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PUBLIC UTILITY RATE PROPOSALS OF PRESIDENT
CARTER'S ENERGY PROGRAM
(PART E OF S. 1469)

GOVERNMENT
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CUMENTS

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HEARING

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BEFORE THE

SUBCOMMITTEE ON
ENERGY CONSERVATION AND REGULATION
OF THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

NINETY-FIFTH CONGRESS

FIRST SESSION

ON

S. 122

A BILL TO REFORM ELECTRIC UTILITY RATE REGULATION, TO
STRENGTHEN STATE ELECTRIC UTILITY REGULATORY AGENCIES,
AND FOR OTHER PURPOSES

S. 1300

A BILL TO REFORM ELECTRIC UTILITY RATE REGULATION, TO
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AND FOR OTHER PURPOSES

S. 1363

A BILL TO PROMOTE THE RECOVERY OF WASTE HEAT ENERGY RE-
SOURCEES AND THE EXPEDITED DEVELOPMENT AND COMMERCIAL
APPLICATION OF DUAL-PURPOSE POWERPLANTS, AND FOR OTHER
PURPOSES

S. 1364

A BILL TO PROVIDE FOR THE SUBSISTENCE ELECTRICAL NEEDS
OF ELDERLY RESIDENTIAL CONSUMERS, PROMOTE EQUITY IN
ELECTRICAL COSTING THROUGH REFORM OF CURRENT ELECTRIC
RATE STRUCTURES, AND FOR OTHER PURPOSES

S. 1469 (Part E)

A BILL TO ESTABLISH A COMPREHENSIVE NATIONAL ENERGY
POLICY

SEPTEMBER 20, 1977

Publication No. 95-120

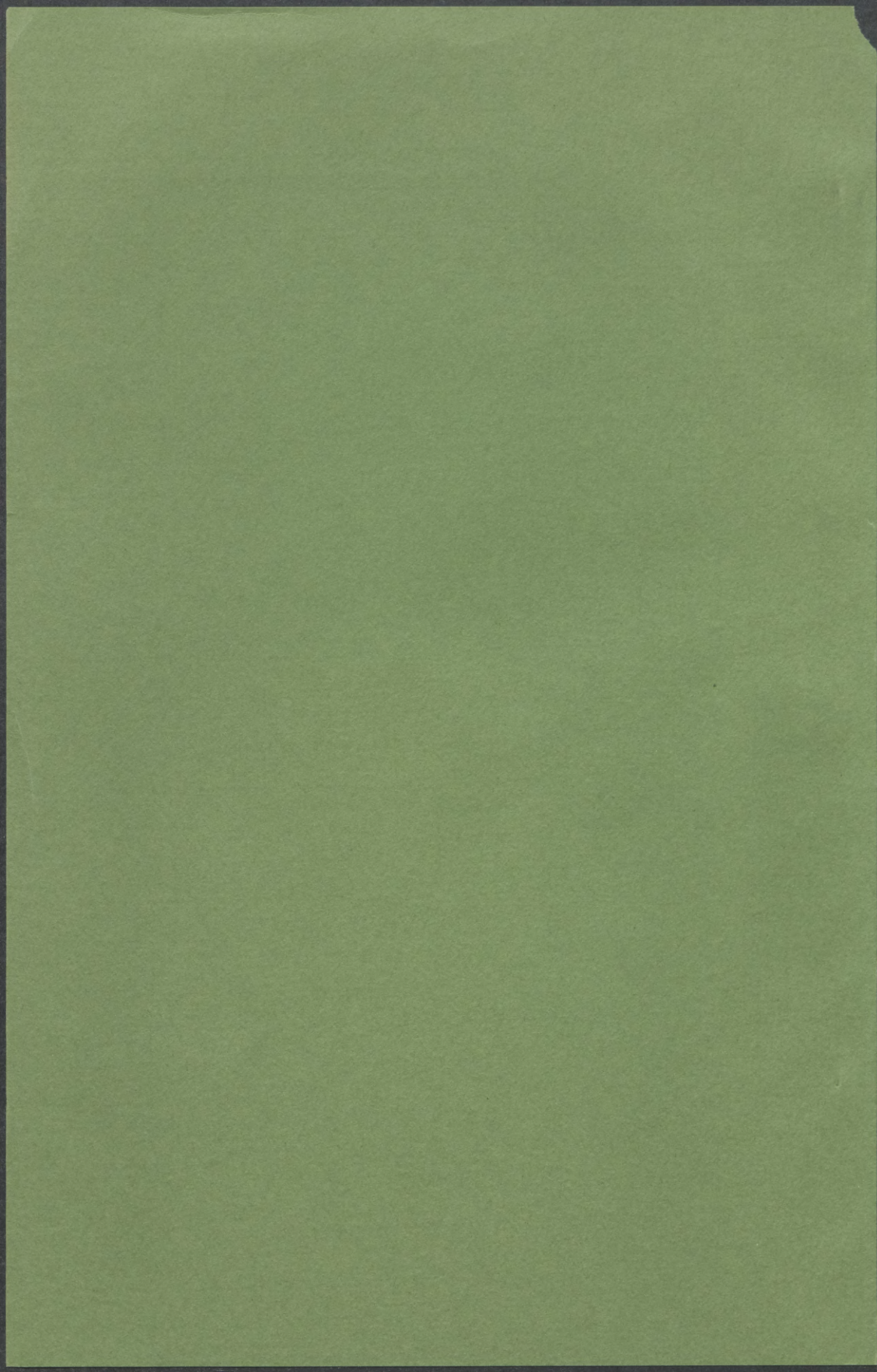
PART 3

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(PART E OF S. 1469)

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Printed for the use of the Committee on Energy and Natural Resources

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WASHINGTON : 1978

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GOVERNMENT

THE GOVERNMENT

The Government of the United States is a federal republic, composed of fifty states, the District of Columbia, and the territories of Alaska and Hawaii. The Constitution of the United States, adopted in 1787, is the supreme law of the land. It establishes the framework of the government, and defines the powers and responsibilities of the various branches. The Executive branch, headed by the President, is responsible for the execution of the laws. The Legislative branch, consisting of the House of Representatives and the Senate, is responsible for the enactment of laws. The Judicial branch, headed by the Supreme Court, is responsible for the interpretation of the laws. The Government is also responsible for the defense of the country, the maintenance of law and order, and the promotion of the general welfare of the people.

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PUBLIC UTILITY RATE PROPOSALS OF PRESIDENT CARTER'S ENERGY PROGRAM

(Part E of S. 1469)

TUESDAY, SEPTEMBER 20, 1977

**U.S. SENATE,
SUBCOMMITTEE ON ENERGY CONSERVATION AND REGULATION,
OF THE COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, D.C.**

The subcommittee met, pursuant to notice at 8 a.m., in room 3110, Dirksen Office Building, Hon. J. Bennett Johnston, presiding.

Present: Senators Johnston, Metcalf, Metzenbaum, and Domenici.

Also present: Benjamin S. Cooper, professional staff member, James T. Bruce, counsel, and Danny Boggs, deputy minority counsel.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SEN- ATOR FROM THE STATE OF LOUISIANA

Senator JOHNSTON. The subcommittee will come to order.

I apologize again for convening our subcommittee at such an obscene hour of the morning, but it was 8 a.m. or no meeting at all. But this particular subject is so important that we thought we ought to have a hearing. Hence, we are here at 8 a.m.

Our time, as usual, is very limited. We must have a quick thumb-nail sketch of everyone's testimony. We will read the written text when we are not constrained by a 2-hour time limitation.

Today the subcommittee will hear testimony on the subject of interconnection of electric utilities. This means, I am told, the physical connection of power lines between two utilities so that power can be shifted from one to another, for instance, in the event of an emergency power shortage. Yesterday the committee reported out a bill on public utility rate reform, but we chose to omit any language relating to interconnection. This hearing was called in order to give the members an opportunity to study this matter in more detail. Subsequent to this hearing an amendment will be prepared on interconnection which may be offered on the floor to the utility rate reform bill.

The focus of this hearing will be the draft of the interconnection provision that the staff has prepared for the committee.¹ In addition we invite the witnesses to offer their views on the interconnection provision that the President has proposed.

The controversy over interconnection involves national issues as well as a dispute over the situation in Texas and among the surrounding

¹ The text of the staff draft is reprinted in Appendix I.

States. One of our panels will address that problem. However, we would urge our witnesses to consider and relate to us how that controversy would be affected by the language proposed by the staff as well as by the President's bill.

You are all probably aware of the legislation that the committee reported out yesterday. This may set the tone for our amendment on interconnection. Nevertheless, we will proceed this early morning with an open mind and a desire to understand all the ramifications of the legislation before us. We are open to suggestions for further changes in this language.

We would like to hear from our first witness. Then we have nine witnesses in 2 hours. So we will have to try to squeeze everybody into 15 minutes.

Our first witness is the Honorable David J. Bardin, Deputy Administrator of FEA.

Is Mr. Bardin here?

Very well then, next we will have a panel, Don D. Jordan, president, Houston Lighting & Power Co., Mr. S. B. Phillips, Jr., chairman of the board, Central & South West Services, Inc., Mr. Jay Galt, of Looney, Nichols, Johnson & Hayes, Oklahoma City, Okla., Mr. T. L. Austin, Jr., chairman of the board, Texas Utilities.

Mr. Jordan, why don't you lead off.

STATEMENT OF DON D. JORDAN, PRESIDENT AND CHIEF EXECUTIVE OFFICER, HOUSTON LIGHTING & POWER CO., HOUSTON, TEX.

Mr. JORDAN. Thank you very much, Mr. Chairman. I am Don D. Jordan, president and chief executive officer of Houston Lighting & Power Co.

We appreciate the opportunity to testify again.

First, I think we should say that we in Houston Lighting & Power Co. support the concept of interconnection insofar as it will enhance reliability and reduce costs for our customers.

