proper design requires the study and design of all individual utilities in the interconnected system operating in synchronism. Proper design requires the study of contingency events in multiple systems. It relies on the response of each utility's generation and transmission facilities to properly

accommodate the changes resulting from the contingency. It is essential that the planning of major facilities be closely coordinated because of the reliance of each utility within the interconnection on the correct functioning of the interconnected system.

Q. Have certain essential operating standards been adopted for the interconnected systems?

A. Yes, operating standards are at least as important as planning criteria. For that reason, the systems have jointly developed and complied with certain operating criteria which are shown on my Exhibit RLH - 7.

The operation of electric utilities is very complex. The interconnection of utilities increases that complexity and increases the interdependence of interconnected utilities. Very close control and communications on a moment-by-moment basis is necessary between member utilities for routine operation as well as for adverse operating conditions. Events in one area of the interconnection immediately affect operations in other parts of the interconnection requiring certain actions in response to those events.

Q. Please explain some of the reasons for such complexity and interrelation.

A. To fully understand the complexity and interrelation within an interconnected system it is necessary to understand some of the general theory associated with interconnections and synchronous operation. Electrical utilities are not energy producing activities, but instead are energy converting activities, and simply convert energy in one form to energy in a more convenient and flexible form for utilization by the ultimate consumer. Electrical energy cannot be conveniently stored for any significant period of time, and this imposes an unusual constraint on an electrical system with respect to instant changes. It requires a very delicate and responsive balance between fuel input to the utility boiler and the electrical energy requirements of the consumer.

A. Please explain what is meant by synchronous interconnected operations.

A. It is impractical to consider serving all the consumers in the State of Texas from one turbine generating unit, and it is also impractical to consider serving each consumer with an individual turbine generating unit. As a result, a utility installs a number of turbine generating units and connects the output of the generator to the electrical transmission system thus interconnecting the generators and providing multiple supply paths to the

transmission and distribution system for the electrical energy required by the consumers connected to the system. The interconnection of generators with each other constitutes what is termed synchronous operation.

The number of alternations per second is said to be the frequency of the system. In the United States 60 cycles per second is the dominate operating frequency, and it is necessary that generators operating in synchronism not only alternate in unison but also function at the same frequency.

Once the generators are operating together in synchronism, there is an electrical "locking" effect which tends to keep the generators in synchronism.

Since it is advantageous for a utility to interconnect their generators for synchronous operation, and since the physical location of those plants is dispersed throughout the utility's service territory, it has become necessary to interconnect those generating facilities with high voltage transmission lines. The concept of synchronous operation of the generators has been extended beyond

the individual utility concept and extended to a number of utilities interconnected through transmission interconnections to form larger interconnected systems operating in synchronism.

Q. How does an electric utility system operating in synchronism respond to changes in customer energy requirements?

A. If the consumer changes his electrical energy requirements, more energy must be provided at the power plant. This could be accommodated by manually admitting more steam to the turbine to provide more mechanical energy, which in turn would provide more electrical energy. Manual control is cumbersome and inefficient, therefore certain automatic facilities have been installed to provide this function. There is installed on the turbine a governor that controls a series of steam valves that admits sufficient steam from the boiler to produce the required energy output of the generator. The signal that the governor sees is the speed of rotation of the turbine rotor and consequently the generator rotor.

As the consumer requires more electrical energy there is a brief and minute decline in the RPM of the turbine and

generation which is perceived by the governor. The governor automatically opens the steam valves and admits enough steam to restore the turbine generator RPM to its desired speed. That speed is set to maintain 60 cycles per second system electrical frequency. Automatic controls on the boiler then sense the change in steam conditions and automatically adjust the fuel and air ratios for proper combustion and proper energy input of the boiler.

Conversely as the consumer reduces his electrical energy requirements, there is an instantaneous acceleration in the RPM of the turbine and generating unit sensed by the governor which acts on the steam valves to reduce the admitted steam to balance the mechanical input and the electrical output so that 60 cycles per second frequency is maintained.

For units operating in synchronism, each unit responds to the changes in accordance with the governor characteristics, and the incremental changes in energy requirements then are distributed over those units operating in synchronism.

For a number of sound technical reasons, the unit response under governor control does not quite restore the system back to normal frequency, and that final restoration has to be executed either by automatic control or manually.

Q. Is the operation of the system affected by events other than changes in customer demand?

A. Yes, in addition to the normal changes in the load generation relationship resulting from changes in the customer's energy requirements, there are on occasions unusual and abnormal changes resulting from major losses of load in the system which tend to accelerate the RPM of those units in that area that are still in synchronism and results in unusual high frequency excursions.

There also are occasions when the system becomes deficient in power plant input energy resulting from the abrupt loss of a generating unit. The loss of generation in this case causes unusual and extreme frequency decrease excursions.

Q. Does the size of the interconnected system complicate synchronous operation?

A. The larger the interconnected system the more complex and complicated the identification, communication and response to the problems become. In the case of ERCOT, there are approximately 282 generating units that may operate in synchronism requiring special automatic control, communication and data acquisition arrangements.

Q. Describe the automatic load control system which is necessary to the operation of the interconnected system.

A. The automatic load control for the bulk power system of the ERCOT members is composed of seven load control areas each with automated control that regulates the individual generators within that control area and the desired tieline response between the respective areas.

In the case of differences between energy input to the plants and energy requirements of the consumers, changes in frequency result as previously described. Although a significant portion of the response is under automatic governor control there still is additional correction required that must be done either automatically or manually. With the large number of generating units involved in the ERCOT area, the major generating entities have been divided into automatic load control areas. Exhibit RLH - 8 indicates those automatic load control areas in which the generating facilities are automatically controlled to restore that portion of the frequency

deviation not corrected under governor response. This automatic control equipment is able to take into consideration the scheduled power flows between utilities and automatically makes that compensation necessary.

Q. Mr. Hancock, earlier you mentioned frequency changes. What is the significance of frequency deviations?

A. Under normal operating circumstances, there are slight deviations in system frequency resulting from load changes. Under abnormal circumstances there are rather severe frequency deviations resulting from loss of generation or loss of load.

To place the magnitude of frequency deviation in perspective, turbine manufacturers indicate that sustained turbine operation at frequencies of 58.5 cycles per second rather than 60 can result in serious damage. Other information from turbine manufacturers indicate that over the full life of the turbine only 60 minutes cumulative operation at 58.5 can be tolerated without serious unit damage.

In addition to potential turbine damage, there also is some potential for improper pump and motor performance under varying frequencies that effect both the utility operation and the consumer's utilization of electrical energy.

For sustained operation at reduced frequency levels, the major utilities in the ERCOT system have installed under frequency relays that automatically "shed" a portion of the consumer load in order to restore the balance between input energy and customer energy requirements in the event of severe frequency reductions. This is in accordance with the operating criteria reflected in Exhibit RLH - 7.

There is a tendency within any system for frequency to deviate slightly on a cumulative basis from 60 cycles per second. This causes cumulative time error on all electric clocks. Periodic frequency corrections are required in order to correct for these cumulative deviations. The correction is usually accomplished by operating the interconnected system either slightly over or slightly below normal frequency until a correct time correction has been accomplished when compared to standard times. This is a complicated and time consuming effort, and the larger more massive the

interconnected system, the more difficult it is to make the appropriate correction. The automatic load control areas must accelerate their systems sufficiently to increase the frequency, and it is necessary that all attempt to increase at the same time. This correction procedure is outlined in the Operating Procedure outlined on Exhibit RLH - 7.

Q. What is meant by spinning reserve requirements and what is the importance of those requirements?

A. If each generator connected to the system was operating at full capability and had no reserve capacity, it would be unable to respond under governor response or automatic control to increases in electrical energy requirements by the consumer or respond to unusual deviations resulting from losses of generating capacity. As a result, reliability would decline and quality of service would decline. To respond to these deviations certain spinning reserve must be carried in any interconnected system. This simply means that additional reserve capacity must be available in sufficient quantity to provide a satisfactory level of reliability and quality of electric service so that under the governor action and load control action previously described instant responses could be accommodated by the currently

operating generators. The required spinning reserve is determined under the operating criteria outlined in Exhibit RLH - 7.

Q. How is communication and control maintained among the seven control areas?

A. To provide the necessary communication and control, certain security centers have been established to gather periodic data on various utility generation and load information, to provide communications between the various load control centers, to help diagnose the system disturbances, and to coordinate the required response to both normal changes and severe changes. This varies in scope from normal, routine, day-to-day operation to the restoration of service in the event of severe cascading disruptions.

In the ERCOT system, the evolutionary development of the Texas Interconnected System and the subsequent development of the ERCOT system led to the development of two regional security centers, as illustrated in Exhibit RLH - 8. One located in the south part of the ERCOT system, coordinating the activities of the Central Power & Light Company, Houston Lighting & Power Company, City Public Service Board and

Lower Colorado River Authority load control areas. This security center is located in the Lower Colorado River Authority Energy Control Center in Austin, Texas.

The coordination of the area load control in North Texas, comprised of Texas Electric Service Company, Dallas Power & Light Company, Texas Municipal Power Pool and Texas Power & Light Company is handled through the North Texas Security Center located in Texas Power & Light Energy Control Center in Dallas, Texas. These two control centers communicate very closely and provide the necessary coordination for routine day-to-day operation within the area load control systems and under any and all adverse system circumstances.

Q. Mr. Hancock, how has the interconnected system been successful in achieving economical, reliable service to the public?

A. The general philosophy has been that each utility is responsible for the planning and installation of the necessary capacity and facilities to meet the service obligations within their service area. The purpose of the major transmission systems is to provide the interconnections between the utilities, to provide for synchronous operation, the transfer of power under emergency conditions, and the general improvement in reliability throughout the interconnected area. Each utility involved has been

responsible for the physical construction of the facilities within their system and has coordinated those plans and actions with the remaining members. Recently, the close coordination and planning relationship has led to the planning and construction of jointly owned generating and transmission facilities with the potential benefits flowing to the consumers in the respective service areas.

The ERCOT systems have enjoyed excellent reputations and performance when compared to other interconnected systems in the United States. The interconnected system has been small enough to be very responsive and large enough to be resourceful. It has had a long history of excellent service and has functioned on a mutual benefit and cooperative basis as opposed to encumbering legislation or contractual arrangements. Through cooperation, coordinated planning and operating by the participants, a highly reliable interconnected system has evolved that has provided reliable electric service at minimum cost to the customers of the respective electric utilities that are privileged to provide that service.

Q. Mr. Hancock, you have testified regarding the history, purpose and operations of the ERCOT system, as well as the complexities of operating an interconnected system. How is this important to a proper disposition in this proceeding?

A. I believe that this background information is vital in order that a proper assessment may be made of any consequences of the disruption of the interconnected system which might adversely affect planning of facilities and reliability of service. A utility's ability to meet future energy requirements requires decisions between five and ten years in advance. Many utilities have jointly owned facilities under construction and many more are being planned. It is essential that the existing disruption be remedied in order to have the necessary assurances which will allow the resumption of planning and reliable service.

EXHIBIT RLH-1

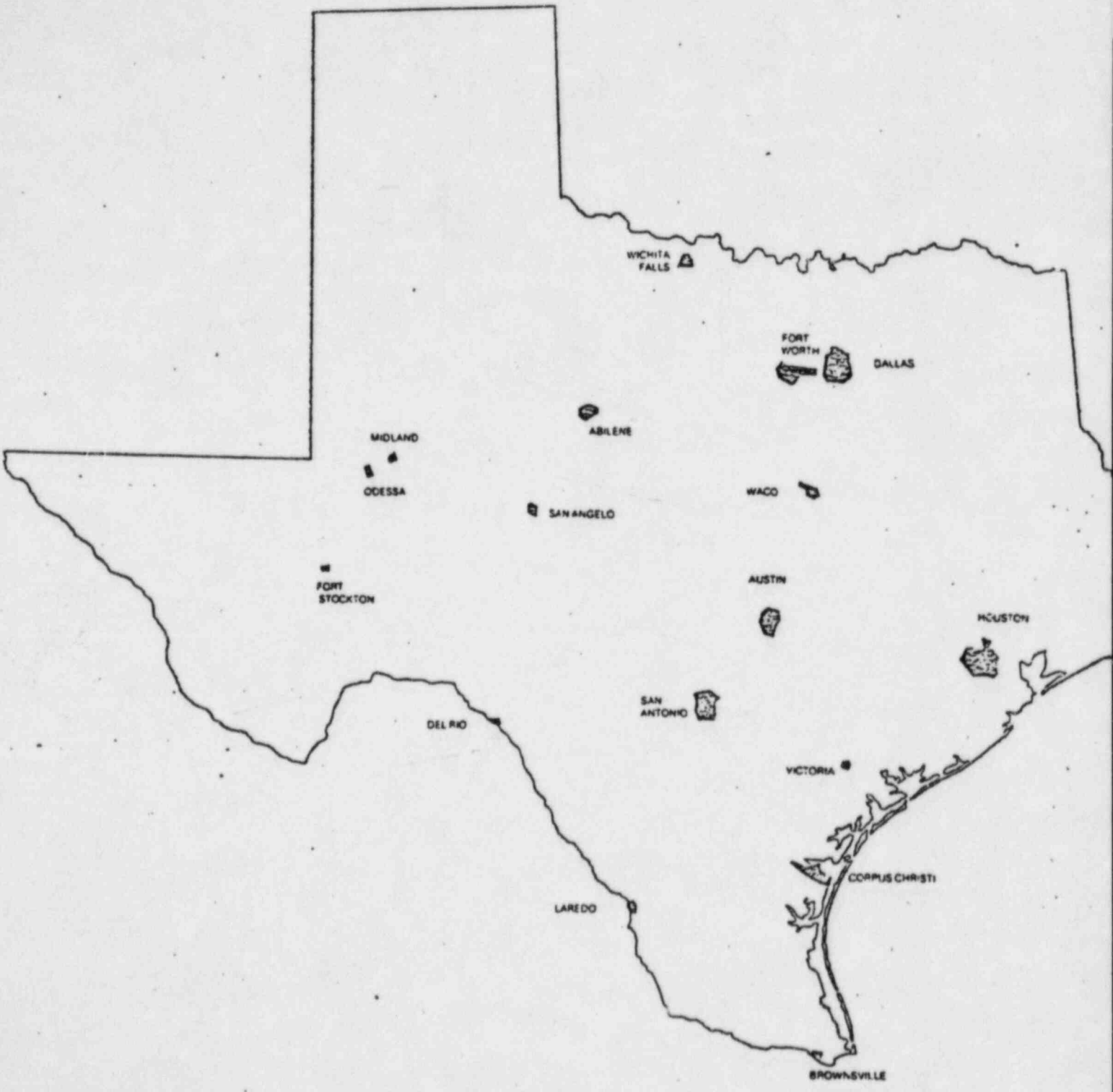
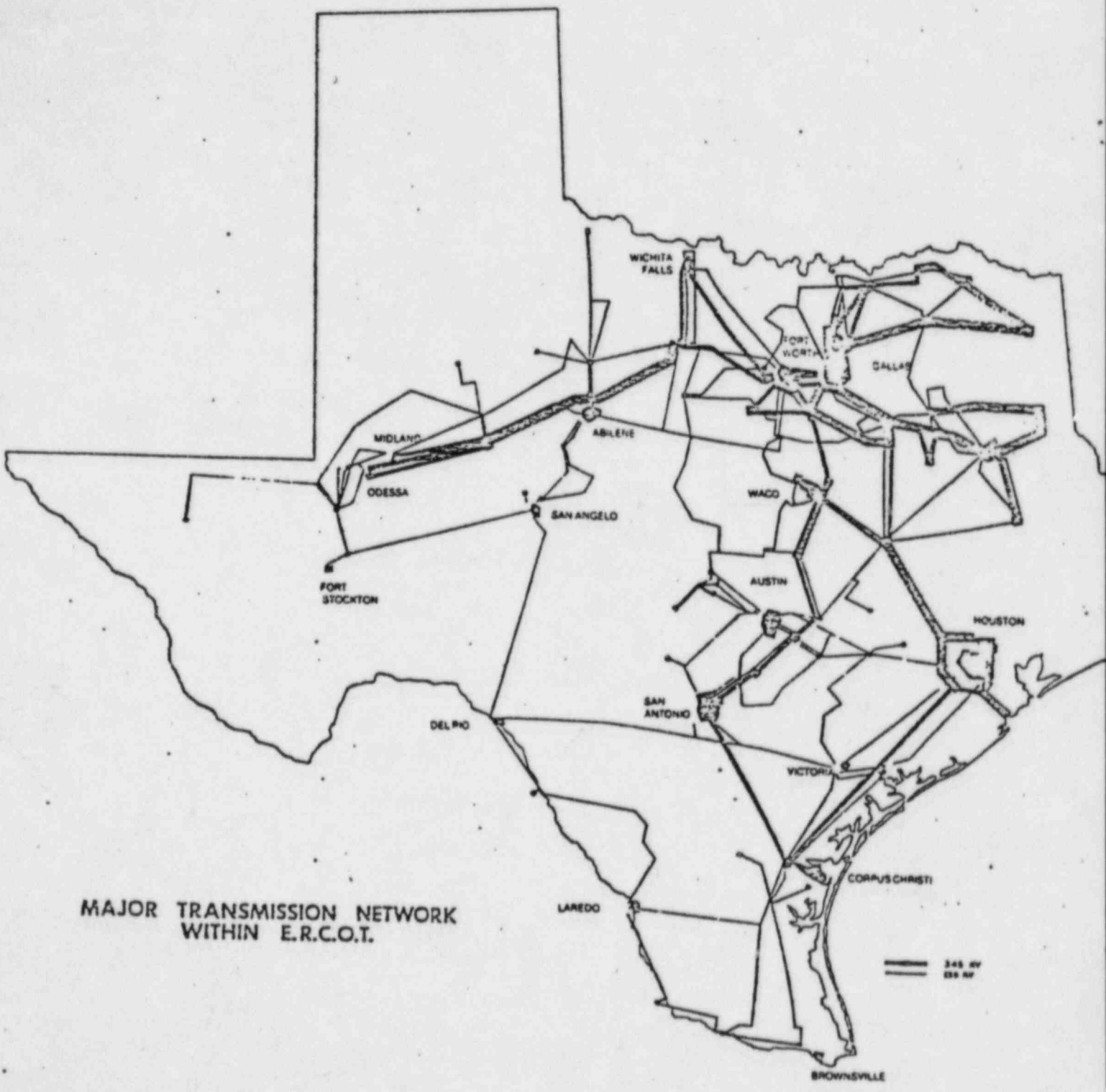


EXHIBIT RLH-2



MAJOR TRANSMISSION NETWORK
WITHIN E.R.C.O.T.

MAJOR GENERATING FACILITIES COMPRISING BULK POWER SUPPLY WITHIN ERCOT

System	Energy MWH	Peak Demand MW	Customers Served
HLP	43,427,292	8,219	759,085
TP&L	20,296,815	4,519	397,434
TESCO	17,053,989	3,392	447,097
CP&L	10,480,950	2,024	376,110
DPL	10,269,708	2,378	251,982
CPSB	6;179,666	1,560	273,610
TMPP	3,864,627	930	194,300 Est.
WTU	3,766,727	675	136,824
LCRA	3,417,582	780	229,908 Est.
COA	2,823,736	711	124,121

1 OCT. '75 - 30 SEPT. '76

ERCOT BOARD

R. W. Hardy, CPL, Chairman

C. E. Duckworth, Garland, Vice Chairman

J. M. Ammons, Mid-West Elec. Coop

J. P. Deely, CPSB, replaced by J. K. Spruce, CPSB

R. E. Kennedy, WTU, replaced by Durwood Chalker, WTU

Don D. Jordan, HLP

D. F. Blackburn, Denton, replaced by Jim Wright, Denton

Charles F. Herring, LCRA

W. G. Marquardt, TESCO

Ross Segrest, Brazos Elec. Coop.

J. F. Skelton, TPL

I. S. Turner, Jr., DPL

1 OCT. '76 - 30 SEPT. ' 77

ERCOT BOARD

W. G. Marquardt, Chairman, TESCO

C. E. Duckworth, Vice Chairman, Garland

J. F. Farrington, DPL

J. M. Ammons, Mid-West Elec. Coop

J. K. Spruce, CPSB

Durwood Chalker, WTU

Don N. Jordan, HLP

Jim Wright, Denton

Charles F. Herring, LCRA

Ross Segrest, Brazos Elec. Coop.

J. F. Skelton, TPL

L. S. Turner, DPL

TEXAS INTERCONNECTED SYSTEM
COMMITTEES
(May 1975 - May 1976)

	Corporate Chief Executive	Administrative Committee	Planning Subcommittee	Operating Subcommittee
Brazos Elec. Power Cooperative, Inc. (Texas Municipal Power Pool) 2404 La Salle Ave. P. O. Box 6296 Waco, Texas 76706 (7) 752-2501	R. A. Segrest	William B. Townsend, Jr.	Paul R. Cunningham	Dan Swenke*
Central Power & Light Co. P. O. Box 2121 Corpus Christi, Tex. 78403 (512) 883-2631	R. W. Hardy	W. G. Siegelin	Don Daniel* C. E. Orsak**	J. M. Mabe* M. C. Barr***
City of Austin P. O. Box 1088 Austin, Texas 78767 (512) 477-6511	Dan H. Davidson	R. L. Hancock, (Chairman)	Emmett C. Rummel* Eugene Preston**	G. C. Pokorny* (Vice-Chairman) Chris Ioannou**
City Public Service Board P. O. Box 1771 San Antonio, Texas 78296 (12) 227-3211	Jack Spruce	Jesse B. Poston	Sam Mayo* Paul Graf**	R. J. Castello* Phil McEnery***
Dallas Power & Light Co. 1506 Commerce Street Dallas, Texas 75201 (214) 747-4011	L. S. Turner, Jr.	Max H. Tanner, Jr. (Vice-Chairman)	C. D. Montgomery* Lloyd O. Heizer**	R. K. Payne* Harold Geist***

Revised 3-9-76

	Corporate Chief Executive	Administrative Committee	Planning Subcommittee	Operating Subcommittee
Houston Lighting & Power Co. P. O. Box 1700 Houston, Texas 77001 (713) 228-9211	Don D. Jordan	D. E. Simmons	K. L. Williams* F. J. Meyer**	Charles F. Ham* W. H. Rasco***
Lower Colorado River Authority P. O. Box 220 Austin, Texas 78767 (512) 474-5931	Charles F. Herring	E. H. Soderberg	Ralph G. Helyer* (Chairman) Larry J. Krenek**	H. T. Sites* F. E. Frazier***
Texas Electric Service Co. P. O. Box 970 Ft. Worth, Texas 76101 (817) 336-9411	W. G. Marquardt	L. F. Fikar	Henry L. Manning*	J. M. Pennebaker* H. K. Bassinger***
Texas Power & Light Co. P. O. Box 6331 Dallas, Texas 75222 (214) 748-5411	J. F. Skelton	G. R. Coffman	Joseph Jurlina* Cecil Oradat**	H. J. Simiele* Johnny L. Ray***
West Texas Utilities P. O. Box 841 Abilene, Texas 79604 (915) 672-3251	R. E. Kennedy	Randal G. Meador	Donovin Smith* (Vice-Chairman)	Randal G. Meador* (Chairman) Carl Yancy***

*Members - **Alternates or Contacts - ***Chief System Operators

Revised 3-9-76

Approved & Adopted
TIS Administrative
Committee 2-23-68

EXHIBIT RLH - 7
Page 1

TEXAS INTERCONNECTED SYSTEM
OPERATING CRITERIA

A. BASIC PRINCIPLES OF SYSTEM LOAD AND CAPACITY

1. Each control area will provide the real and reactive power required for its load so as not to impose its regulating burden on the Texas Interconnected System.

2. Unit and line maintenance outages will be coordinated.

B. FACILITIES

1. Each control area will have in service adequate and sufficient transmission tie-lines with proper relaying and other substation equipment to receive or deliver power under normal and emergency conditions avoiding undue disturbance to the remainder of the system.

2. Kilowatt telemetering and kilowatt-hour readings will be available to control centers on all tie-lines affecting interconnected operation.