For that reason, we participated originally in the formation of ERCOT, which is one of nine original regional interconnection groups in the United States. It was formed approximately 40 years ago, and it has worked very well since that time.

It has a total of about 30,000 megawatts in this system which the FEA has indicated in its previous reports appears to be something of optimal size.

Although the system is totally intrastate within the State of Texas, it is in fact larger than some of the other nine regional systems in this country.

It is composed of not only investor-owned but State-owned, municipal-owned, and co-ops operating within the State of Texas.

So the question boils down, not to one of whether or not Texas should be interconnected, but should the interconnected system in Texas be connected with another regional system.

Houston Lighting & Power Co. and ERCOT have sometimes been likened in hearings before the Federal Power Commission and at times before the Congress to a crusty rancher before a waterhole with a rifle fighting off those who might seek a drink. This is suggested pri-

marily by those who might want you to believe that we want to avoid interconnection and therefore avoid the jurisdiction of the Federal Power Commission.

On the 8th of September 1977, I testified before your committee and testified that if benefits could be shown to the customers of my company and they could be realized from interconnection, that I was willing to volunteer at that time to submit to such interconnection. And I renew that pledge to you this morning.

Senator JOHNSTON. Interconnection is defined as "physical connection between two companies" with no requirements that you sell or exchange power.

Are we together on our definition?

Mr. JORDAN. Interconnection as we view it would by necessity go considerably further than that. If there is not going to be an exchange of power between the companies, there would be no reason to interconnect. The interconnection will be expensive, requiring not only the initial investment of the transmission facilities to connect those two companies, but there would also be the necessity to go back within the system to shore up those transmission facilities that are now in place.

This happens simply because of the mathematics of electricity and the way that the energy flows between systems relating to the size of the components that make up the total regional or interregional connections.

Senator JOHNSTON. I am missing something. It just means a physical connection with no requirement to sell or exchange. Are we together on that?

Mr. JORDAN. Interconnection would be a connection done for the purpose of exchange. If there is no reason to ever exchange power across the interconnected system, then there would be a question in my mind as to why the connection should be made.

Senator JOHNSTON. If you are ordered to interconnect and then you are told, well if you consider it to be advantageous in times of a pending blackout or emergency or whatever, then you can exchange power, what is wrong with that?

Mr. JORDAN. There is nothing wrong with it if the facility is large enough to do it. And unless your facilities are large enough to do it. I think you clearly run the risk of downgrading the reliability of the system rather than to improve it.

It seems to us, and our studies have shown, that the question before the committee today and facing our country and others in Texas is exactly that. If in fact there were evidence that we could spend the money necessary to make the interconnection and our customers could benefit from that, either from reliability or both from reliability and the cost of services that might be provided, then we would certainly be willing to make that interconnection.

Everything we have seen, and I think I can articulate for you here in 1 minute as to why there is debate on that question, everything we have seen clearly indicates that that would not be the case with the State of Texas.

May I proceed, Mr. Chairman?

Senator JOHNSTON. Yes.

Mr. JORDAN. I think that it is obvious from the makeup of this panel today that you are concerned on two bases. First, the broad base on

interconnection and wheeling which I think will be addressed by others and by representatives of EEI.

Obviously because this panel is concerned with the situation that exists in Texas, you have three chief executive officers before you today, Mr. Chairman, of the three biggest organizations involved in this dispute.

I would suggest to you that it is the best chance you might ever have to ask whatever questions you might want to ask and get correct answers from the three people sitting here today.

With that in mind, I would like to outline very, very briefly for you, without taking a lot of time, exactly how we got to the point where we are today.

Please remember that the test that should be applied is one of equity to the customer as relates to cost and reliability, and any other self-serving position should be rejected as one that lacks merit.

Senator JOHNSTON. Let me interrupt again if I may. Is it true that you have excess power?

Mr. JORDAN. No, sir; it is not true that we have excess power. As a matter of fact, our construction program through the next 12 years contemplates a 12 percent reserve capacity which, operating on a coal-fired system, would be as low as anyone would expect to go. It is a little lower than we would like to be, and our calculations—

Senator JOHNSTON. I just wanted to see if that was a fact.

Mr. JORDAN. We do not have excess power and will not have through the 1980's.

The history briefly of the controversy is as follows. Central & South West you have visiting with you today and who is our opponent on this issue, has operated outside the Holding Company Act of 1935 for some years. Two of their companies operate and are interconnected with ERCOT, and two operate and are interconnected with the Southwest Power Pool.

They were perfectly happy with this arrangement until a lawsuit was filed against them by some co-ops in Oklahoma—

Senator JOHNSTON. Wait a minute. All of these acronyms, we have about 10,000 of them. What does ERCOT stand for?

Mr. JORDAN. Electric Reliability Council of Texas which involves the 30,000 megawatt system we talked about.

Senator JOHNSTON. That is the one Houston is in?

Mr. JORDAN. That is the one we are in. And also in that is Central Power & Light Co. and West Texas Utility Co. which are two of the operating companies of Central & South West.

The other regional section that we would be asked to interconnect with is Southwest Power Pool which has the two other operating companies of Central & South West organization, those being the Public Service Company of Oklahoma and Southwestern Electric Power Co. located in Louisiana.

Senator JOHNSTON. Excuse all these interruptions. Go ahead. You were telling me Central & South West is operating outside the jurisdiction of the Public Utility Holding Company Act.

Mr. JORDAN. That is correct.

Senator JOHNSTON. And they have been until they had a lawsuit filed against them by whom?

Mr. JORDAN. Our company was visited by Mr. Phillips relative to the question, and he proposed that a study be made to determine whether or not it was economical to make interconnection between these systems.

The proposal was one that would not be made to determine how the State of Texas or State of Oklahoma could be served best from the standpoint of the customers, but had a definite prerequisite attached to it that the holding company of Central & South West had to be maintained.

We have rejected the idea—

Senator JOHNSTON. What is the violation of the Holding Company Act in your view?

Mr. JORDAN. In my view the Holding Company Act requires that all four of the companies within the Central & South West organization be totally integrated. Those four companies are not as of today.

Senator JOHNSTON. Integrated, you mean in the sense of a power pool?

Mr. JORDAN. Where they would exchange power between companies.

Senator JOHNSTON. And they are not?

Mr. JORDAN. They are not in that position today.

Senator JOHNSTON. They are interconnected and not pooled?

Mr. JORDAN. They are interconnected—well, they are really not interconnected. They have the ability through some switching to move power in one direction or another, but they could never be servicing part of ERCOT and part of Central & South West—I mean South-west Power Pool at the same time.

It is a situation that was done legally because there was a permit granted for this in the 1940's, and they have operated under that permit from the Securities and Exchange Commission, since that time.

Recently the question has been raised as to whether or not the conditions today are the same as they were during those war years and whether or not that exemption should still apply.

We rejected the idea of participating in the study because of the fact that it had a prerequisite that the company had to be maintained in its current status or its holding company status. And the study was in fact made by Power Technology Inc.

We believe it is clear that they had a prerequisite, to preserve the holding company, and they provided a study based on assumptions that were provided by Central & South West, and they were not asked to make a study on the best way to serve the customers of Texas or the customers of Oklahoma.

So the assumption I think was merely calculated in my own opinion to produce a preconceived answer to the study.

After the study was completed and as results were made public, statements were made to the Securities and Exchange Commission and me personally that if we did not voluntarily submit to the situation whereby there would be interconnection, then they would take whatever action would seem to be necessary to force us into that position.

All calculations that were made on this problem continued—they never intended from the beginning to pay additional costs to Houston Lighting & Power Co. for shoring up any of the systems in our service area.

That question was specifically asked on more than one occasion and has been in recent days reconfirmed before the Securities and Exchange Commission.

Senator JOHNSTON. You had better explain to us what you mean by the shoring up of your electric system in order to be interconnected.

Mr. JORDAN. Let me see if I can do that very simply. If in fact two systems determine to make an interconnection, the first thing that is done or that would logically be done would be to connect those systems to a transmission facility that would simply intertie across whatever gap might exist between two systems.

That appears to be a very simple and reasonably inexpensive proposition if you go no further than that. But according to the laws of electricity, if in fact you have an interchange for no other purpose than emergency situations, and if you have a loss of power in some area, you are going to have to support the flow of energy in proportion to the size of the interconnected system you are a part of.

Senator JOHNSTON. By "size" do you mean the size of the wire?

Mr. JORDAN. No, the size of the total magnitude of the generating capacity in the system you are part of. In ERCOT we have about 30,000 megawatts. If Houston Lighting & Power Co. represented 10 percent of that 30,000 megawatts capacity, and if we lost major generating facilities down in Houston, we would then pick up about 10 percent of that capacity from our own system and we would import 90 percent into our system because we represent 10 percent of the total.

If we were connected into a situation whereby the total system was much larger and we represented only 1 percent of the total in that interconnected system, and we had that same failure, we would pick up only 1 percent internally, and we would have to import 99 percent into our system in order to satisfy that requirement.

The flows of electricity just work that way through the laws of physics.

In order to protect your system then, you not only have to make that initial interconnection between the two and bridge the gap between the two systems, you have to go back and build up the internal transmission system within the company's service area. If this is not done you could well be in the position where you would isolate, through switches opening and that sort of thing, certain areas of your service area when that emergency occurs.

It is a two-pronged problem, the initial expenditure that would cause you to bridge the gap, and the second expenditure, which is a much greater expenditure, of having to rebuild and improve the transmission facilities—

Senator JOHNSTON. Central & South West would not help you with your costs of shoring up. They discussed the interconnection itself but not the shoring up?

Mr. JORDAN. That is essentially correct.

Senator JOHNSTON. If you don't have any excess power, why do they want to interconnect, other than the Holding Company Act?

Mr. JORDAN. In my judgment, Mr. Chairman, the Holding Company Act is the primary reason that Central & South West has started this whole issue.