C. GENERATION OPERATING PROCEDURES

1. Scheduled Power Changes

   Scheduled power interchanges between areas will be changed at a uniform rate which will not adversely affect operation of any control area.

2. Tie-Line Bias Operation

   The automatic generation control equipment will use a bias setting as close as possible to its control area response characteristic.

3. Time Error Correction Procedure

   One control area will be designated as the monitoring system and responsible for initiating time error corrections and such correction notification will be passed to the other control areas of TIS.

D. SPINNING RESERVE

North Texas will maintain a minimum spinning reserve of not less than the sum of the capability of the largest unit in operation in North Texas plus 100 Mw. The allocation of this spinning reserve will be agreed upon mutually.

South Texas will maintain a minimum spinning reserve of not less than the sum of the capability of the largest unit in operation in South Texas plus 100 Mw. The allocation of this spinning reserve will be agreed upon mutually.

Each control area will maintain the assigned minimum spinning reserve within its own control area.

Spinning reserve will be distributed so that all allocated spinning reserve will be utilitzed in normal governor action before reaching the first step in load shedding.

E. AUTOMATIC VOLTAGE REGULATORS

Generator automatic voltage regulators will be kept in service whenever possible. Each control center will continuously monitor and control the status of the regulators.

F. LOAD SHEDDING

Automatic load shedding will be initiated as follows:

Frequency	% Load Relief
59.3	5%
58.9	10%
58.5	10%

Load shedding will be widely dispersed in each control area and accomplished by using high speed underfrequency relays with no more than 30 cycles fixed time delay except for existing relays in service which cannot reasonably be modified. If the frequency drops below 58.4 cycles, each system must determine additional steps it will take to survive and

it is desirable that each system will continue to drop load to attempt to stabilize frequency. Underfrequency relays may be installed on the transmission interconnections with the consent of the systems involved providing the relays are set at 58.0 cycles or below and are not directional and have at least 2.0 seconds time delay. Load restoration will be under the direction of each control area operating center.

G. SECURITY CENTERS

Two centralized Interconnected System Security Centers will be maintained. The LCRA Operating Center will serve this function for South Texas and the Texas Power & Light Operating Center will serve this function for North Texas. These Centers will maintain a continuous surveillance of the status of operating conditions and act as a central information collection and dissemination point for the individual control areas.

H. PROTECTIVE RELAYING

Adjacent areas will review, coordinate, and exchange protective relaying information and settings which affect interconnected operations.

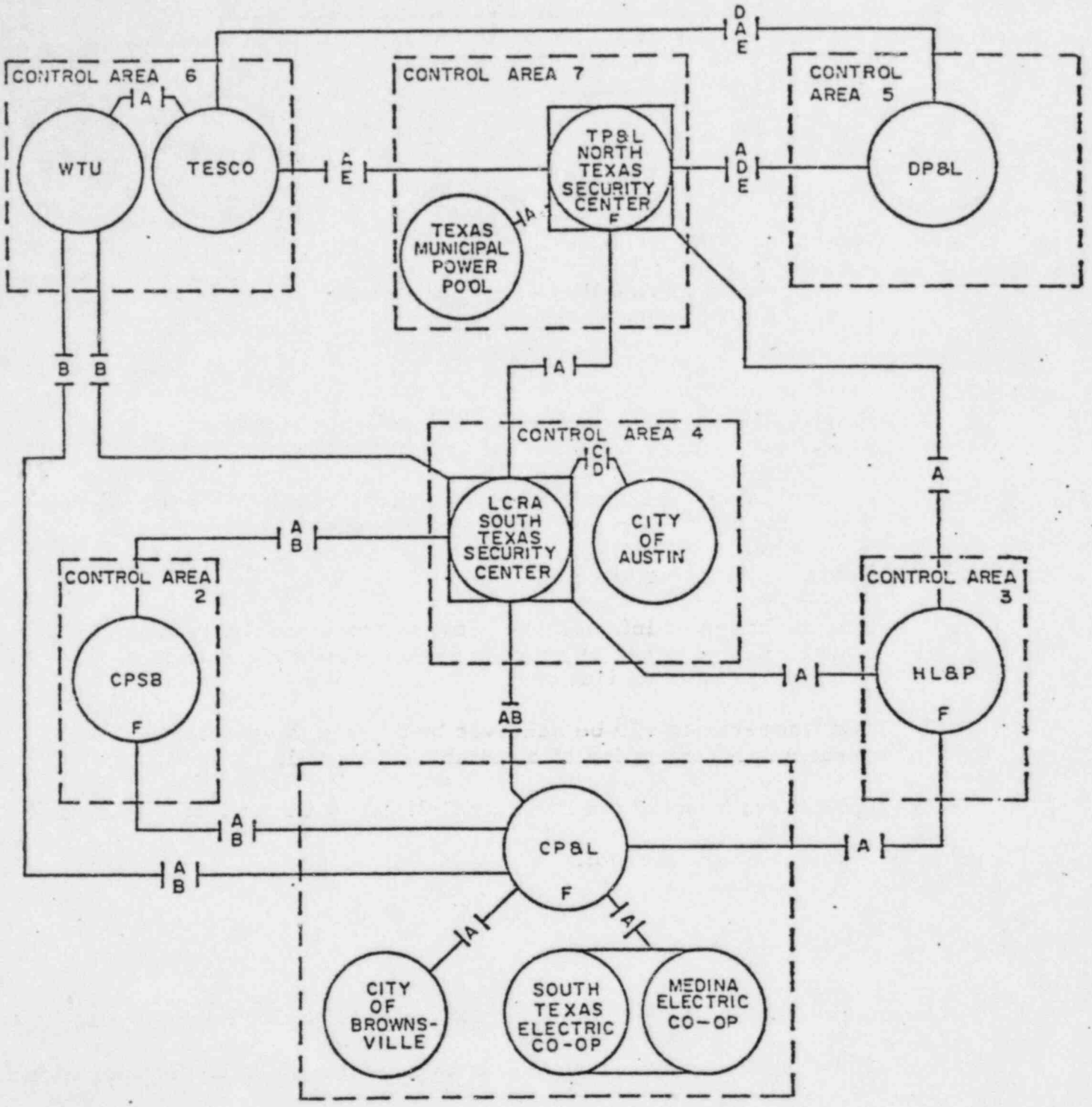
I. COMMUNICATIONS

Adequate and reliable communications will be provided between the operating centers of directly interconnected control areas and to the appropriate Security Center. These communications will be operational without power supplied from the power system.

J. EMERGENCY OPERATING PROCEDURES

Each operating entity will have emergency operating procedures for restoration of service in event of partial or complete system shutdown.

ELECTRIC RELIABILITY COUNCIL OF TEXAS
CONTROL AREAS & INTRASYSTEM COMMUNICATION FACILITIES



COMMUNICATION CHANNEL CODE:

A – LEASED FULL PERIOD TELEPHONE CIRCUIT
B – POWER LINE CARRIER
C – PRIVATE CABLE PAIR WITH MAGNETO SIGNALING
D – LOCAL TELEPHONE LINES
E – RADIO – TELEPHONE

Appendix B

ELECTRIC RELIABILITY COUNCIL OF TEXAS

AGREEMENT

PREAMBLE

With the desire:

(1) to serve better their respective customers;

(2) to render more reliable service;

(3) to ensure the availability of ample electric power and energy now and in the future; and

with the belief:

(1) that availability of an adequate and reliable supply of electric power and energy is a necessity;

(2) that voluntary cooperation between those responsible for supplying electric power and energy is the only satisfactory way to achieve the degree and type of cooperation which would be meaningful;

(3) that exchange of information between those supplying electric power and energy is of great benefit in the performance of their respective obligations;

(4) that cooperation can be achieved best through voluntary creation and operation of a reliability council;

the undersigned have created the Electric Reliability Council of Texas, and hereby become members thereof.

ARTICLE I.

Purpose

Section 1. The purpose of the Electric Reliability Council of Texas (hereinafter referred to as the Council) is to promote the reliable operation of power systems by:

(a) exchanging information concerning the planning and operation of generating, transmission and distribution facilities;

(b) exchanging information pertinent to materials, supplies, equipment, and manpower available to others in the restoration of service disrupted by hurricanes, cyclones, tornadoes, floods, riots, enemy attack and disorders;

(c) maintaining direct communication channels for the purpose of rendering total aid to victims in the event of enemy attack, thereby providing maximum civil defense for all members of the Council;

(d) providing a means of exchanging information and system data and for making necessary regional studies designed to increase the reliability of such power systems under all normal and abnormal circumstances; and by

(e) creating a vehicle for the reporting, where appropriate, of information to regulatory agencies.

Section 2. The responsibility of the Council is to assist in the achievement of the purposes set out in Section 1 above; however, it is understood that this responsibility shall not conflict with the responsibility of the individual member systems and associations to carry out their own coordination of planning and operation within their respective areas.

ARTICLE II.

Qualifications for Membership

Section 1. Any entity, corporate or otherwise, including agencies of the Federal government or federally-owned or financed systems and state, municipal or other government-owned or financed entities, which owns, controls and operates an electric power system in Texas, all or

part of which consists of facilities for the generation, transmission or distribution of electric energy in purely intrastate commerce (that is, not directly or indirectly transmitting, buying or selling electric energy in interstate commerce) and serving the public (members served by rural electric cooperatives shall be considered "public" for the purpose of this provision) may be admitted to membership in the Council.

Section 2. Any electric system which meets the above qualifications for membership and has executed this Agreement shall be a member of the Council so long as that member continues to meet these qualifications and the obligations of membership.

Section 3. Any other electric system which meets the above qualifications for membership and makes written application for membership to the Chairman of the Executive Board of the Council will be approved for membership and upon signing a copy of this Agreement shall become a member with equal standing to the parties originally signing this Agreement and remain a member so long as it continues to meet the qualifications and obligations of membership.

ARTICLE III.

Member Representatives

Each member shall appoint a representative, which representative shall be one of its employees, to act for it at meetings of the Council and shall give to the Chairman of the Executive Board in writing the name of the person thus appointed.

ARTICLE IV.

Meetings

The organizational meeting of the Council was held on the _____ day of _____, 1970 at _____. Subsequent meetings of the Council shall convene at least annually on a date and at a place to be established by the Executive Board. Additional meetings of the Council may be held provided that such meetings have been authorized by the Executive Board and provided that written notice of any such meeting shall be mailed to all members of the Council at least three (3) weeks prior to the scheduled date of the meeting.

ARTICLE V.

Organization

Section 1. The affairs of the Council shall be administered by an Executive Board of twelve (12) representatives elected by the Council. The Executive Board shall be selected so as to provide representation, in so far as practicable, from each of the various types of systems comprising the membership of the Council, i.e., investor-owned, federal, state, municipal, cooperative and large and small systems. The Executive Board shall include at least three (3) representatives of non-investor-owned systems (federal, state, municipal or cooperative) and at least three (3) representatives of investor-owned systems.

Section 2. The Executive Board shall be elected initially at the organizational meeting of the Council and annually thereafter at the annual meeting of the Council, in each case for a term of one (1) year and by a majority of the votes (as established in Article VI) of members present and voting at such meetings.

Section 3. The Executive Board shall elect initially at the organizational meeting of the Council and annually thereafter from the Board's membership a Chairman and a Vice-Chairman. In addition, the Executive Board shall appoint a Secretary-Treasurer who need not be a member of the Council. The Executive Board may employ such staff and may appoint such committees or subcommittees and/or task forces from employees of the Council members as it deems appropriate to carry out the purposes of the Council.

Section 4. Prior to each annual meeting a Nominating Committee shall function. Such Nominating Committee shall be appointed by the Chairman of the Executive Board at least two (2) months in advance of the annual meeting. It shall be the duty of the Nominating Committee to nominate qualified representatives of the members of the Council for election to the Executive Board. The report of the Nominating Committee shall be mailed to all members at least two (2) weeks prior to the annual meeting. The Nominating Committee shall consist of four (4) representatives of the Council, two (2) of whom shall represent noninvestor-owned systems and two (2) of whom shall represent investor-owned systems.

The Nominating Committee shall nominate a total of twelve (12) persons for election to the Executive Board at the next annual meeting of the Council. Additional nominations for election to this Board may be made at the annual meeting provided, however, that the Board elected at the annual meeting shall satisfy Section 1 of this Article.

Section 5. Meetings of the Executive Board shall be held at least annually upon call of the Chairman. The Chairman may call additional meetings of the Executive Board as required. The Chairman shall preside

at all meetings and shall be responsible for preparation of agendas for such meetings. In the absence of the Chairman the Vice-Chairman shall serve in his place. The Secretary-Treasurer shall be responsible under direction of the Chairman for timely issuance of notices and agendas of meetings, the keeping of accurate minutes of meetings, the distribution of such minutes and other communications to all members of the Council, and the reporting, where appropriate, of information to regulatory agencies.

Section 6. Nine (9) members of the Executive Board shall constitute a quorum and 75% of the voting strength of the Council shall constitute a quorum at meetings of the Council.

ARTICLE VI.

Voting Strength of Members

Prior to each annual meeting of the Council, the Chairman of the Executive Board shall have prepared and sent to each member a written tabulation showing the voting strength of each member of the Council. The voting strength shall be determined by the following formula:

$V = 1000 \times M/T$

M = Average kwh handled by member through the intrastate system which is the basis for its membership herein during three (3) preceding calendar years (reported on FPC Form 1 as Disposition of Energy-Total or equivalent for systems not reporting on Form 1).

T = The sum of M for all members

V = Voting strength of member (expressed in nearest whole number but not less than one vote per member).

Such voting strength shall prevail from the convening of each annual meeting until the convening of the next following annual meeting. Each member must report for each year, on a calendar year basis from the above described FPC Form 1, the energy account for its system. For each member the value of M in the formula shall be the average of the energy accounts for the three (3) calendar years immediately preceding the next annual meeting. Such energy reports shall be made to the Chairman of the Executive Board not less than three (3) months prior to the next scheduled annual meeting.

ARTICLE VII.

Functions of the Executive Board

Section 1. It shall be the duty of the Executive Board to initiate the action required, in their opinion, to fulfill the purposes of the Council as stated in Article I within the limitations set out herein. The Executive Board or such committee or individual as may be appointed by the Executive Board shall (a) assemble and distribute to members information from each member with respect to the items mentioned in Article I, Section 1 hereinabove; (b) assemble and distribute to members information pertaining to reliability of service; (c) aid in obtaining information requested by any member or group of members pertaining to matters related to availability and reliability of service; (d) recommend criteria for such elements of design as affect the reliability of any interconnected bulk power system, and recommend procedures for the effective establishment of up-to-date information which is vital in maintaining maximum reliability in the

important segment of the electric utility systems between the bulk power supply and the ultimate consumer; and (e) report, where appropriate, information to regulatory agencies concerned with reliability.

Section 2. Each member of the Council shall report to the Executive Board in such form and for such period of time as may be requested by the Board from time to time such available data for the system which the member represents which are reasonably necessary to prepare and file reports to regulatory agencies as provided for in Section 1 (e) of this Article.

Section 3. Each member of the Council shall inform the Executive Board of its plans for generation or transmission additions which significantly affect the reliability of operation of the bulk power supply system and shall report any decisions as to alterations or changes proposed for their respective electric systems whether in generation, transmission, distribution, intersystem communication or control or protective equipment, which may significantly affect the reliability of the interconnected bulk power systems.

Section 4. Each member of the Council shall inform the Executive Board of operating procedures or changes in operating procedures which may significantly affect the reliability of operation of the members' systems. Upon receipt of such information the Executive Board shall study and evaluate (or shall direct such committee, subcommittee or task force as it may appoint to study and to evaluate) the operating procedures or proposed changes in operating procedures.

Section 5. The Chairman of the Executive Board shall report to the Council for its consideration any findings, conclusions and recommendations

of the Board with respect to such additions, alterations, operating procedures or proposed changes in operating procedures.

ARTICLE VIII.

Finances

Section 1. The personal and travel expenses of each member of the Council, Executive Board, any committees, subcommittees or task forces that shall be formed, shall be borne by the system which such member represents.

Section 2. An administrative budget for the Council for each ensuing year, starting from the date of the organizational meeting, shall be adopted at the annual meeting. Such administrative budget (including cost of liability insurance) for the Council itself for each fiscal year (October 1 through the following September 30) shall be prepared by the Executive Board and submitted to the Council at the annual meeting, and to be effective must be approved by the affirmative vote of not less than two-thirds of the voting strength of the Council (as such voting strength is defined in Article VI); provided a budget for administrative expenses which may be incurred by the Council between time of formation and September 1970, and the method of meeting same shall be agreed upon at the organizational meeting.

Section 3. The administrative expenses of the Council shall be financed by funds received from annual dues levied against the members of the Council in proportion to each member's voting strength at the beginning of the fiscal year for which the budget of such administrative expenses was adopted. The foregoing basis for apportionment of the

Council's administrative expenses will be reviewed annually by the Executive Board and may be modified by that Board to assure equitable distribution of the Council's expenses among the member systems.

Section 4. Each member shall be notified of the administrative budget and its proportionate share of the administrative expenses of the Council at least thirty (30) days before the beginning of the fiscal year.

Section 5. Any member may withdraw from the Council after the budget is approved, and will thereby be relieved of any obligation to pay any part of such administrative expenses, provided notice of the desire to withdraw is given before beginning of the fiscal year, so that such withdrawal can be taken into account in determining the proportionate share of those members remaining as members.

Section 6. The Secretary-Treasurer shall bill each member within thirty (30) days after adoption of the budget and each member shall pay such dues within sixty (60) days after billing date.

Section 7. No member shall, without its consent, be responsible for the administrative expenses of the Council in any one year in excess of its proportion of the amount budgeted for administrative expenses for that year.

Section 8. Special projects may be separately budgeted and the cost allocated upon any basis agreed upon by those participating in such special project.

ARTICLE IX.

Termination of Membership

Section 1. Notwithstanding any other provision of this Agreement or any amendment of this Agreement, any member may terminate its

obligations under this Agreement, other than its obligations to pay its proportionate share of the administrative expenses of the Council for the full fiscal year within which such termination is effective, at any time upon thirty (30) days' notice, whereupon it shall cease to be a member of the Council.

Section 2. The Council may be dissolved by a vote of a majority of the voting strength.

ARTICLE X.

Amendment

This Agreement may be amended at the annual meeting by a vote of two-thirds of the voting strength of the members; provided no amendment shall curtail the right of a member to withdraw from the Council as set out in Article VIII, Section 5, and Article IX hereof.

ARTICLE XI.

General

Section 1. It is agreed that this Council is a voluntary association and no member shall be subject to any type of claim whatsoever by reason of any action or failure to act of said member or any other member as there is no legal obligation on any member to do any act or refrain from doing any act hereunder. Each member shall do such things and perform such acts as such member may deem desirable.

Section 2. Each member shall retain sole control of its own facilities and the use thereof, and nothing in this Agreement shall require a member to construct or dedicate facilities for the benefit of any other member or allow its facilities to be used by any other member, or to construct or

provide any facilities for its own use, and nothing herein shall be deemed to impair the ability or right of any member to take such actions or to fail to act, as it deems necessary or desirable, with respect to the management, extension, construction, maintenance and operation of its own facilities, present and future.

ARTICLE XII.

Term

This Agreement shall continue until terminated by agreement of a majority of the voting strength of its members.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed as of the _____ day of _____, A. D. 1970.

DOCKETED USNRC JAN 22 1979 Office of the Secretary Docketing & Service Section

TEXAS INTERCONNECTED SYSTEM COORDINATION AGREEMENT

ARTICLE I
Purpose of Agreement

For more than 25 years the electric power systems comprising the North Texas Interconnected Systems have successfully operated interconnected with and in synchronism with the electric power systems comprising the South Texas Interconnected Systems. The joint operation of these two groups has come to be known as the Texas Interconnected System.

Committees responsible for coordinating operations and planning bulk power supply facilities have functioned on a regular basis for many years. Due to the growth of loads necessitating use of larger generating units, and EHV and other high capacity transmission lines, it is recognized that the best approach to maintaining maximum reliability of bulk power supply facilities for the Texas Interconnected System is through continuing and strengthening these coordinating committees. It is further recognized that reliability of bulk power supply can best be achieved by a manageable number of electric systems operating within a major area of reasonable geographical boundaries.

To insure the most effective coordination of planning and operation of bulk power supply facilities to obtain maximum reliability the parties to this agreement agree as follows:

ARTICLE II
Administrative Committee

Each party shall, after execution of this agreement, appoint and designate by written notice to the other parties a person to act as its representative as a member of a group to be known as the Administrative Committee, hereinafter referred to as the "Committee". Each person so appointed shall have the authority to act for his company in any matter pertaining to the purposes of this agreement.

The members of the Committee shall decide among themselves the date and location for each meeting, which shall be at least once annually. Location of the meeting shall be rotated among the parties and the member representing the party sponsoring the meeting shall serve as Chairman of the Committee for that meeting.

The responsibilities of the Administrative Committee shall be:

1. Determine and establish general policy with regard to coordination of planning and operation of the Texas Interconnected Systems.
2. Review and evaluate criteria and procedures affecting the reliability of bulk power supply facilities.
3. Appoint chairmen and make assignments as referred to under Articles III and IV to the Planning Subcommittee and the Operating Subcommittee, and such other subcommittees as

the Committee may deem desirable to assist it in getting information; studying and reviewing plans; and evaluating criteria and procedures affecting the reliability of bulk power supply facilities.

4. Provide information and data to each of the parties and to other organizations as deemed necessary.

ARTICLE III
Planning Subcommittee

Each member of the Administrative Committee shall appoint a person to act as his representative as a member of the Planning Subcommittee. The duties of the Planning Subcommittee shall be to perform and evaluate steady state load flow and stability studies; review basic plans for development of the systems; make such recommendations as it deems appropriate to the Committee; and perform other planning duties as directed by the Committee. They shall meet as often as is necessary to perform these assignments.

Their studies shall include but not be limited to the following:

1. Installed generation reserves
2. Abnormal system conditions
3. Major outage contingencies
4. Statistical studies
5. Transmission facilities
6. Future generation installations.

The expense of each member of the Subcommittee shall be borne by the party by whom he is regularly employed. Any other expense of the subcommittee shall be shared as agreed upon by the Committee.

ARTICLE IV
Operating Subcommittee

Each member of the Administrative Committee shall appoint a person to act as his representative as a member of the Operating Subcommittee. The duties of the Operating Subcommittee shall be to make such recommendations as it deems appropriate to the Committee covering the coordination of all phases of interconnected system operation. They shall meet as often as is necessary to perform these assignments.

Their studies shall include but not be limited to the following:

1. Relay settings
2. Communication facilities
3. Allocation of spinning reserve generation
4. System dispatching procedures
5. Load frequency tie line control
6. Load shedding procedures
7. Coordination of maintenance schedules
8. System and group protective measures.

The expense of each member of the subcommittee shall be borne by the party by whom he is regularly employed. Any other expense of the subcommittee shall be shared as agreed upon by the Committee.

ARTICLE V
General

Nothing herein shall be construed as making any party liable for the breach of this agreement by any other party. Nothing herein shall be construed as limiting or interfering with in any way the power or right of each party to control the use and operation of its own facilities.

ARTICLE VI
Termination

Any party to this agreement may withdraw from and cease to be a party hereto at any time by giving written notice to the other parties.

ARTICLE VII
Relationship of the Parties

Nothing herein contained shall ever be construed to create an association, joint venture, trust or partnership, or impose a trust or partnership duty, obligation or liability on or with regard to any of the parties hereto. No party shall have the right or power to bind any other party without its express prior written consent.

APPROVED:

DATED:

CENTRAL POWER & LIGHT COMPANY

By: _____

June 5, 1967

CITY OF AUSTIN

By: _____

May 29, 1967

CITY PUBLIC SERVICE BOARD OF SAN ANTONIO

By: _____

May 31, 1967

DALLAS POWER & LIGHT COMPANY

By: _____

May 24, 1967

HOUSTON LIGHTING & POWER COMPANY

By: _____

May 24, 1967

LOWER COLORADO RIVER AUTHORITY

By: _____

May 30, 1967

TEXAS ELECTRIC SERVICE COMPANY

By: _____

May 24, 1967

TEXAS POWER & LIGHT COMPANY

By: _____

May 24, 1967

WEST TEXAS UTILITIES COMPANY

By: _____

May 24, 1967

The agreement of May, 1967, establishing the Texas Interconnected Systems ("TIS") is hereby amended so as to include as a member, from this date, the Texas Municipal Power Pool (composed of the cities of Denton, Garland, Bryan and Greenville and Brazos Electric Power Cooperative, Inc. and represented in TIS by Brazos Electric Power Cooperative, Inc.).