Senator JOHNSTON. And it is clear they could avoid the effect of the Public Utility Holding Company Act by an interconnection.

Mr. JORDAN. An interconnection such as the type they are proposing would avoid the Holding Company Act.

Senator JOHNSTON. How or why would they do that?

Mr. JORDAN. They would become an integrated system where all four of their companies would be interconnected.

Senator JOHNSTON. In other words, through interconnection with you they would be connected all over the country?

Mr. JORDAN. That is correct. I think it is important for you to know that nobody in Texas has any objection to Central & South West integrating their own system if they want to spend the money to do it.

It is their election, however, not to do that. They don't want to interconnect separately, but want to interconnect through our system and utilize our facilities to help make that interconnection. This would legally interconnect their four companies according to the terms of the Holding Company Act. In order to do that, a great deal of money has to be spent by the systems in ERCOT. You will hear such numbers proposed as \$15 million being the total amount of dollars involved in making this interconnection.

This is simply not true. We contend that this estimate comprises only about three transmission interconnections, and more than that is required. Whether it is \$15 million or \$25 million, the initial connection is a fraction of the total cost of interconnection. We believe those numbers could well run to \$300 million.

Senator JOHNSTON. Would it enhance their reliability to be interconnected with you?

Mr. JORDAN. It all depends on how the interconnections are made. ERCOT, for example, has one of the outstanding reliability records in this country as of today. We have a system that has proven over and over again to respond to emergencies.

We believe ERCOT itself would be hurt through such an interconnection. That is not unique with Houston Lighting & Power Co.'s position. It is the position of other investor-owned utility companies, plus those public companies of the city of San Antonio, city of Austin, LCRA, et cetera.

In addition to that, it is the considered judgment of the Public Utility Commission of the State of Texas.

Senator JOHNSTON. Unless you have another special point to make, why don't we hear from the other side so we can sharpen these issues.

Senator Metcalf, do you have any questions?

Senator Metzenbaum?

Senator METZENBAUM. Not at this time.

[The prepared statement of Mr. Jordan follows:]

STATEMENT OF DON D. JORDAN, PRESIDENT AND CHIEF EXECUTIVE OFFICER,
HOUSTON LIGHTING & POWER CO., HOUSTON, TEX.

My name is Don Jordan and I am President and Chief Executive Officer of Houston Lighting & Power Company.

Mr. Chairman, I appreciate the fact that you scheduled this additional day of hearings on interconnection and have provided me the opportunity to testify this morning.

Let me say at the outset that HL&P vigorously supports the use of interconnections to enhance the reliability of and to cut the costs of providing electric service in this country. We are already receiving benefits from interconnection because we are part of a large integrated electric utility system, sometimes referred to as ERCOT, which comprises investor-owned, state-owned, municipally-

owned and REA cooperatively-owned electric utilities in the State of Texas. ERCOT also includes at the present time two of the four operating subsidiaries of Central and Southwest, a holding company whose legality is this very day under question in proceedings before the Securities and Exchange Commission. ERCOT has been open to all electric utilities willing to operate together for the common good of our customers. At hearings this past spring before the Texas Public Utilities Commission on the appropriate mode of operation for ERCOT, practically all of the public electric utilities supported the present ERCOT mode of operation entirely within the State of Texas.

I mentioned Central and South West's problems at the Securities and Exchange Commission. What happened was some smaller electric utilities in Oklahoma filed a complaint at the SEC, pointing out that Central and South West really wasn't operating all of its four operating companies in a single system. To meet this challenge, Central and South West would have Houston Lighting and Power and the other members of ERCOT integrate their systems with the Southwest Power Pool so that the transmission systems of our companies could be used to transmit power for Central and South West, thereby integrating their companies and removing the risk of divestiture. When we refused to abandon what we believed to be an optimal mode of operation for the systems in our service areas, Central and South West, in the dead of night, sneaked a small radial line across the Red River and when the courthouse and the FPC opened the next morning, filed suits and claims that Houston Lighting and Power and others were selling power in interstate commerce and building on that argument, sought an order from the Federal Power Commission to compel an interconnection of the ERCOT systems with whatever configuration Central and South West might need to save their corporate hide. The Federal Power Commission has held against Central and South West, and Central and South West has appealed to the courts. Antitrust claims against HL&P by Central and South West are pending in the United States District Court. The Texas Public Utilities Commission has also considered this matter and ordered Central and South West to return to the operation that it so successfully used in our service territory prior to the May 4, 1976 Red River raid. This is the mode of operation that we find today in Texas.

If there are any questions at all about Houston Lighting and Power or the operations of the electric utilities in Texas, we would like to answer these publicly and on the record. It is easy to say that the nice folks in Texas wish to protect their own insular domain without regard to the interests of the rest of the United States; that is the charge that Central and South West generally makes when seeking to compel us to make our transmission system available for their personal use. But let the record be clear: a company subject to the jurisdiction of the Federal Power Commission is subject to three types of orders: orders to file certain reports, orders concerning wholesale sales of electricity, and interconnection orders. We already file all the reports at the Federal Power Commission that we would file if we were subject to FPC jurisdiction. As to wholesale sales, we only have one wholesale customer in our entire system. It is not particularly a large sale, and can hardly form the basis for an objection to rate regulation. Indeed, it does not. The third area is the one where our judgment has been vindicated. We have been concerned that interconnection jurisdiction would lead someone like Central and South West to seek to destroy a perfectly good system or to convert it to its own use.

ERCOT is larger than several other U.S. regional networks. We are an optimum size system. Even the Federal Energy Administration studies indicate this. We not only work well together, but we cooperate fully with the Federal Power Commission on national studies of bulk power supply and transmission. We also stand ready at all times to make power from our system available in emergencies to other systems. We have an FPC authorized interconnection with Gulf States Utilities in the Southwest Power Pool in order to transmit or receive energy in an emergency.

What then, would this bill add? No one has been excluded from ERCOT who wished to participate in it, so long as they were willing to work with ERCOT as a single, integrated system capable of doing its own planning, reliability and transmission. In fact, the addition of the interconnection jurisdiction to the FPC's arsenal of power seems almost unnecessary in this context, since the FPC has, to my knowledge, never used its interconnection authority to effect interconnections among entire systems. The power has basically been used to prevent certain utilities from keeping smaller distribution companies from access to power, an issue not presented in the Texas situation.

What is presented in the Texas situation is whether the corporate interests of Central and South West are to be advanced by giving the Federal Energy Regulatory Commission jurisdiction to order a permanent interconnection and to order transmission of Central and South West's power over the Texas system.

Should this Committee decide to grant the Commission this authority, we urge that language be enacted clearly protecting the rights of our customers. Specifically, we recommend that Section 2 of the Staff Draft provide that the costs of interconnection shall be borne by those utilities receiving its benefits, and that such a determination be made before not after an order to interconnect is issued.¹ Secondly, interconnections should be ordered only after the benefits to be gained have been clearly demonstrated in a full evidentiary hearing.² The bill should prohibit the federal government from ordering interconnection just for the sake of interconnecting, or worse yet, to achieve an ulterior objective unrelated to the economic and technical benefits of interconnection, such as the preservation of a particular company's corporate structure.

Mr. Chairman, I am prepared to answer any questions you or the Members may have.

SUPPLEMENTAL STATEMENT OF DON D. JORDAN, PRESIDENT AND CHIEF EXECUTIVE OFFICER, HOUSTON LIGHTING & POWER CO., HOUSTON, TEX.

On May 23, 1977, Mr. S. B. Phillips, Jr., represented to the House Subcommittee on Energy and Power that independent studies conducted by two expert consultants, Power Technologies, Inc. (PTI) and Stone and Webster Engineering Corp. (S&W), conclude that some \$2 billion may be saved by interconnecting ERCOT and SWPP. Today, Mr. Phillips makes a similar statement to the Senate Committee on Energy & Natural Resources. Both statements are at best misleading.

Neither PTI nor S&W, despite Mr. Phillips statements to the contrary, were commissioned by C&SW to objectively evaluate the merits of interconnecting ERCOT with the SWPP. Rather, PTI was given the assignment of evaluating C&SW operating alternatives, each premised on the continuation of the C&SW holding company, in terms of the potential economic impact on C&SW. The original PTI study explicitly disavows an intent to study the issue of interconnecting ERCOT and SWPP. Moreover, costs to ERCOT companies, which convince us that the C&SW plans are not in the public interest, were not considered by the PTI study. In this regard, I invite the Committee's attention to the attached statements of Dr. Allen J. Wood, who is primarily responsible for the PTI study, which were made on September 16, 1977, during proceedings before the Securities and Exchange Commission.

Similarly, S&W was not asked to determine whether or not such interconnections are in the public interest. Statements to the contrary are belied by the sworn statements of Mr. George Arey, who directed the S&W study, in a deposition taken on July 18, 1977. These statements reveal that S&W has not recom-

¹ In this connection, we suggest that the following language (in *italics* below) be added to Section 2 of the Committee Staff Draft:

"(2) The terms and conditions of agreements among the utilities affected by an order issued under this subsection shall be determined, *prior to the issuance of an order*, by negotiation among said utilities subject to approval by the Commission; *Provided*, that in the event that the parties do not reach agreement, the Commission may prescribe the terms and conditions of the arrangement including the apportionment of cost between them and the compensation or reimbursement reasonably due to any of them; *Provided further* that all costs of any increased transmission capacity shall be borne by the utilities using the facilities of another utility."