March 19, 1974

CENTRAL POWER AND LIGHT COMPANY

By: _____

CITY OF AUSTIN

By: _____

CITY PUBLIC SERVICE BOARD OF SAN ANTONIO

By: _____

DALLAS POWER & LIGHT COMPANY

By: _____

HOUSTON LIGHTING & POWER COMPANY

By: _____

LOWER COLORADO RIVER AUTHORITY

By: _____

TEXAS ELECTRIC SERVICE COMPANY

By: _____

TEXAS POWER & LIGHT COMPANY

By: _____

WEST TEXAS UTILITIES COMPANY

By: _____

TEXAS MUNICIPAL POWER POOL

By: _____

Appendix D

TESTIMONY OF H. L. PETERSON
ASSISTANT DIRECTOR ELECTRIC UTILITY
CITY OF AUSTIN

Q. For the record, please state your name and position.

A. My name is Howard L. Peterson. I am employed by the City of Austin as Assistant Director of the Electric Department. My background and qualifications are attached to this testimony.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to explain how the disruption of the ERCOT system on May 4, 1976, increased the daily operating costs for the Austin Electric System, how the disruption reduced the reliability of Austin's system, and how the disruption has affected planning and the current costs of committed projects. Additionally, my testimony will recommend Commission action for relief from the disruption of the ERCOT system.

Q. Would you briefly describe the Austin Electric System and its history.

A. The City of Austin Electric System was initially formed in 1895 with the completion of the first power plant. The System has grown to a system demand of 711 megawatts and a system generating capacity of 1,000 megawatts. The principal growth of the system has occurred since 1950.

The City of Austin system serves a 410 square mile area. This area covers about 50% of Travis County and includes all the incorporated area of Austin. The Electric System serves 124,000 customers. The system originally only served approximately the incorporated limits of the City until 1939 when, through an agreement with LCRA, the system expanded into the 410 square mile area. Austin now has 10 generating units located at 3 power plants. The Seaholm Plant located in the 800 block of West First Street has five generating units of 120 megawatt capacity. The Holly Plant located at Holly Street and Pedernales Street has four generating units with a capacity of 555 megawatts. The Decker Plant has one generating unit of 325 megawatt capacity. A second unit is near completion at this plant, having a capacity of 400 megawatts. The transmission system consists of both 69KV lines and 138KV lines. The 69KV system forms an inner transmission grid. This grid connects the Seaholm Plant and Holly Plant into the 138KV system. The 138KV lines form an outer transmission loop around the City.

Q. Are the present units able to burn fuels other than natural gas?

A. The present operating units are designed for burning natural gas with limited emergency capability of burning either #2 or #5 fuel oil. Decker Unit No. 2 will have

capability of burning either gas or oil. This Decker Unit was committed before the gas shortage developed and could not be substantially changed other than adding fuel oil burning capability.

Q. Describe how the Austin System is interconnected with LCRA.

A. Austin made its first interconnection with another utility in 1938 by contractual agreement with the Lower Colorado River Authority. This agreement has been modified several times, and with a new agreement in 1966 provides additional interconnections and joint use of right-of-ways and facilities. The present interconnections with the Lower Colorado River Authority include three 69KV connections and three 138KV connections. Austin is participating with LCRA in joint planning, joint generating facilities, joint transmission and substation facilities. These joint projects are evidenced by the Fayette Power Project and by the recent Transmission Agreement for joint transmission facilities. The City of Austin is bordered on three sides by cooperatives that are supplied by the Lower Colorado River Authority and on one side by Texas Power & Light Company.

Q. Is it necessary that Austin be interconnected with the same systems as LCRA?

A. Because of the physical relation between Austin and LCRA systems and the present interconnections, Austin must of necessity be interconnected with the same utilities as LCRA.

Q. What is the history of Austin's participation in TIS and ERCOT?

A. Austin was one of five interconnected utilities in South Texas in the 1940's and 1950's and Austin was one of the original members of the Texas Interconnected System (TIS). Austin became a member of the Electric Reliability Council of Texas (ERCOT) in 1970 with its formal establishment. Austin has actively participated in all planning and operational level meetings of both the ERCOT organization and the TIS organization.

Q. Describe some of the more recent planning and commitments of the Austin system.

A. Detailed planning of transmission and generation facilities began in the early 1950's with the rapid expansion of Austin's system. Austin has used the planning and operating

criteria of the TIS, ERCOT and the older South Texas organization in developing the long range plan for its system. This planning criteria has allowed Austin to build larger, more economical generating units such as the two 100 megawatt, 175 megawatt and 190 megawatt units at the Holly Plant and the 325 megawatt and 400 megawatt units at the Decker Plant. These larger units were built at a lower cost and have lower heat rates than smaller units that would have had to be built if the interconnection had not existed.

Q. Describe Austin's future generation plans.

A. Austin is committed to 50% joint ownership of two 600 megawatt units in the Fayette Power Project and 16% of two 1250 megawatt units at the South Texas Project. Austin's commitment of these two projects and the successful operation of the units of these two projects are predicated on the interconnection with ERCOT. The larger units in coal fired facilities are much more economical per unit cost than smaller units because of the amount of auxiliary equipment required that is independent of size. The same statement is also true of the nuclear units of the South Texas Project.

Q. Is there a problem in taking power from the South Texas Project if all four participants, CP&L, HL&P, San Antonio and Austin, are not interconnected?

A. Yes, if such systems are not interconnected, additional equipment will be required at an additional cost to connect to the South Texas Project. One method is a DC connection, which requires considerable expenditures. This cost will have to be borne, ultimately, by the rate payers of one or more of the systems.

Q. Would you describe Austin's transmission system which is shown on what has been marked as Exhibit HLP - 1.

A. Austin's transmission system has been developed to take full advantage of the location and interconnection with the ERCOT transmission system. The overlay on the Texas map (RLH -1) shows Austin's 138KV loop system and the connection to the ERCOT 345KV system. The planned expansion of the transmission system is shown in dashed lines and provides the transmission facilities for connection to the Fayette Power Project and the South Texas Project. During the time of disruption the 345KV transmission system north to the TU system was open and provided no benefit. This removed from Austin the major source of the ERCOT emergency backup provided from the TU and Houston systems.

Q. What is the extent of Austin's commitments to the Fayette and South Texas Project?

A. Austin has committed 215 million dollars to the development of the Fayette Power Project, 180 million dollars to the development of the South Texas Project and 20 million dollars for transmission systems to connect these projects into Austin's system. The disconnection of the ERCOT system has placed doubt on being able to operate these facilities at full capacity and has the effect of increasing the cost of these commitments.

Q. Did Austin have advance notice of the disruption of ERCOT?

A. Austin had no knowledge or indication from the other participants that this disconnection would occur when Austin committed to these projects or before WTU's actions of May 3, 1976, which triggered the disruption of ERCOT.

Q. Is the South Texas Project especially important to Austin and its ratepayers?

A. The South Texas Project is more important to Austin than to any of the other participants. While Austin has only 16% of the project, this portion of the project will contribute 50% of Austin's energy requirements in the mid-1980's. This offers a very good opportunity of lowering electrical rates to Austin's ratepayers in the mid-1980's.

Q. What was the impact of the recent disruption of ERCOT on Austin?

A. The bifurcated configuration of the interconnection reduced the reliability of service that Austin provides its customers. Austin was disconnected from an interconnection with a system that totaled 33,000 megawatts of generating capability to an interconnection with a system that has only 8,500 megawatts of generating capability. The adverse effect of Austin's connection with this smaller interconnection system was evidenced on November 22, 1976, when a loss of a unit in Central Power & Light Company's system dropped the frequency to 59.62 cycles. Another occasion was on January 10, 1977, when a loss of a unit in City Public Service Board of San Antonio's system dropped the frequency to 59.59 cycles. Any additional generation loss at either time would have caused severe system disruption. These frequency excursions were much more severe under the present interconnection than a similar loss of generation would have been under the pre-May 4, 1976, interconnection.

Q. What was the effect on Austin's spinning reserve requirements?

A. The disruption required Austin to carry additional spinning

reserve in its generating schedule. This additional spinning reserve increased maintenance cost and fuel expenses. Austin's spinning reserve requirement increased from 75 megawatts to 100 megawatts due to the disconnection on May 4, 1976. This extra spinning reserve requirement caused Austin to keep a 40 megawatt unit on a line about 50% of the year. In order to keep this 40 megawatt unit on the line, a minimum load of 12 megawatts has to be placed on this unit. This means that this amount of energy is generated at a heat rate of 12,650 BTU per kilowatt hour on the 40 megawatt Seaholm unit instead of 10,188 that could generate this energy on the more efficient Decker unit. This increased cost of fuel calculates to be $255,260 per year. The increased maintenance cost of this unit because of operating it at low load for prolonged periods of time is estimated to be $20,000 per year. There is one other cost that happens because of operating the 40 megawatt unit. This is degradation of the heat rates on other units operating at a lower load. This degradation is conservatively estimated at 30 BTU per kilowatt hour. Based on the total number of kilowatt hours produced per year, this degradation of heat rate calculates out to be $180,000 per year. Adding the three costs together calculates to be $455,260 per year as the cost for carrying the additional spinning reserve.

Q. What is the impact of the disruption on Austin's future planning and reliability?

A. Long range planning is impossible because of the uncertainties which jeopardize any commitments. Also, there are possible additional costs because of not being able to operate the Fayette Power Project and the South Texas Project at full capacity.

The addition of larger generating units to a small system (which has 8,500 megawatts) will cause additional system reliability problems. The bifurcated system will not sustain the loss of the two units at the Fayette Power Project. Loss of a plant is the criteria that the TIS used in planning interconnections. No credible studies could be run with the South Texas Project because existing lines were much too small and no information was available on any additional planned transmission.

Q. What are Austin's recommendations in this proceeding?

A. a). Austin recommends that the Commission take whatever action is necessary to require WTU to permanently severe its connection across the Oklahoma border. This would allow the complete and permanent restoration of the ERCOT systems.

b). As an alternative, Austin recommends that the Commission allow WTU to operate in interstate commerce as it desires. But, to avoid the adverse effect of such operations on the remaining systems the Commission should take whatever action is necessary to require WTU to sever connections from Central Power & Light Company, TESCO, and Lower Colorado River Authority and the others. This would allow restoration of 95% of the pre-May 4, 1976, ERCOT systems. This would solve all the problems associated with the South Texas Project, since Central Power & Light Company would be connected with the three other participants. This would allow West Texas Utilities to remain connected with its Northern Division and the Southwest Power Pool which it prefers.

c). As a second alternative, Austin requests the Commission to take whatever action is necessary to direct LCRA, San Antonio and Austin to sever ties with West Texas Utilities and Central Power & Light Company and reconnect with Houston Lighting & Power Company and Texas Utilities.

d). Permanent relief should be granted as soon as possible in order that

1) planning can be orderly and each system's expansion can be at minimum cost to the system's ratepayer;

2) present additional cost of operation can be eliminated;

3) the reliability of the interconnection systems can be restored; and

4) no delay shall be experienced in implementing those financial and physical commitments which have been made.

QUALIFICATIONS
OF H. L. PETERSON

Assistant Director of Austin Electric Department since 1974.

Prior to that, Superintendent of Engineering Design from 1971 to 1974.

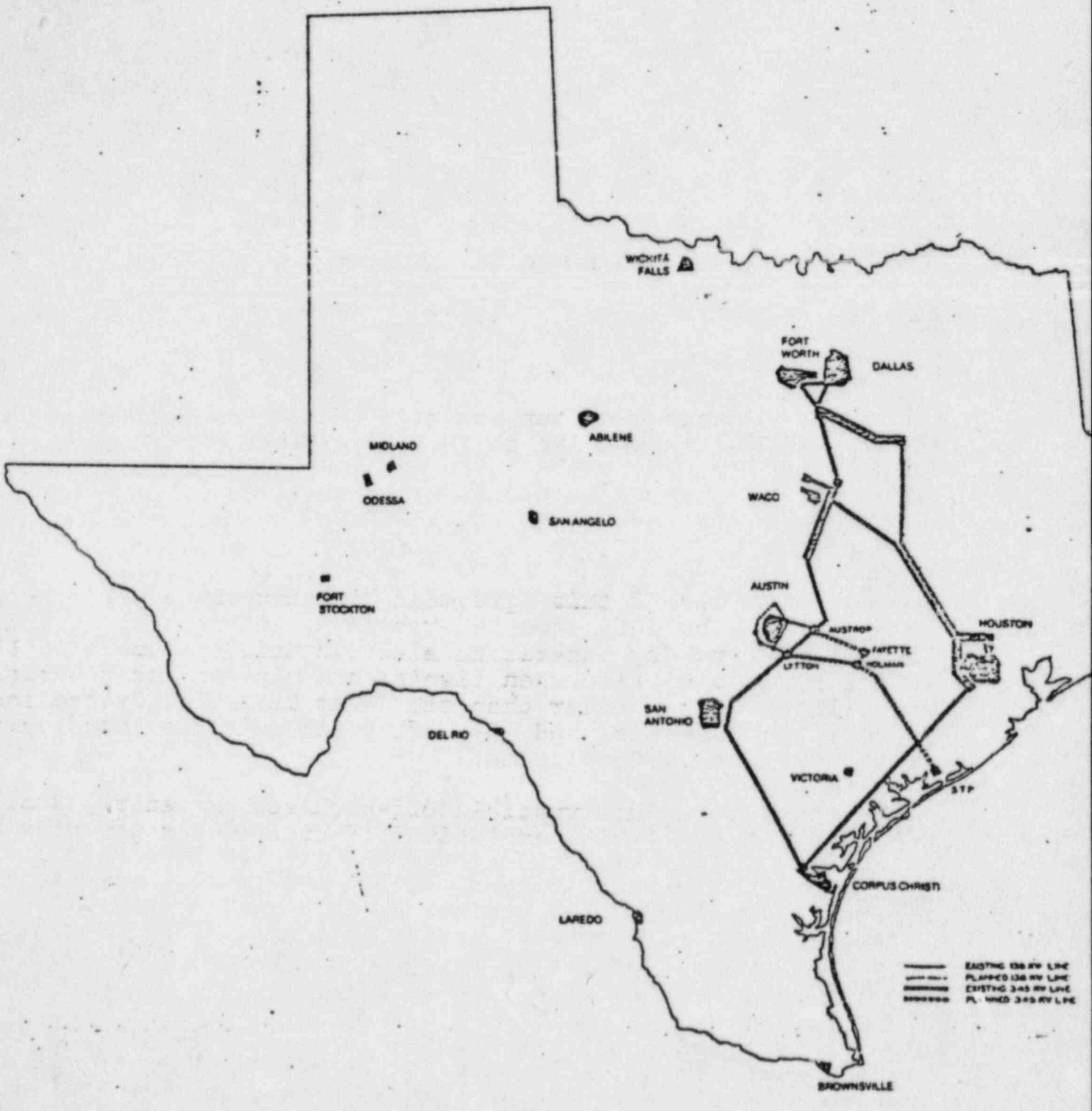
Employed by the City of Austin in 1949.

Between 1949 and 1971, held various engineering and supervisory responsibilities.

BS degree from the University of Texas in Electrical Engineering.

Registered Professional Engineer.

EXHIBIT HLP-1



TEXAS POWER & LIGHT COMPANY
1511 Bryan Street • P.O. Box 6331 • Dallas, Texas 75222

R. K. CAMPBELL
PRESIDENT

Appendix E

October 28, 1977

DOCKETED USNRC
JAN22 1979
Office of the Secretary
Docketing & Service
Section

Mr. R. L. Hancock
Austin Electric Department
P. O. Box 1088
Austin, TX 78767

Dear Mr. Hancock:

In accordance with our recent discussions, Texas Power & Light Company (TP&L) is willing to supply you interruptible, off-peak economy energy, as available in an amount not to exceed 150 megawatts per hour. Such deliveries shall be made in accordance with the provisions hereof and delivered through existing points of interconnection.

For purposes of this Agreement "interruptible off-peak economy energy" shall be understood to represent energy that is available for delivery to any generating electric utility member of TIS only during periods of time when lignite and minimum gas generating capabilities are greater than the Texas Utilities System load and reserve requirements, and only after all suitable intra-system sales have been accomplished.

Furthermore, interruptible off-peak economy energy shall be supplied, as available, exclusively during TP&L's off-peak hours as determined solely by TP&L. It is anticipated that peak hours will be from 10 AM through 10 PM of each Monday through Friday of the months of June through September of each year. Determination of off-peak hours is, however, at the sole discretion of TP&L based upon then current operating conditions, fuel availability, reserve requirements, and other relevant factors.

Interruptible, off-peak economy energy is subject to interruption or curtailment, with or without notice, when, in the sole opinion of TP&L, such action becomes necessary to maintain the integrity of the Texas Utilities System network.

Further, both parties realize that deliveries of energy hereunder may from time to time be suspended, curtailed, or interrupte if generating facilities and/or transmission lines used to deliver such energy are required pursuant to prior commitments to Texas Interconnected System and/or Electric Reliability Council of Texas

Interruptible, off-peak economy energy as available will be offered in sequence to TIS members heretofore or hereinafter accep ing agreements substantially similar to this, with priority genera ly to be determined by date of TP&L's receipt of fully negotiated agreements. The amount of energy sold to any purchaser shall be dependent upon the quantity available, upon purchaser's ability an willingness to receive said energy at that time, and upon quantiti of energy sold to purchasers with higher priority. Any deliveries and offers to deliver energy made in accordance with such sequence are understood to be of a duration not to exceed 24 hours, such 24 hour period to run from 7 AM to 7 AM. Deviations from sequence ma be made from time to time because of operating conditions; or to facilitate the administration of these agreements or the dispatchi of energy.

During those occasions when interruptible, off-peak economy energy is being delivered to purchaser(s), and any reduction in th quantities of delivered energy or any interruptions of such energy are deemed necessary by TP&L, acting in its sole discretion, then such reductions or interruptions will be generally apportioned to purchasers in reverse of the sequence as described above.

Billing for interruptible off-peak economy energy will be at net monthly rate of six (6) mills per Kwh plus an adjustment per K of energy taken for fuel costs calculated in accordance with TP&L Schedule FCF, or any subsequent fuel cost schedule as in effect fr time to time. The net monthly rate of six (6) mills per Kwh shall increased by one-half (1/2) of the amount by which the adjustment fuel costs calculated in accordance with Schedule FCF is less than (10) mills per Kwh. Bills will be rendered monthly and are due wh rendered. Bills become past due if not paid within fifteen (15) d Interruptible off-peak economy service may be discontinued for non ment of a past due bill.

TP&L may arrange for the aforesaid interruptible off-peak eco energy or portion thereof to be supplied from time to time by Dall Power & Light Company (DP&L) and/or Texas Electric Service Company (TESCo). Energy so supplied shall be deemed in compliance with th obligations of TP&L hereunder and you will be billed by and will p TP&L only. It will be the sole responsibility of TP&L to pay sums due such other suppliers upon receipt from you. In such event tha interruptible off-peak economy energy provided for herein should b supplied, all or in part by DP&L and/or TESCo, then the conditions and limitations concerning such deliveries as set forth herein sha also apply to such deliveries.

This Agreement shall not apply to interchange energy furnished to you under terms of any other existing or future agreements or to transactions covered by TIS Operating Guide. Appropriate adjustments will be made to eliminate such excluded transactions in computing sums due hereunder.

This Agreement shall become effective January 1, 1978, and shall continue in effect until December 31, 1979.

All electric energy delivered under this Agreement and any agreements supplemental hereto shall be generated, transported and consumed wholly within the State of Texas, and each party agrees that it will not connect its facilities or permit its facilities to be connected through other parties during the term of this Agreement to any other generating, transmission and/or distribution facilities having interstate connections. In the event either party violates or is about to violate this provision, such violating party shall be immediately in default and scheduled delivery of power and energy hereunder shall be discontinued until such default shall have been cured to the satisfaction of the other party.

This Agreement and the charges herein set forth are subject to approval of the Public Utility Commission of Texas and/or any other regulatory authority having jurisdiction, and the rates and charges herein set forth are subject to change or termination pursuant to the order of any such regulatory authority.

Furthermore, this Agreement shall not become effective until the Public Utility Commission of Texas, or the appropriate regulatory body, has ruled that all sums paid by the Purchaser for electric energy delivered hereunder including 3rd party transmission charges may be fully included in the calculation of the Fuel Adjustment or Fuel Cost Factor of the Purchaser.

Very truly yours,

R. K. Gouphouse

Accepted and agreed to this

8th day of December, 1977

By Richard L. Hancock

TEXAS POWER & LIGHT COMPANY
1511 Bryan Street • P.O. Box 6331 • Dallas, Texas 75222

R. K. CAMPBELL
PRESIDENT

March 20, 1978

Appendix F

Mr. R. L. Hancock
Austin Electric Department
P. O. Box 1088
Austin, TX 78767

Dear Mr. Hancock:

In accordance with our recent discussions Texas Power & Light Company (TP&L) is willing to supply and City of Austin from time to time is willing to purchase Ready Economy Energy, as available, in accordance with the provisions hereof and delivered to existing points of interconnection.

For purposes of this Agreement, Ready Economy Energy is understood to represent firm electric energy that TP&L may make available to you on a 24 hour per day basis for periods set forth below, as you request, subject to the terms and conditions as contained herein.

Ready Economy Energy is available for periods as described below:

A. Daily Ready Economy Energy Period (24 hours) will be arranged between System Operators of both parties at least 24 hours prior to initial delivery hour. At that time, agreement will be made, for each Daily Energy Period, as to the maximum hourly rate of delivery expressed in megawatts (MW), a minimum hourly rate of delivery (MW) equal to not less than 25% of maximum hourly rate, and energy (MWH) scheduled for delivery which will result in not less than a minimum 80% load factor for the specific 24 hour period.

B. Weekly Ready Economy Energy Period (7 days) shall be arranged by System Operators at least 72 hours prior to initial delivery hour. At that time, agreement will be made, for each Weekly Energy Period, as to a maximum hourly rate of delivery (MW), a minimum hourly rate (MW) equal to not less than 25% of the maximum rate, and energy (MWH) scheduled for delivery that will result in not less than a minimum of 65% load factor over the 7 day period.

C. Monthly Ready Economy Energy Period (30 days) shall be arranged between System Operators at least 7 days prior to initial delivery hour. At that time, agreement will be made as to the maximum hourly rate of delivery (MW), a minimum hourly rate (MW) equal to not less

than 25% of the maximum rate, and energy (MWH) scheduled for delivery and/or delivered that will result in not less than a minimum of 60% load factor for the 30 day period.

In addition to the above, it is understood by both parties to this Agreement that the following stipulations shall also apply to the sale and delivery of Ready Economy Energy as provided for herein:

I

For each Ready Economy Energy Period which you arrange to purchase, the maximum rate (MW) at which such energy is to be delivered shall be determined solely by your System requirements as requested by you for each period, and as accepted by TP&L. TP&L reserves the right to refuse any request, in whole or in part, to supply Ready Economy Energy if, in its sole judgment, such supply of energy is not available, if supply of such energy may adversely affect the quality of service to the customers of the TU System, or if supply of such energy may adversely affect the TU System emergency transfer capability

II

Billing for Ready Economy Energy shall be in accordance with the appropriate rate as contained in the Schedule of Pricing, attached hereto as Exhibit A and made a part hereof. For each month during the term hereof after April, 1978, TP&L will notify you on or about the 15th day of the preceding month of the applicable rate to be inserted in Exhibit A for sales and purchases during each such month. In no event will the billing for any Ready Economy Energy period be less than an amount computed by applying such appropriate rate to the Minimum quantity of energy for each Ready Economy Energy period as provided for herein and as calculated by applying the formula for Minimum Energy contained in Exhibit A. Bills so calculated shall be rendered monthly and are past due if not paid within 15 days. Ready Economy Energy service may be discontinued for non-payment of past-due bills.