² In this connection, we suggest that the following language be added to Section 1 of the Committee Staff Draft:

"(g) (1) Whenever the Commission, on its own motion, or upon application of any State commission or of any electric utility as defined in the Public Utility Regulatory Policies Act of 1977 and after notice to each State commission and electric utility affected and after opportunity for an *evidentiary* hearing, finds such action necessary or appropriate in the public interest and to carry out the purposes of Sec. 1 of the Public Utility Regulatory Policies Act of 1977, it may by order direct an electric utility (other than a Federal agency) to establish physical connection of its transmission facilities with the facilities of any other electric utility; *Provided*, that no order may be issued unless the Commission determines that—

"(A) such order will benefit consumers of an electric utility by reducing costs of supplying electric energy to such consumers or will otherwise provide public benefits in assuring that supplies of electric energy are generally made available with greater economy and with regard to the proper utilization and conservation of natural resources; and

"(B) no utility subject to such order or consumers of such utility will suffer economic hardship thereby."

mended that the operating companies of C&SW be integrated. Neither has S&W recommended that the SWPP and ERCOT be interconnected. S&W was merely asked to design a transmission system interconnecting the C&SW subsidiaries utilizing a generation forecast supplied by C&SW. These statements are also attached for the Committee's convenience.

BEFORE THE SECURITIES AND EXCHANGE COMMISSION

(Administrative proceeding¹ file No. 3-4951)

IN THE MATTER OF: CENTRAL & SOUTH WEST CORP., CENTRAL POWER & LIGHT CO.,
PUBLIC SERVICE CO. OF OKLAHOMA, SOUTHWESTERN ELECTRIC POWER CO., WEST
TEXAS UTILITIES CO., AND TRANSOK PIPELINE CO.

The above entitled matter came on for further hearing, pursuant to adjournment, at 10:00 a.m.

Before: EDWARD B. WAGNER, *Presiding Administrative Law Judge*.

Appearances: (As heretofore noted).

Additional appearances: On behalf of the City of Austin, Texas: Don R. Butler, and George K. Elbrecht.

On behalf of Houston Lighting & Power Company: Stephen Hunsicker.

On behalf of the City of San Antonio: John D. Fisch.

* * * * *

A. Yes.

Q. In this case, Dr. Wood, you can't assume that the various interconnected systems will voluntarily coordinate their operation, can you?

A. I can neither assume that they will or will not.

Q. I see. You have some reason that HL&P is going to join Central and South West in urging an interconnection with the South West Water Pool?

A. I have no opinion on that.

Q. And while we are on the subject, I don't believe you provided any evidence in this case that the South West Power Pool should be interconnected with ERCOT, have you?

A. I don't believe I can state with a flat yes or no the answer to that question. There is some information in this reliability study for instance that leads me to believe that portions of the South West Power Pool would benefit from a reliability point of view if they were interconnected with ERCOT.

Q. Very interesting point. Very interesting point that would otherwise—otherwise, what you are saying is you have a preliminary indication that it would benefit the South West Power Pool companies, right?

A. Yes.

Q. You are not here as I understand it to change what you put in the original PTI report. This is Exhibit 3 to Exhibit 1.

If you will look at page VII, the original PTI report referred to as Exhibit 3 to Central and South West Exhibit 1, at the bottom of page VII says, "this particular study was triggered by specific questions raised before the Securities and Exchange Commission involving C&SW's present operating pattern. The possibility of changing this pattern raises the broad question of the possibility of altering the basic operating pattern of the entire region to one where all the utilities of ERCOT and SWPP are interconnected."

This study does not attempt to examine and answer directly this broader question, but instead evaluates three alternate possibilities in terms of the potential economic impact of each on the customers of Central and South West."

Did I read that correctly?

A. Yes, you read it correctly.

Q. Now, my question to you is:

Have you put any evidence in this record to date which purports to examine and answer directly the question of whether the "basic operating pattern of the entire region should be changed to one where the utilities in ERCOT and SWPP are interconnected"?

A. I believe that my previous answer is appropriate to the question you just asked. The only evidence that I am personally presenting as part of my testimony with regard to your question is the reliability study in which we examined the relative reliability of some members of the South West Power Pool.

¹ Hearing Room 1, 1100 L St. NW., Washington, D.C., Thursday, Sept. 15, 1977.

Q. No economic studies on this subject?

A. No economic study, no sir.

Q. And none are in progress?

A. No. None are in progress.

Q. None have been requested by Central and South West?

A. No.

Q. Or anybody else for that matter?

A. As far as I know, no.

Q. From you?

A. That is correct.

Q. All right.

I suppose in order to make a comparison you had to form an opinion and make some calculations concerning the LOLP for ERCOT operating independently and separately from the South West Power Pool, is that correct?

A. If you will excuse me, I lost the thread of your question.

Q. Did you look at the reliability in the ERCOT system?

A. Yes.

Q. And you looked at the reliability in the ERCOT system through your own calculations both with and without an interconnection with the South West Power Pool?

A. Yes.

Q. I want to talk to you about ERCOT without a connection to the South West Power Pool:

* * * * *

You refer on the bottom of page 94 to Exhibit 37 attached to your testimony describing the internal transmission required in each expansion by each of the operating subsidiaries of Central and South West.

I take it that you have done nothing to look at what internal transmission, if any, would be required by, say, Houston Lighting and Power under the various modes?

A. I do not believe that that is a fair statement. We have been concerned collectively, that is myself, Stone and Webster, Central and South West Operating and Service Company Engineers, with the potential for causing difficulties in the ERCOT systems, and we have examined, insofar as was possible, numerous cases, load flow cases run to simulate future operating conditions, to see if we could identify any major difficulties that might be experienced by Houston, Texas Utilities, or any of the cities involved.

We have not, to my recollection, found any difficulties that I would classify as either insurmountable or causing a great deal of expense. Now, the question of what I mean by great deal of expense is one we could debate all day long. We have not included in this economic calculation which I am presenting any of those costs. These costs are entirely for the Central and South West companies.

Q. Towards the end of your statement you got to the point that I was making, that you don't present any studies as to—however insignificant to you, or perhaps to Central and South West, you don't present any study as to what internal transmission would be required by HL&P to be installed under these various plans?

A. There is no such information in this testimony.

Q. All right. And the same is true for, say, the City of San Antonio?

A. Yes.

Q. City of Austin?

A. Yes.

Q. LCRA?

A. Yes.

Q. Texas Utilities?

A. Yes sir.

Q. Just Central and South West?

A. Just Central and South West costs are included here, including the costs of—all of the costs of the interconnection.

Q. Would you say in your opinion, Dr. Wood, that the cost of the transmission systems by Central and South West under these various modes were significant or insignificant?

A. They are significant.

Q. Doesn't it strike you as somewhat odd, Dr. Wood, that only Central and South West companies would incur any significant transmission costs in the event of a mode four

* * * * *
that order of magnitude.

Q. So the difference then, some \$200 million, is the benefit, among others, that Central and South West gets if they can use the ERCOT system?

A. I would not be willing to accept the word "benefit". The \$200 million is the difference in the investment costs in the two different designs. Whether it is a benefit or a detriment is a matter of judgment.

Q. Well, would you agree that it would cost Central and South West about \$200 million less in transmission investment if they can use the ERCOT system?

A. I would agree that these calculations show an investment of \$200 million less for Mode 4.

Mr. Gooch. Thank you very much, Your Honor.

Adm. Law Judge WAGNER. Thank you. Are you ready to start, Mr. Samples?

Mr. SAMPLES. Yes.

By Mr. SAMPLES:

Q. Dr. Wood, going back to the scope of your engagement for Central and South West, I would like to ask you if Central and South West Corporation ask you, and/or PTI, to undertake a study and to recommend to CSW the best way for any or all of their operating companies to operate their systems for the future?

A. Our assignment from Central and South West, and from the Central and South West Corporation, is I believe clearly stated in my prepared testimony. We were hired to make a study of the alternatives of operating in two pieces, or as a single system, and that assignment was culminated in the report that has been referred to in these hearings as the PTI report. Subsequent to that, we have been assigned the responsibility of conducting a reliability study. I have been requested to prepare testimony for this hearing and I have been requested to serve as a consultant in various and sundry other matters.

We have not specifically been asked to do what you asked in your question.

Q. So, the short answer, rather than the long answer to the question, is no; is that correct?

A. That is correct.

Q. Has PTI to your knowledge been asked to recommend to CSW what they, that is PTI, believe to be the best operating mode for all of the electric utilities in the Southwest?

A. No.

Q. What PTI, to your knowledge, asked to evaluate the proper mode of operation for all of the utility companies in the southwest?

A. Our assignment was limited to—

Q. Answer yes or no, if you could, please.

A. The answer is—I have forgotten the question.

Adm. Law Judge WAGNER. Whether you were asked to determine whether it was the proper mode, I think was the question.

The WITNESS. May I have the question read?

Adm. Law Judge WAGNER. Please, Mr. Reporter. (Question read)

The WITNESS. No, we were not.

By Mr. SAMPLES:

Q. Directing your attention specifically to the testimony you filed for this hearing, in order to get at least in my mind a clear understanding of what you have done and what you have not done, and what you are sponsoring and what you are not sponsoring, is it true or not that the management of Central and South West Corporation developed the generation plan for both Mode 1(b) and Mode 4?

A. The answer is they developed those plans, yes.

Q. And, did PTI develop the transmission plans that fit with either Mode 1(b) or Mode 4?

A. No.

Q. Did PTI make the assumptions necessary to make the cost calculations for either Mode 1(b) or Mode 4?

A. PTI contributed to some of the cost assumptions that were used to make the economical calculations.

Q. Did you make the cost assumptions?

A. Some of them, yes, sir.

Q. Which ones?

* * * * *

In the United States District Court for the Northern District of Texas
Dallas Division

(C.A. No. 3-76-0633-F)

WEST TEXAS UTILITIES CO. & CENTRAL POWER & LIGHT CO.

TEXAS ELECTRIC SERVICE CO. & HOUSTON LIGHTING & POWER CO.