III

During periods of delivery of Ready Economy Energy, TP&L will use its best efforts to supply such energy as set forth above, but does not guarantee service against irregularities, interruptions, or failure to supply service because of shortages, or allocation, or curtailment of fuel, governmental action, or other cause(s) reasonably beyond the control of TP&L. Furthermore, Ready Economy Energy is subject to interruption or curtailment by TP&L, with or without notice when, in its sole opinion, such action becomes necessary to prevent loss or possible loss of service to regular firm power customers of the Texas Utilities System.

AGREEMENT Appendix G

THIS AGREEMENT, made and entered into this 19 day of MAY, 1978, by and between the CITY OF AUSTIN, Travis County, Texas, hereinafter referred to as "Austin", and HOUSTON LIGHTING & POWER COMPANY, a Texas corporation, hereinafter referred to as "Houston".

WITNESSETH:

WHEREAS, Austin owns and operates an electric utility system including generation, transmission and distribution facilities in the State of Texas, and desires to sell electric power to Houston,

WHEREAS, Houston owns and operates an electric utility system including generation, transmission and distribution facilities in the State of Texas, and desires to purchase electric power from Austin,

NOW, THEREFORE, in consideration of the premises and mutual covenants and agreements hereinafter set forth, the parties hereto mutually contract and agree as follows:

ARTICLE I.

ELECTRIC POWER

1.1 Austin will have 500 megawatts (MW) generating capacity available for sale to Houston from January 1, 1980 through and including December 31, 1981 and agrees to sell such capacity to Houston on the following terms, and subject to the conditions set forth in this agreement:

(a) Capacity Charge - Houston shall pay Austin an Annual Capacity Charge of $8,000,000.00 (500,000 kw x $16) to be paid in installments of $666,667.00 per month (hereinafter "Monthly Capacity Charge") for each month during 1980 and 1981; provided, however, if in any month Austin fails to make available 500 MW of capacity then the Monthly Capacity Charge for that month shall be adjusted to reflect the amount of capacity actually made available to Houston. The $666,667 per month Capacity Charge is based on the availability, in a 30-day month, of 500 MW during each of 720 hours. During any hour that any part or all of the 500 MW is not available the Monthly Capacity Charge will be adjusted by subtracting $1.85 for each MW not available during such hour.

(b) Energy Charge - Houston is entitled to purchase energy up to the maximum hourly amount capable of being generated by the 500 MW of capacity. For all such energy purchased Houston will pay, in addition to the Monthly Capacity Charge, a Monthly Energy Charge for energy actually delivered to Houston. The Monthly Energy Charge will permit Austin to recover i) the incremental fuel costs incurred by Austin in generating the energy delivered to Houston each month; ii) the operation and maintenance expenses incurred by Austin in generating the energy delivered to Houston each month, which expenses will be billed on the basis of an estimated levelized monthly charge and will be adjusted at the end of each year to reflect the actual operation and maintenance expenses for the year; and iii) the costs related to transmission losses on the Austin system resulting from such deliveries to Houston each month, which cost will be determined by load flow studies under procedures to be established by the parties hereto. The fuel furnished by Austin, in the event that the City sells others economy energy, shall be billed at the first incremental fuel cost for fuel burned after Austin's internal requirements are met. Austin will have complete discretion as to the fuel mix that will be used to generate energy delivered to Houston and it is anticipated that the fuel mix will vary depending on such factors as the time of day the energy is transferred and the number of units available at the time of transfer.

1.2 Houston shall carry its spinning reserve assignments under the Texas Interconnected Systems (TIS) operating agreements on its own generators.

ARTICLE II.

FUEL SUPPLY

2.1 The delivery of energy to Houston is subject to fuel limitations that may be imposed upon Austin or its fuel suppliers by regulatory action, statutory changes, or the invocation of present provisions in Austin's coal, oil and gas contracts for boiler fuel.

2.2 To help ensure that fuel will be available, Houston shall provide estimates of the energy it expects to purchase by month for a

IV

Deliveries of energy hereunder may from time to time be suspended, curtailed, or interrupted if generation and/or transmission facilities used to produce and/or deliver such energy are required pursuant to prior commitments to Texas Interconnected System and/or Electric Reliability Council of Texas members, including, without limitation, the general commitments to provide energy during emergencies.

V

TP&L may arrange for the aforesaid Ready Economy Energy or portion thereof to be supplied from time to time by Dallas Power & Light Company (DP&L) and/or Texas Electric Service Company (TESCO). Energy so supplied shall be deemed compliance with the obligations of TP&L hereunder and you will be billed by and will pay TP&L only. It will be the sole responsibility of TP&L to pay sums due such other suppliers upon receipt from you. In the event that Ready Economy Energy provided for herein should be supplied all or in part by DP&L and/or TESCO, then the conditions and limitations concerning such deliveries as set forth herein shall also apply to such deliveries.

VI

This Agreement shall not apply to interchange energy furnished to you under terms of any existing or future agreements, to transactions covered by Texas Interconnected System Operating Guide, nor to energy supplied under any other agreements. Appropriate adjustments will be made to eliminate such excluded transactions in computing sums hereunder.

VII

This Agreement shall become effective upon TP&L's receipt of fully negotiated Agreement from you and shall continue in effect thereafter until December 31, 1978.

VIII

All electric energy delivered under this Agreement and any agreements supplemental hereto shall be generated, transported and consumed wholly within the State of Texas, and each party agrees that it will not connect its facilities, or permit its facilities to be connected through other parties, during the term of this Agreement to any other generation, transmission and/or distribution facilities having interstate connections. In the event either party violates or is about to violate this provision, such violating party shall be immediately in default and scheduled delivery of power and energy hereunder shall be discontinued until such default shall have been cured to the satisfaction of the other party.

IX

Purchaser will make all necessary arrangements for use of transmission facilities of third parties to deliver energy supplied hereunder and will pay any charges for such use. For purposes of this paragraph, DP&L and TESCO shall not be deemed third parties.

X

This Agreement and the charges herein set forth are subject to approval of the Public Utility Commission of Texas and any other regulatory authority having jurisdiction, and the rates and charges herein set forth including any third party transmission charges are subject to change or termination pursuant to the order of any such regulatory authority.

Yours very truly,

R. K. Campbell

Accepted and agreed to this

12 day of July, 1978

R. L. Hancock

it is agreed that if either party fails to perform any of its obligations hereunder, including the prompt payment of monthly bills or delivery of electric power, the injured party may suspend payment of bills or delivery of energy hereunder, and said party will not be liable in any manner for loss or damage arising from such non-payment or suspension, provided, the injured party shall specifically notify the other party of such failure in writing at least ten (10) days prior to such suspension or non-payment. No such suspension or non-payment will interfere with the enforcement by either party of any other legal right or remedy. No delay by either party in enforcing any of its rights hereunder, and no waiver of any right to enforce any breach hereof, will be deemed a waiver of such rights; nor will any waiver by either party of any delay by the other party be deemed a waiver of any other or subsequent default, all rights and options herein provided to the benefit of either party being continuing to the end that the failure to exercise any such right or option shall not be construed as waiving the right or option upon any subsequent delay or breach whether of like or different character.

ARTICLE VII.

INTRASTATE OPERATION

7.1 All electric energy delivered under this agreement shall be generated, transported and consumed wholly within the State of Texas. Each party agrees that it will not connect its facilities or permit its facilities to be connected through other parties during the term of this agreement to any other generation, transmission and/or distribution facilities having interstate connections, except in the event of an emergency under Section 202 of the Federal Power Act or unless done under order or approval of a Federal or State court or agency having jurisdiction to order or approve such interconnection. In the event either party violates or is about to violate this provision, the other party may discontinue synchronous interconnection with the defaulting party and thereby suspend the provisions of Article I of this agreement until such default shall have been cured to the satisfaction of the non-defaulting party.

ARTICLE VIII.

REGULATORY APPROVAL

8.1 The terms of this contract and the charges herein set forth are subject to the approval of any regulatory authority having jurisdiction over the parties hereto, and the rates and charges herein set forth are subject to change or termination pursuant to the order of such regulatory authority.

ARTICLE IX.

TERM

This agreement shall become effective upon execution and shall continue in effect until December 31,1981.

ARTICLE X.

SUCCESSORS AND ASSIGNS

This contract will inure to and be binding upon the successors and assigns of the respective parties.

IN WITNESS WHEREOF, the parties hereto have caused this contract to be executed by their duly authorized officers the day and year first above written.

CITY OF AUSTIN

By _____

ATTEST:

Grace Monroe

~~Secretary~~ City Clerk

HOUSTON LIGHTING & POWER COMPANY

By _____

President

ATTEST:

J. R. Johnston

Asst Secretary

twelve month period. This estimate shall be made available to Austin by November 15, 1979 for the 12 month period beginning January 1, 1980, and by November 15, 1980 for the 12 month period beginning January 1, 1981.

2.3 Daily scheduled requests for capacity and energy will be made at least twenty-four (24) hours in advance and will be scheduled for a minimum period of ten (10) hours.

2.4 Houston may arrange for delivery of natural gas fuel to Austin to be used by Austin in generating the energy delivered by Austin to Houston under this contract. In the event Houston does make such natural gas fuel available to Austin, by contract release or otherwise, Houston shall be responsible for arranging the delivery of such fuel to Austin, and Houston will bear all cost for the delivery of said fuel. At such times as natural gas fuel is made available to Austin, Houston will arrange for the delivery of said fuel to power plants designated by Austin.

ARTICLE III.

TRANSMISSION LINE CAPABILITY STUDIES AND WHEELING POWER

3.1 Houston shall make all the studies required to verify that there is adequate transmission line capability within TIS to transport the energy it expects to purchase from Austin during the term of this agreement. In the course of making such studies Houston will determine whether, and to what extent, transmission services are required from third party electric utilities in order for Austin to deliver energy to Houston under this agreement. For purposes of all deliveries of energy under this agreement, Austin will have the right to rely on Houston transmission line capability studies and any written or oral representation made by Houston concerning the studies and the capabilities of third party transmission lines.

3.2 This agreement shall become null and void if a) Houston determines from the studies contemplated in Paragraph 3.1 that there is insufficient transmission line capability in the TIS facilities to accommodate the energy transfers expected to occur under the terms of this

agreement and/or b) Houston is unable to negotiate satisfactory arrangements for the transmission services by third parties contemplated by Paragraph 3.1.

ARTICLE IV.

CONTINUITY OF SERVICE

4.1 Each party will exercise reasonable diligence and care to avoid interruptions of delivery of power and energy hereunder, but will not be liable for any damage or loss that may be occasioned by any failure or interruption caused by fires, floods, lightning, storms, or other acts of God, or by strikes, riots, civil disturbances, action of public authority, litigation, breakdown, or other causes beyond its reasonable control. Austin may interrupt service to make necessary repairs or to make changes in equipment or to install new equipment, but only for such time as may be unavoidable. Reasonable advance notice of such interruption will be given if the nature of the situation permits.

ARTICLE V.

BILLING AND PAYMENT

5.1 Beginning February 10, 1980, and continuing on the tenth day of each calendar month thereafter, Austin shall render a statement for the energy delivered to Houston during the preceding month; provided however, Austin may defer said billing for a reasonable period of time if required in order to obtain the necessary information to compute the Monthly Energy Charge. Austin shall consider the amount due and payable within fifteen (15) days from the date of the statement.

5.2 Each party shall have the right at reasonable hours to examine the books, records and charts of the other party to the extent necessary to verify the accuracy of any statement, payment calculation or determination made pursuant to the provisions of any article hereof. If any such examination shall reveal, or if either party shall discover, any error in its own or the other party's statements, payment calculation or determinations, then proper adjustment and correction thereof shall be made as promptly as practicable thereafter.

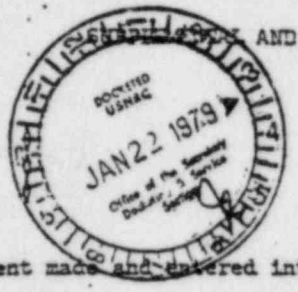
ARTICLE VI.

REMEDIES FOR BREACH

6.1 In addition to, and not excluding any remedy herein provided,

AND STANDBY ELECTRIC SERVICE

Appendix H



STATE OF TEXAS

COUNTY OF TRAVIS

This agreement made and entered into the 9th day of October 1969 between the University of Texas at Austin (herein called the "University") and the City of Austin (herein called the "City").

WITNESSETH:

THAT, WHEREAS, the University desires to provide firm standby capacity for its electric generating plant(s) and to purchase supplemental electric power and energy; and

WHEREAS the City has or can make available standby capacity and can furnish supplemental electric power and energy,

NOW THEREFORE commencing upon the date the University first takes electric service hereunder or September 1, 1970 whichever date is earlier and continuing for a period of ten (10) years from such commencement the City agrees to furnish and the University agrees to take and pay for standby and supplemental electric service for a Contract Capacity (as defined in Article III hereof) of 20,000 kilo-volt-amperes in accordance with the terms, conditions, and agreements hereinafter set forth. The University may increase the Contract Capacity upon written notice to the City not less than twelve (12) months prior to the effective date of the increase in Contract Capacity if the cost to the City of making the changes in or additions to the City's equipment necessary to meet such increase can be recovered within the time for which such increase is requested either under the City's standard schedules of amortization or net salvage value or both, and if the increase can be made without material impairment of the City's capability to meet the requirements of its other users of electrical service.

ARTICLE I

Subject to the terms and conditions herein stated the City will, until termination of this agreement (unless prevented by one or more of the causes set forth in Article X hereof) furnish standby and supplemental electric service to the University. The point hereinafter called "Point of Delivery" will be the low

voltage terminals of City owned transformer located in the vicinity of 26th and San Jacinto Streets. Electric power and energy furnished pursuant to this agreement will be of the character commonly known as three (3) phase, sixty (60) cycle, four (4) wire, twelve thousand (12,000) volts alternating current. The voltage and frequency will be subject to the variations which occur on the City's electric system.

Under and subject to the terms and conditions of this agreement the University may take electric energy at any rate of supply which, in its sole discretion, it may desire, up to but not greather than the "Contract Capacity" as defined in Article III hereof.

The University shall make payment to the City for the standby and supplemental electric service and the energy incident to the use of such service in accordance with the terms, conditions, and considaration of Article III hereof. The quantity of energy supplied by the City to the University and the rate of supply thereof shall be measured at the Point of Delivery by meters furnished and installed by the City for such purposes as provided in Article VIII hereof.

ARTICLE II

The University shall, at its own expense, provide easements for the City's facilities which are necessary to perform the obligations of this agreement. Specifically included but not limited thereto are pole lines, duct lines, and a suitable substation site which will be enclosed (at City's expense) by a security fence. Access to that portion of the substation site inside the security fence will be controlled by the City. All easements shall provide for free access at any time, by Electric Department personnel of the City to the City's facilities installed on such easements. Upon termination of this agreement the City will within 12 months of said termination remove (or at City's option abandon) its property from and vacate said easements.

ARTICLE III

For each billing period the University shall, on or before the tenth day following the date of billing, make payment to the City for the electric service furnished in accordance with this agreement. For each billing period the aforementioned payment shall be the sum of the "Standby Capacity Charge" plus the

"Energy Charge" or the "Minimum Bill", whichever is the greater and each as determined and defined in this article.

CONTRACT CAPACITY:

As used herein "Contract Capacity" means the maximum rate of supply, expressed in kilovolt-amperes, at which the City is obligated by this agreement to furnish electric service to the University.

BILLING PERIOD:

As used herein the term "Billing Period" shall mean the elapsed time between two consecutive sets of meter readings made for billing purposes. Each Billing Period shall be approximately one month (30 days) and there shall be twelve (12) Billing Periods each calendar year. Meter readings for billing purposes will not be made on a Saturday, Sunday, or a City Holiday.

ENERGY BILLING DEMAND:

In each Billing Period the greatest average 30 minute demand shall be determined by means of meters furnished and installed by the City for such purpose. For each Billing Period the Energy Billing Demand shall be the greater of the greatest average 30 minute demand established in the current or immediately preceding eleven (11) Billing Periods. Energy Billing Demand shall be determined and expressed in kilovolt-amperes.

ENERGY CHARGE:

The net charge for energy delivered to the University in each Billing Period shall be as follows:

$0.05	per KWH for the first	50 KWH
0.033	per KWH for the next	550 KWH
0.026	per KWH for the next	2400 KWH*
0.012	per KWH for the next	5000 KWH*
0.006	per KWH for the next	1,250,000 KWH*
.00275	per KWH for all additional	

*Add 100 KWH for each KVA of Energy Billing Demand from 21 to 100 KVA inclusive, add 70 KWH for each KVA of Billing Demand from 101-500 inclusive and 50 KWH for each KVA of Energy Billing Demand over 500 KVA. The minimum energy charge in any Billing Period shall be not less than $1.50 per KVA of Energy Billing Demand.

Fuel Cost Adjustment: The above energy charges shall be increased or decreased by .004¢/KWH for each whole one quarter of a cent by which the delivered cost of fuel during the next preceding month exceeds 18 cents or is less than 16 cents per million BTU.

STANDBY CAPACITY:

Standby Capacity is hereby defined as the numerical (not vector) difference between the Contract Capacity and the Energy Billing Demand each expressed in kilovolt-amperes (KVA).

STANDBY CAPACITY CHARGE:

Each Billing Period there shall be a charge of $1.00 for each KVA of Standby Capacity.

MINIMUM BILL:

For the electric service furnished each Billing Period the payment by the University to the City for such electric service shall be an amount not less than the amount of a Standby Capacity charge based on the Contract Capacity.

ARTICLE IV

Standby Capacity as previously defined may be used by the University without notice to the City in event of an emergency shortage of power in the University's electric system due to breakdown or malfunction of their electric equipment while in operation or to other causes beyond reasonable control of the University. If by reason of such an emergency shortage of power the University should use Standby Capacity and thereby establish a demand greater than any Energy Billing Demand for that Billing Period, then the City upon receipt of evidence satisfactory to the City that there was an emergency use of power as defined above then the excess demand created by such emergency for a period of twenty-four (24) hours shall not be included in the Energy Billing Demand. If the emergency persists for more than twenty-four (24) consecutive hours then for each 24 hours or fraction thereof

of the emergency after the first 24 hours thereof there shall be added to the Energy Charge (for each Billing Period during the emergency) six and six-tenths cents ($0.066) for each 24 hour period after the first 24 hours for each KVA of the maximum KVA demand recorded during the emergency which is in excess of the Energy Billing Demand which was applicable before the emergency.

ARTICLE V

Service voltage at the Point of Delivery will normally be 12,000 volts. However, it is agreed that such voltage will be subject to the usual variations normal for an electric utility system and to the unusual variations resulting from faults, malfunction of equipment or other causes beyond reasonable control by the City.

ARTICLE VI

Inasmuch as the University will be operating its electric system and equipment in parallel with the City's electric system it is expressly understood and agreed that the University will operate and maintain their electric system and equipment in such a manner as to maintain at all times a power factor of not less than ninety percent (90%) at the Point of Delivery.

To further implement the power factor requirement the City agrees to utilize transformers with tap changers having a 10% boost or buck range and operable under load and to allow the University to control said tap changers provided the 90% power factor is maintained. During the periods which the University because of an emergency shortage of power uses Standby Capacity to take energy, the 90% power factor requirement shall not apply.

ARTICLE VII

Inasmuch as it is necessary for the protection to life, limb and property the City will install certain protective devices. It is therefore expressly agreed that the City may interrupt service under the agreement if the University should attempt to take energy at a rate greater than the Contract Capacity, or by operation of the City's protective devices, and that no liability shall accrue to the City by reason of such interruption.

ARTICLE VIII

The quantity of electric energy and the rate of supply thereof shall be determined by meters furnished and installed by the City for such purposes. These meters will be installed at a location mutually agreeable to the City and the University at a location adjacent to the Point of Delivery.

The rate of supply of electric energy to the University shall be determined by suitable recording watt-meter(s) and var-meter(s). The reading(s) of said meters shall be conclusive as to the rate of supply of electric energy unless upon being tested such meters shall be found to register inaccurately and the error determined to be greater than four (4) percent.

The amount of electric energy supplied to the University shall be determined by means of suitable integrating kilowatt-hour meters furnished and installed by the City; such meters shall be read each Billing Period and the readings thereof shall be deemed conclusive evidence of the quantity of electric energy supplied to the University, unless upon being tested said meters shall be found to register inaccurately and the error determined to be greater than two (2) percent.

Either party may, upon two (2) days notice to the other, inspect and test such meters in the presence of a representative of the other party, and whenever such test shall show any meter to be registering in error beyond the limits specified as to each in this article, such meter shall be adjusted to register within the limits of error so specified, and whenever said meters are so adjusted, the readings thereof shall be corrected, and payments made accordingly. No such correction shall be made, however, as to any bill rendered by the City, unless requested by either party before the expiration of the Billing Period next succeeding the Billing Period in which such readings for billing purposes were made.

ARTICLE IX

The University shall install and maintain its electrical equipment in a thoroughly safe and efficient manner at all times. The duly authorized representative of the City for the purpose of inspecting wiring and apparatus, removing or replacing City's property, reading meters, and other purposes incident to the performance of this agreement shall have free access to such University premises as are necessary for these purposes.

The City does not assume the duty of inspecting the University's wiring, machinery or apparatus, and shall not be responsible therefor. The University will properly protect the City's property on the University's premises, and permit no one to inspect or tamper with the City's wiring and apparatus except the City's representatives. At and from the Point of Delivery, the University assumes full responsibility for all electricity furnished under this contract on the University's premises, and for wires, apparatus and appurtenances used in connection therewith; and the City shall have no responsibility for injury or damage to persons or property resulting from such electricity occurring on University premises beyond the Point of Delivery.

ARTICLE X

The City will make reasonable provisions to insure satisfactory service, but does not guarantee a continuous supply of electrical energy, and shall not be liable for damages occasioned by interruptions or failure to commence delivery caused by an act of God or the public enemy, inevitable accidents, fire, explosions, strikes, riots, war, delay in receiving shipments of required materials, order of any Court or Judge granted in any adverse legal proceeding or action, or any order of any commission or tribunal having jurisdiction in the premises; or, without limitation by the preceding enumeration, any other act or thing reasonably beyond its control; or interruptions necessary for repairs or changes in the City's generating equipment and distribution system. No payment, however, shall be required from the University for service which the City herein agrees but fails to furnish.

ARTICLE XI

The University will not sell or otherwise dispose of electric power and energy delivered hereunder except to its own agencies located on the main campus or on University owned property contiguous to the main campus.

ARTICLE XII

This agreement supersedes all prior agreements between the City and the University for service mentioned herein, and all representations, promises, or other inducements, written or verbal, made with respect to the matters herein contained. It is subject to all laws and regulations and is not binding upon

the City unless and until signed by the City Manager. No modification of any provision of this agreement shall be binding unless reduced to writing and signed by the parties hereto, and modification of any one or more provisions of the agreement by mutual consent of the parties hereto shall not affect any of the remaining provisions hereof not so modified.

ARTICLE XIII

This agreement may be terminated at the option of the City if this agreement or any interest in it is assigned without the written consent of the City by the University or by operation of law.

ARTICLE XIV

This agreement shall continue until terminated as provided herein and shall, subject to the provisions of Article XIII hereof, shall bind and benefit the respective successors and assigns of the City and the University.

ARTICLE XV

All monetary obligations of the University hereunder are expressly subject to the availability of appropriations by the Legislature of the State of Texas, and the University agrees that it will not make use of services provided for herein unless appropriations for such use have been made. It is agreed that the City may refuse to render future service if provisions for payment is not made, and may terminate service for non-payment of prior bills.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be signed in sextuplicate as of the day and year first above written.

THE UNIVERSITY OF TEXAS
AT AUSTIN

BY _____
James H. Colvin
Vice-President for
Business Affairs

ATTEST:

_____
City Clerk

CITY OF AUSTIN, TEXAS

BY _____
City Manager