DEPOSITION OF: GEORGE AREY (VOLUME 1)

* * * * *

Central and Southwest, however. You have already agreed to copy and furnish me—

Mr. MILLER. Excuse me. Would you prefer to examine the papers in Boston yourself or would you—

Mr. SAMPLES. I would really prefer that you get them to me.

Mr. MILLER. Just copies? Okay.

Q. Mr. Arey, has Stone & Webster Engineering Corporation proposed that the Central and Southwest operating companies be integrated?

Mr. MILLER. Object to the form of the question.

A. Would you repeat the question, please?

Q. Has your employer proposed or recommended that the operating companies of Central and Southwest Corporation be integrated?

A. No.

Q. Has your employer recommended to Central and Southwest Corporation that its four operating subsidiaries commence synchronous operations?

A. No.

Q. Have you or your employer been asked by any representative of Central and Southwest Corporation to make any recommendations with respect to whether or not the four operating companies should be integrated?

A. No.

Q. Would your answer be the same if I asked you if you had been asked to recommend whether or not they engage in synchronous operations? You have not been asked to recommend to CSW as to whether their four operating companies should engage in synchronous operations?

A. We have not been asked that.

Q. Have you or your company been asked, Mr. Arey, to evaluate the operating patterns of the members of the Southwest Power Pool and the ERCOT to determine whether or not they should be interconnected and thereafter engage in synchronous operations?

A. Have we now or have we ever been asked that question?

Q. Yes.

A. Is that your question?

Q. By Central and Southwest Corporation?

A. No.

Q. Mr. Arey, has your company been asked by CSW to determine the best way for West Texas Utilities and Central Power & Light Company to operate their respective electric systems?

A. No.

Q. Has your company been requested to undertake a study or an evaluation to determine whether Central Power & Light Company and West Texas Utilities Company could be operated more efficiently by interconnections only with members of the Electrical Reliability Council of Texas?

Mr. MILLER. Object to the form of the question.

Mr. SAMPLES. I think that the answer was "no."

Mr. MILLER. I think so.

Mr. SAMPLES. Do you want to withdraw your answer?

Mr. MILLER. Let's hear the question.

A. Repeat the question, please.

(The last question was read by the reporter.)

A. No.

Q. Has your firm been requested to do a comparative analysis of whether Central Power & Light Company and West Texas Utilities Company could be operated more reliably or efficiently with members of ERCOT versus members of the Southwest Power Pool?

Mr. MILLER. Object to the form of the question.

A. No.

Q. You understand, Mr. Arey, at the time you undertook this study for CSW that CSW had already come to the conclusion that they were going to integrate their four operating companies by engaging in synchronous operations.

A. I do understand that.

Q. To the best of your knowledge, can you tell us, sir, specifically what your assignment was for CSW as defined in the latter part of 1975 or the early part of 1976?

A. Stone & Webster's assignment was to design a least cost transmission system to interconnect the four operating companies of the Central and Southwest.

Q. In a synchronous operating form?

A. That's correct.

Senator JOHNSTON. Now, who should we get on the other side, Mr. Phillips, I suppose. Mr. S. B. Phillips, Jr., chairman of the board of Central & South West Service, Inc. in Dallas.

STATEMENT OF S. B. PHILLIPS, JR., CHAIRMAN AND CHIEF EXECUTIVE OFFICER, CENTRAL & SOUTH WEST CORP., DALLAS, TEX., ACCOMPANIED BY RICHARD D. CUDAHY, COUNSEL; DR. ALLEN J. WOOD, PRINCIPAL ENGINEER, POWER TECHNOLOGIES, INC., SCHENECTADY, N.Y.; AND F. GEORGE AREY, ENGINEER, STONE & WEBSTER ENGINEERING CORP., BOSTON, MASS.

Mr. PHILLIPS. Gentlemen, I am S. B. Phillips, Jr., of Dallas, Tex., chairman and chief executive officer of Central & South West Corp. I am accompanied here today by counsel to the corporation, Richard D. Cudahy, former chairman of the Wisconsin Public Service Commission, Dr. Allen J. Wood, principal engineer with the firm of Power Technologies, Inc., Schenectady, N.Y., and Mr. F. George Arey, engineer with the Stone & Webster Engineering Corp., Boston, Mass.

We believe that the enactment of section 521 of Senate bill 1469 is in the public interest and that the prevailing criticisms of section 521 are misguided or reveal a misapprehension of what it attempts to do.

We understand, however, that this subcommittee has studied the problems carefully and may want to make modifications perceived to be in the interest of the various parties concerned, as well as in the national interest.

With respect particularly to interconnection, we would have no objection to modifications in the legislation as such, provided basic objectives were effectively retained.

No utility involved or its customers should be required to suffer undue hardship or uncompensated economic loss. Any utility proposing interconnection should be prepared to pay the reasonable costs incurred by reason of benefits it expects to receive.

Senator JOHNSTON. Do you disagree that there are costs of shoring up as well as interconnection?

Mr. PHILLIPS. I not only disagree but I have technical experts here who have testified that our plan for interconnection of ERCOT and Southwest Power Pool would cause no disturbances to the other systems for which they would have to spend that money to correct.

They have bandied about a figure of \$1 billion and they have admitted that it is a back of the envelope calculation. Our figure from Stone & Webster Engineering Corp. for a very adequate interconnection between these two worlds, that is to bring Texas into the union, would be in the neighborhood of \$15 to \$18 million.

Senator JOHNSTON. Those are the costs of shoring up or interconnection.

Mr. PHILLIPS. That is the cost of interconnection. In addition to that, Central & South West proposes to build contract pass, transmission lines for any transfer of power that we anticipate making.

Senator JOHNSTON. Is there a concept of shoring up or do you just disagree—

Mr. PHILLIPS. I just disagree with that.

Senator JOHNSTON. It never happens, or why are they asking for too much?

Mr. PHILLIPS. They are asking way too much.

Senator JOHNSTON. It does happen then.

Mr. PHILLIPS. Our engineering studies—

Senator JOHNSTON. Let me get this straight. There is a phenomenon that, due to the laws of electricity, requires a shoring up. Is that correct or incorrect?

Mr. PHILLIPS. I say it's incorrect in this instance.

Senator JOHNSTON. Never.

Mr. PHILLIPS. In the electric business there are infinite numbers of possibilities and interconnections and ways and means of doing things.

Senator JOHNSTON. It's not just the figure we are disagreeing with, it's the whole concept.

Mr. PHILLIPS. Our plan, as produced by Stone & Webster Engineering Corp., and by Power Technologies, Inc., does not contemplate, and it has been—the study has been underway since 1974.

We literally beg these neighbors of ours in Texas to join us and study the future mode of operation for the Southwest, for utilities in the Southwest.

We made no—

Senator JOHNSTON. Let me ask you this, Mr. Phillips. Do they have extra power?

Mr. PHILLIPS. Why—I understand that there are—that ERCOT reserves for 1981 are estimated to be 22 percent in excess of need.

We understand right now the Texas utility system has some 43 percent excess reserves. They have offered two of our companies recently some 300 to 400 megawatts of firm power for 3 years. Our companies are not able to use this.

We discovered that Western farmers electric cooperative across the line in Oklahoma would dearly love some of that power, but the Southwest Power Administration, with its low-water situation right now, would dearly love some of that power, indeed have been paying higher prices than Texas utility system offers it to us.

We are interconnected in Mexico.

Senator JOHNSTON. We are going to pass now. Let me get to the first question. Do they have excess power now?

Mr. PHILLIPS. We believe they do.

Senator JOHNSTON. What is that excess power right now?

Mr. PHILLIPS. It's in the form of generating capability.

Senator JOHNSTON. What percent?

Mr. PHILLIPS. We think 32 percent.

Senator JOHNSTON. And you say 12 percent?

Mr. JORDAN. I said for our company, sir, it is 12 percent. We now have a reserve of about 17 percent. All that is natural gas and after conversion of that we hope to maintain a 12 percent reserve to 1989, and that's after spending \$8.5 billion.

Senator JOHNSTON. You say 32 percent, you say 12 percent.

Mr. JORDAN. I am speaking about my company, and he's talking about the Electric Reliability Council of Texas.

Senator JOHNSTON. Is he correct in his figures?

Mr. JORDAN. I'm not sure for 1981.

Senator JOHNSTON. What about right now?

Mr. JORDAN. Right now I would say it probably approaches 20 percent, but that's a guess.

Senator JOHNSTON. Isn't that just a mathematical calculation as to what the excess is?

Mr. JORDAN. It certainly is and there is no reason why anyone would hide it, it is a published number.

Senator JOHNSTON. So why are we talking about 12 and 20 and 32 percent? Can't we figure out what that is?

Mr. JORDAN. No question about it, as a matter of fact I can find out what it is right now.

Mr. AUSTIN. I think, Mr. Chairman, Mr. Phillips is right with those figures. My name is T. L. Austin.

Senator JOHNSTON. And you are with—

Mr. AUSTIN. Texas Utilities, the Electric Reliability Council of Texas. I apologize for the definitions, we are worse than the Federal Government.

Senator JOHNSTON. You say that Mr. Phillips is correct?

Mr. AUSTIN. He is approximately correct. You are comparing apples and oranges, though.

Senator JOHNSTON. Why?

Mr. AUSTIN. Mr. Jordan is talking about what Houston Lighting & Power Co. system will have in—when—

Mr. JORDAN. Throughout the eighties

Mr. AUSTIN. In the eighties, and Mr. Phillips is talking what the Electric Reliability Council of Texas has now.

Mr. PHILLIPS. Has currently. Let me continue about this offer of power.

Senator JOHNSTON. Are we agreed that when we are talking about apples and oranges, that ERCOT now has in the neighborhood of 32 percent excess power?

Mr. JORDAN. Evidently that's pretty close.

Mr. AUSTIN. Part of that is in the Central & South West system, though. I believe Central Power & Light Co. has excess capacity too, that's part of the ERCOT 32 percent.

Senator JOHNSTON. Please continue.

Mr. PHILLIPS. With regard to this power that has been offered us, we cannot—it cannot be sent across the border into Texas, but it can be exported into Mexico. We are operating in synchronism, all of the ERCOT system, with the company at Mexico, and we cannot send the power back and forth across the interstate barrier.

Senator JOHNSTON. Let me ask you about the nature of extra power. What does that mean? Does it mean that you have fuel oil and natural gas that could be burned down to your boiler or does it mean that you—

Mr. PHILLIPS. Correct, it means you have the generating capability, you have the fuel to make the machines turn, that you could be selling this power to people on the outside of the United States for money that would help your consumers and your stockholders.

Senator JOHNSTON. Let's answer one question first and then we will go onto something else.

When you have excess power, does that mean your machine is turning or do you slow your machine down, or you don't burn as much coal or gas or what?

Mr. PHILLIPS. You carry what is called a spinning reserve, you are turning your machine but there is other excess reserve.

Senator JOHNSTON. I didn't understand that answer. You have to be very elemental with us. We are just getting into this question and we have to get in and out in 1 day, and you have been dealing with this all your life.

Mr. AUSTIN. Mr. Chairman, I feel for you gentlemen because you are in a very complex situation. I don't know how you would do it, in 1 day you've got to judge what bankers do and the next day what utility magnates do, and all of this.

There are two problems to running a utility. There are lots of problems, but putting up with Congress is one of them and I apologize for that.

Senator JOHNSTON. That's all right. [Laughter.]

Mr. AUSTIN. You have capacity and that is that you have generating plants of 500 kilowatts or you have 750,000 kilowatts. You have a certain capacity. When we talk about that ERCOT has 32 percent reserve capacity, or that our system, the Texas utility system, has—

Mr. PHILLIPS. I said 43.

Mr. AUSTIN. Forty-three percent capacity, that means you have the capacity built into the generating facilities.

Senator JOHNSTON. That's what I want to do, have capacity built in. Does that mean you have another replication of a machine, or does that mean your existing machine is going twice as fast and does that mean you waste your electricity?

Mr. AUSTIN. You don't waste any electricity. It's like a car, if you have 10 cars and 4 of your kids go away to college and leave the cars at home—this is very hypothetical—then you have 40 percent excess capacity in the car.

But if you don't have any fuel for those cars it's not excess capacity, they won't run. So you have a capacity problem and then you have a fuel problem.

Senator JOHNSTON. Are you telling me that you have machines that are not used, generators that are not used, or are you telling me that you've got—that all of your generators are used but are not run as fast. It's a very simple question.

Mr. AUSTIN. You have generating plants that are not on the line, they are sitting there.

Senator JOHNSTON. That's what I wanted.

Mr. AUSTIN. That's about what you said, but it's a little different. We've got old plants of smaller capacity, 90,000 kilowatts or 175,000 kilowatts. They have higher heat rates, in other words, they are less efficient.

Senator JOHNSTON. They are peaking units.

Mr. AUSTIN. They are peaking units, the 40 percent odd capacity we have on these kind of plants. Baseloading, we've gone further than anyone else in the Southwest, I believe.

Senator JOHNSTON. Are you telling me there is no waste in the 32 percent, or whatever the appropriate figure is involved, there is no waste in energy?

Mr. AUSTIN. There is no waste in energy.

Senator JOHNSTON. But there is a waste in capacity in the sense that you pay for capacity to generate, and you are not generating that capacity.

Mr. AUSTIN. That's correct. The reason we have 32 percent capacity is because, we, early in the game, saw that we were going to run out of natural gas. So we started building lignite plants and baseloading them.

Senator JOHNSTON. What does the term baseload mean?

Mr. AUSTIN. The peaking units come on and the baseload stays on.

Senator JOHNSTON. Your peaking units are natural gas.

Mr. AUSTIN. That's right. We have not built any lignite or nuclear fast enough, some of our baseload is still on gas. The reason we did that was because we could—in other words we put in our first lignite plant for \$135 per kilowatt, and we are producing that lignite for about 30 to 35 cents a million Btu's.

The difference between the 30 and 35 cent million Btu and the \$2 we are paying for gas today, it was better for our customers to spend the extra money for the extra capacity in order to get the cheap fuel.

In other words, we can prove that even with the fixed charges and everything we saved our customers over \$300 million in the last 4 or 5 years by going on and building in this excess capacity.

Senator JOHNSTON. I want to get back to Mr. Phillips in just 1 minute. Let me ask you this question. Mr. Phillips has said there is no phenomenon known as shoring up, where shoring up is required by interconnection. That the total cost of an interconnection is in effect the cost of the wire between the two systems, and not only does he disagree with the mathematics by which Mr. Jordan says there is a great cost to it, but there is no such phenomenon. Who is correct, in your view?

Mr. PHILLIPS. In this interconnection that we proposed?

Mr. AUSTIN. Are you asking me or Mr. Phillips?

Mr. JOHNSTON. I am asking you.

Mr. AUSTIN. He is a good friend of mine, except when we are here. I believe that in testimony yesterday, you might ask his experts back here, that they testified that if they built the contract paths of transmission that they proposed, and if they took some of the Oklahoma Power and put it down into the State of Texas, only 25 percent would go through the contract paths and 75 percent would go through our system.

Now, they are very good at saying that this won't cost anything.

Senator JOHNSTON. Who is they?

Mr. AUSTIN. My friends at Central & South West, real friends, except in here. In other words—may I ask their experts if that is true, or will you ask them?

Senator JOHNSTON. Whose experts?

Mr. AUSTIN. That guy sitting right back there. Let me ask if this expert agrees with this.

Senator JOHNSTON. All right.

Mr. AREY. What was the question, Mr. Austin?

Mr. AUSTIN. If Central & South West builds contract paths.

Senator JOHNSTON. What are contract paths?

Mr. AUSTIN. That is a big transmission line that goes from Freeport, La. to Corpus Christi, let's say. Then they start putting power over that line, due to what Mr. Jordan says, the arithmetic of electrical engineering, and I am a mining engineer so I am not an expert on that. Twenty-five percent would go through that and 75 percent would go through our system, is that right or wrong?

Mr. AREY. That is correct if the word "our" includes your system and Mr. Jordan's system and several other systems.

Mr. AUSTIN. Now, how in the hell are we going to keep from shoring up our system if 75 percent of that power goes through it? Now we have excess capacity in transmission lines because they are there for reliability purposes.

When Mr. Jordan's 700 megawatt machine trips off because that system is used for us to help him and the other systems.

Senator JOHNSTON. What you're saying then is that Mr. Jordan is correct when he says there are costs of shoring up. Is that right?

Mr. AUSTIN. Mr. Phillips will debate this, so I want to answer his question now. He would say that there is plenty of capacity down the lines to do this.

Senator JOHNSTON. What does our expert in the audience say, for the record, what is your name?

Mr. AREY. George Arey, Stone & Webster Engineering Corp. in Boston. I believe Mr. Austin asked a second question—

Senator JOHNSTON. We will get to that later. I want to get a yes or a no, if I can. Is Mr. Jordan correct when he says there are costs of shoring up? I am not dealing with what the costs are, he is correct.

Mr. AUSTIN. Yes, sir; but may I—

Senator JOHNSTON. No, not at this point.

[Laughter.]

Senator JOHNSTON. In your view, some percentage of a cost of shoring up ought to be shared by the company who wants the power, without reference now, to what the dollar amount is, that correct?

Mr. AUSTIN. Yes.

Senator JOHNSTON. I interrupted Mr. Phillips so I want to get back to him, and we will come back to you in a minute, Mr. Austin. Go ahead, Mr. Phillips.

Mr. PHILLIPS. We are dealing in a very complicated subject, the operation of electric utility systems, and I suggest that this operation of interconnected systems, where power flows like water where it may, is a customary thing in the world outside of Texas.

The subject of interconnection is like motherhood, it is axiomatic in an interconnected system. It is the most efficient way to operate. It

gives you the possibilities for the lowest reserves, the most efficient use of energy.

Senator JOHNSTON. Are you talking about interconnection or pooling?

Mr. PHILLIPS. I'm talking about interconnection.

Senator JOHNSTON. Do we understand interconnection correctly as being the physical tying together of two systems not requiring a sale or not requiring some exchange of power? Are we correct in our terms?

Mr. PHILLIPS. I don't know about the law requiring it, but an interconnection like Don Jordan said, there wouldn't be any purpose for it if there wasn't a flow of energy back and forth, as is economically justified.

Senator JOHNSTON. What would you have us require Houston Lighting & Power or ERCOT?

Mr. PHILLIPS. We would like to set up a forum by a change in the Federal Power Act that would give the Federal Power Commission or its successor, the right to study the merits of interconnection between an intrastate company and an interstate company.

There are only two intrastate companies left in the United States.

Senator JOHNSTON. You want something more than a study here, we have studies all the time.

Mr. PHILLIPS. We asked that a forum be set up so that the question be studied. Here is my testimony: despite many contrary suggestions, section 521 does not mandate interconnections by utilities, which are not now interconnected or subject to Federal Power Commission jurisdiction.

Rather, section 521, or an appropriate modification of it, empowers the FPC, or its successor agency, to examine the merits of any proposed interconnection even though otherwise subject to FPC jurisdiction.

Senator JOHNSTON. Here is the question. We can have a study, that doesn't mean anything. What do you want to give FPC the right to require.

Mr. PHILLIPS. I want to give them the right to require that after evidentiary hearings, an interconnection between an intrastate company and an interstate company is found to be in the public interest, that it be able to order that.

Senator JOHNSTON. Order what?

Mr. PHILLIPS. Order the interconnection.

Senator JOHNSTON. What is an interconnection?

Mr. PHILLIPS. Tying together transmission lines to tie two systems together.

Senator JOHNSTON. So FPC, after all of this, gives an order that you shall—let me put it in very simple language—string a wire between Houston Lighting & Power and Central & South West.

Is that all you want, or do you want FPC to say that Houston Lighting & Power must exchange power on a reasonable basis, reasonable about the power and reasonable prices. Is that what you want—

Mr. PHILLIPS. No, we don't care what Houston Lighting & Power does as long as they are in interstate operation. They and Texas Utilities are preventing us from operating our own system in an interstate operation. They are preventing us from making \$2.3 billion of sav-

ings in the next 20 years for our customers, not for us but for our customers.

Mr. AUSTIN. When all you've got is a wire stretch between there, how does it save you any money? Suppose he says, well, Phillips, I don't like the way you testified and I'm going to string a piece of wire there, but I'm not going to wheel any power, I'm not going to receive it, sell it, or anything else. What are you going to do then?

Mr. PHILLIPS. If you make interconnections, if you make them of sufficient size as our study indicates what the size ought to be and where they ought to be, power will flow.

When we build transmission paths for our own power to flow, we will be able to make economic movements of power.

Senator JOHNSTON. Wait 1 minute, you say first, power will flow.

Mr. PHILLIPS. It's like water, you put two pipes together and it will flow where it's going to flow.

Senator JOHNSTON. Emergency or no emergency.

Mr. PHILLIPS. Right, where it is needed it flows from points where you have it to points where you need it. Each system—

Mr. AUSTIN. In other words when you are talking about interconnection you are talking about interconnection with a switch that is always on. You don't just put that switch on when you need it in terms of emergency?

Mr. PHILLIPS. No, it's always on, always on.

Senator JOHNSTON. Do you agree with that, Mr. Jordan?

Mr. JORDAN. That is what he's talking about.

Senator JOHNSTON. Is that what interconnection means to you?

Mr. JORDAN. That's what it means to me.

Senator JOHNSTON. We apologize for the ignorance of the chairman. I think we have been operating, at least I have been operating, under the impression that interconnection was sort of a piece of wire strung for us in an emergency, with men set up in their little control booths like they were in Con Ed when they had the bolt of lightening and they were talking back and forth, and they said you'd better put another something on the line, and he throws a switch and it flows through.

That's not what we are talking about.

Mr. JORDAN. Mr. Chairman, that is an interconnection and we have such of those in Texas. We are interconnected between Houston Lighting & Power Company and Texas Utilities, for example. We also have an emergency interconnection between ourselves and Gulf States.

In the Gulf States situation it has an—it has an open switch but the facility is there, and in an emergency the switch can be closed.

Senator JOHNSTON. You say in an emergency the switch is closed?

Mr. JORDAN. Yes.

Senator JOHNSTON. In a usual situation the switch is on.

Mr. JORDAN. The switch is open.

Senator JOHNSTON. And power flows automatically.

Mr. JORDAN. No, there is no flow when the switch is open, that's like turning it off.

But that's not the type of interconnection that Mr. Phillips has in mind. May I express one more point?

Senator JOHNSTON. Let me get these elemental things cleared up first. What Mr. Phillips is describing is what I thought of as pooling.

What is the difference between what you are saying, is an interconnection and pooling?

Mr. PHILLIPS. I don't really know what the bill means by pooling. Senator JOHNSTON. We make our definitions as we go.

Mr. PHILLIPS. We talk about power pools, groups of companies that are interconnected and who operate their systems in conjunction with one another. They operate the most efficient generating units in the pool to carry the load.

In other words, they coordinate the total activity in the power pool, although it may be made up of various different companies, private or public, they coordinate.

Senator JOHNSTON. What's the difference between that and this?

Mr. PHILLIPS. Well, there are a few minor interconnections between the intrastate portion of Texas and the outside world, hardly worthy of the name, and they are kept open.

We are forced to keep them disconnected so that no power will flow so that we will not contaminate the Houston and Texas utility companies, and cause them to be subject to Federal Power Commission jurisdiction. This is a totally inefficient way to operate.

All of the rest of the United States and all of Europe——

Senator JOHNSTON. We don't want to go into the arguments for, we want to find out what it is first.

Mr. AUSTIN. Mr. Chairman, you are right in your definition of pooling. He wants to interconnect and he wants to pool the power of this company and ship some power from Oklahoma down into Texas. That's pooling.

In this definition it would only be pooling his company.

Mr. PHILLIPS. Yes, we have four companies.

Mr. AUSTIN. Interconnection is stringing these wires out there and putting it together.

Senator JOHNSTON. You string the wires together and leave them open.

Mr. AUSTIN. Interconnecting would not be leaving them open, everything would be closed. Everything would be operating in a synchronous operation. In other words, all of the generators in the United States would be running at the same speed if you interconnect. We have all of the generators in Texas synchronized now, and it is big enough and efficient.

Senator JOHNSTON. What's the difference between interconnection and pooling?

Mr. AUSTIN. Interconnection, you string the wires and hook them up, as you said, and nothing flows. It just sits there and in case of an emergency the generator tripped off over here, power would flow over here. That's interconnection.

If I understand what Mr. Phillips wants to do, he wants to interconnect and then he wants to pool his company. So far he has not said he wants to pool ours, but that's what he wants to do.

Mr. PHILLIPS. No, no; I don't.

Senator JOHNSTON. Are we in agreement on terms?

Mr. GALT. Mr. Chairman, let me put this into language that I think you can understand.

Senator JOHNSTON. Make it simple.

[Laughter.]

Mr. GALT. I don't think there is anything that exemplifies the need for legislation better than the argument you have heard this morning. They need a forum to argue this one out so somebody can issue an order, rather than arguing it to the Senate subcommittee.

But let's take five municipalities——

Senator DOMENICI. I didn't understand what you said.

Mr. GALT. I said they needed a forum where they could argue this thing out, put their witnesses on and make a decision, rather than arguing it to a Senate panel, and that's what they're asking for, a forum, the Federal Power Commission or its successor.

Let's take a group of municipalities, five municipalities who want to go together in generation. Two of the five municipalities have generating units, one built in the forties that is very inefficient, and one built in the late—early seventies that is very efficient.

Those two municipalities would pool their assets and through the wheeling arrangements wheel the power——

Senator JOHNSTON. I think we understand what wheeling is without any problem.

Mr. GALT. OK. When they pool their assets it means that they centrally dispatch between the two units, and they run the most efficient unit the majority of the time, and only bring the least efficient unit on when it is needed.

That's all Mr. Phillips is asking for his company, and I don't think anybody wants to use the assets of Texas Utilities. We don't want pooling of the other utilities, we don't want Houston Lighting & Power's fuel.

Senator JOHNSTON. You don't want pooling, but what Mr. Austin just said, what Mr. Phillips has described, is pooling.

Mr. GALT. He is describing pooling of only the generating units owned by the Central & South West Corp.

Mr. AUSTIN. I agree with my friend, Mr. Galt.

Mr. GALT. Not the units owned by Texas Utilities or Houston Lighting & Power.

Senator JOHNSTON. But he is interconnected with Texas Utilities.

Mr. GALT. He is.

Senator JOHNSTON. And electricity flows like water.

Mr. GALT. It is his electricity, his fuel being burned, his unit generating the electricity that is putting it in his system. There may be electricity in there, but he is generating it with his fuel.

Senator JOHNSTON. Who is he?

Mr. GALT. S. Phillips, or somebody, but it's our transmission lines.

Mr. JORDAN. It's running through our facilities.

Senator JOHNSTON. It's wheeling through your facilities?

Mr. PHILLIPS. No.

Senator DOMENICI. Mr. Chairman, let me see if I can, in my own mind, clarify this. The interconnection is a mechanism that might affect pooling, is that correct?

Mr. AUSTIN. Without interconnection you can't pool.

Senator DOMENICI. All right. You can interconnect either your own system and you will not be using anyone's assets or energy, just your own. That's one kind of interconnection, is that correct?

Mr. PHILLIPS. That's correct, although, since power flows where it is going to flow, the normal requirements in any interconnecting sys-

tem, any power pool group, is that each company has three things. They have enough generating capacity to supply their own load, they have enough fuel to run the generators to supply their own load, they have their own transmission, contract paths, we call them, to carry their power to where they want it carried.

The point these gentlemen have brought up, power does not always go just where you expect it to go, but the requirement in the outside world and worldwide in a power pool or power group is that you have to require these three, have these three prerequisites.

If it happens to flow on somebody else's line, it also means that their power is flowing on your line, and that's just the way the world works.

Senator DOMENICI. You are not going to use any of their energy, you just want to move through an interconnection. Why do you need them, then, what do you need from them?

Mr. PHILLIPS. We need to be interconnected with our own companies. We need the area of Texas interconnected with the rest of the United States so we can move power back and forth.

Senator DOMENICI. Between your own companies?

Mr. PHILLIPS. Between our own companies, or any other companies that we buy and sell power to. Outside of Texas, we buy and sell power everyday.

Senator DOMENICI. What prohibits you at this point from being able to do that?

Mr. PHILLIPS. There is a physical gap, a barrier that cuts our interstate part of our system off from the intrastate. It is enforced on us by these two companies who, the minute we interconnect with Texas, with Oklahoma, they disconnect from us.

Mr. AUSTIN. We didn't tell them how to run a system, we just disconnected from him. If he wants to interconnect his system he can go on.

Mr. GALT. If the chairman would allow me to make my statement maybe I could get it out of the context of the Central & South West problem.

Senator JOHNSTON. Nobody brought a map, did they, of these systems? Does anybody have a map of these systems?

STAFF. The statement of Central & South West has a picture of the operating area.

Mr. AUSTIN. If somebody will let me draw on this, I will draw you a map.

Senator DOMENICI. What prohibits you from filling the gap now, Mr. Phillips?

Mr. PHILLIPS. The minute we connect across this gap, their two companies disconnect from us totally in Texas.

Senator DOMENICI. What does it do to you?

Mr. PHILLIPS. It creates two systems in Texas, it creates unreliability. The State Commission of Texas, which is barely in the saddle, doesn't like it, and they have ordered us to disconnect from interstate commerce.

SENATOR DOMENICI. So part of your facilities are connected intrastate with Texas companies, is that correct?

Mr. PHILLIPS. Correct.

Senator DOMENICI. Part are out of Texas connected among themselves, and now connected with yours in Texas.

Mr. PHILLIPS. They were until the Public Utility Commission of Texas ordered us to disconnect, something that they have no jurisdiction over.

Senator DOMENICI. And that's the issue here now.

Mr. PHILLIPS. The issue is why the two companies in the United States get special treatment and are able to operate by themselves when it affects so many. Their operation by themselves affects us tremendously. It affects all of these small electric systems in Texas, many hundreds of co-ops and municipalities and generating and transmission co-ops.

They are affected and held in a stranglehold by the action of these two companies.

Mr. AUSTIN. That is not true, Senator.

Mr. GALT. Senator, if I might address this issue it might shed some light on this issue.

Senator JOHNSTON. First of all—Peter, do you understand what it is Mr. Phillips wants to do?

Senator DOMENICI. I think I do. I don't know that I could tell you what it is—

[Laughter.]

Senator JOHNSTON. I look at this map and they say that all of this is your service area and you want to get from here to here.

Mr. PHILLIPS. Right. And from the other side down, all around, on our own lines.

Senator JOHNSTON. You've got your own lines—

Mr. AUSTIN. If he wants it on his own lines, we have no argument with him.

Mr. PHILLIPS. That's a study put out by Stone & Webster, they defined a system.

Senator JOHNSTON. You mean we are coming to an agreement.

Mr. PHILLIPS. No; we are not.

Mr. AUSTIN. Ask the chairman again. Excuse me, Mr. Chairman, I don't mean to run your business.

Mr. PHILLIPS. They refused to accept the facts of life that exist in the outside world, that electricity flows like water.

Mr. AUSTIN. We have always accepted that fact.

Mr. PHILLIPS. A company is required to have its own transmission system, adequate to carry the load it wants to transfer. It never can guarantee to anybody that it won't flow here or there or there.

Nor can the other companies connected with it guarantee that the power won't flow over our system.

[The prepared statement of Mr. Phillips follows:]

STATEMENT OF S. B. PHILLIPS, JR.,
CHAIRMAN AND CHIEF EXECUTIVE OFFICER
CENTRAL AND SOUTH WEST CORPORATION
ON SECTION 521 OF S. 1469 SUBMITTED TO
THE SUBCOMMITTEE ON ENERGY CONSERVATION AND REGULATION
OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

September 20, 1977

I am S. B. Phillips, Jr., of Dallas, Texas, Chairman and Chief Executive Officer, Central and South West Corporation. I am accompanied today by counsel to the Corporation, Richard D. Cudahy, former Chairman of the Wisconsin Public Service Commission; Dr. Allen J. Wood, Principal Engineer with the firm of Power Technologies, Inc., Schenectady, New York; and Mr. F. George Arey, an engineer with the Stone and Webster Engineering Corporation, Boston, Massachusetts.

We believe that enactment of Section 521 of S. 1469 is in the public interest and that the prevailing criticisms of Section 521 are misguided or reveal a misapprehension of what it attempts to do. We understand, however, that this Subcommittee has studied the problems carefully and may want to make modifications perceived to be in the interest of the various parties concerned, as well as in the national interest. With respect particularly to interconnection, we would have no objection to modifications in the legislation as such, provided basic objectives were effectively retained. No utility involved or its customers should be required to suffer undue hardship or uncompensated economic loss. Any utility proposing interconnection should be prepared to pay

the reasonable costs incurred by reason of benefits it expects to receive. As well as the national interest in efficiency, reliability of service and conservation, the rights of the immediate parties to an interconnection must be fully protected.

But despite many contrary suggestions, Section 521 does not mandate interconnections by utilities which are not now interconnected or subject to Federal Power Commission jurisdiction. Rather Section 521, or an appropriate modification of it, empowers the FPC, or its successor agency, to examine the merits of any proposed interconnection even though the party with whom interconnection is sought is not otherwise subject to FPC jurisdiction. Under Section 521, an interconnection can be ordered only if an evidentiary hearing demonstrates that such action is "necessary or appropriate in the public interest," precisely the same language which has governed mandatory interconnection under Section 202(b) of the Federal Power Act since 1935.

Under Section 202(b) the Federal Power Commission has long had authority to consider and, if appropriate, order interconnection -- with only one glaring exception. This legislation would complete the FPC's authority by ending the artifices by which the large Texas utilities have evaded FPC review of the merits of Texas interconnection. It hardly seems in the national interest in this time of concern about energy and fuel resources that Texas be treated separately

from the rest of the United States.

Of immediate interest to us is the fact that Section 521, or an appropriate modification of it, would authorize an investigation into the question whether the public interest really justifies the "intrastate" Texas utilities in continuing their operational isolation, a practice contrary to that followed by every other electric utility in the continental United States. The real question here is whether the large urban-centered Texas utilities -- unregulated even by a state agency until 1976 when a state commission finally commenced operations -- should continue to receive special treatment not in the national interest.

Even after the recent advent of the Texas Public Utility Commission, this agency's only contribution to resolution of the present problem has been to order Central and South West Corporation's Texas operating companies out of interstate commerce -- an act which we regard as unlawful and contrary both to the expressed policy of the Federal Power Act and to the national interest.

It is evident from the historical record that the primary -- if not sole -- motive underlying the opposition by the Texas "intrastate" utilities to interconnection and to the principles of Section 521 has no relation in fact to any alleged operational or cost problems resulting from interconnection. These utilities have been opposed not to interconnections per se, but only to those interconnections which might subject them to FPC jurisdiction. For example,

for many years the Texas utilities have been interconnected with the electrical system of Mexico.

Prior to 1935, Houston Lighting & Power Co. and Texas Utilities maintained interconnections among themselves, and with other Texas utilities, as well as with utilities operating in states other than Texas. The Texas utilities terminated the interstate interconnections simultaneously with the effective date of the Federal Power Act in 1935. Since 1935 all of these utilities have during long periods of time and for their own benefit been interconnected with interstate utilities -- but only when they could obtain orders from the FPC that the interconnection would not have jurisdictional consequences. In May of last year these unregulated utilities abruptly disconnected from two Central and South West subsidiaries which had themselves commenced interstate operations even though, as engineers of these large urban utilities have testified, such interconnections into interstate commerce had no impact whatever on their systems or customers.

I am suggesting only that history demonstrates that much of the opposition to the principles of Section 521 results not from any concern about the merits of interconnections but from a desire to remain unregulated by the FPC. Indeed, for reasons stated earlier, even a true concern about the effect of interconnection should not inspire opposition to Section 521. Should this Section be enacted into law any

"intrastate" utility of which an interconnection was requested would have ample opportunity to marshal all the engineering and economic data which it believed showed that such interconnection would not be in the public interest, and could present this data in an orderly manner to the agency with expertise sufficient to permit an informed decision. If these allegedly intrastate utilities truly believe that the merits of the interconnection controversy are on their side, they should welcome the opportunity which Section 521 extends to them.

The fate of Section 521 is not, as has been stated, a matter of indifference to all but Central and South West and the large, unregulated Texas utilities. To the contrary, the future transmission configurations of these utilities have been shown to be of great concern to other investor-owned utilities as well as to municipally-owned systems and rural electric cooperatives. A representative of the Committee on Power for the Southwest, composed of 33 municipal systems and 170 rural electric cooperatives located in the States of Missouri, Oklahoma, Arkansas, Louisiana, Kansas and Texas, has testified before the House Committee on Interstate and Foreign Commerce in support of a provision identical in effect to Section 521. In addition, the Oklahoma Corporation Commission has requested of the FPC an investigation of the adequacy of interstate service.

This Subcommittee is not a proper forum for settling the debate. We request only that we be afforded a proper forum in which the merits of this issue can be resolved, and effective action taken, once and for all. Section 521 provides that forum and therefore we support its passage.

In such a forum we could show that formal studies by Stone & Webster and Power Technologies, Inc., unmatched, to our knowledge, by anything that Houston or Texas Utilities have done, demonstrate that full interconnection will improve reliability for all parties and produce savings (after all costs) for Central and South West customers of up to 2.3 billion dollars over 20 years. We are confident that customers of the large Texas companies, which have consistently refused to participate in our studies, could enjoy similar savings. Simple interconnections, making possible the moving of substantial blocks of power, would cost only about \$15,000,000. Interconnection between Texas and the rest of the country will result in the opportunity to utilize cheaper, more available fuels and thus serves the national goal of conservation as well as being in the interest of all affected parties.

We appreciate the opportunity to appear. I have previously submitted a Statement and Supplemental Statement on S. 1469 to this Subcommittee, and Mr. Cudahy has recently conveyed our written comments on the testimony of Mr. Don Jordan of Houston Lighting & Power Company regarding this matter to Senator Johnston.

SUMMARY OF TESTIMONY SUBMITTED
BY CENTRAL AND SOUTH WEST CORPORATION TO
THE SUBCOMMITTEE ON ENERGY CONSERVATION AND REGULATION
OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

September 20, 1977

Mr. S. B. Phillips, Jr., Chairman and Chief Executive Officer of Central and South West Corporation, testified today in favor of the interconnection and related provisions of Section 521 of S. 1469. Mr. Phillips stated that this provision would not mandate the establishment of any specific interconnection, but would only authorize the FPC to order interconnections found after hearing to be in the public interest. Section 521 would close a gap whereby certain "intrastate" utilities are apparently beyond the present authority of the FPC to order interconnection. Mr. Phillips said that Section 521 would authorize the FPC to investigate whether these allegedly intrastate utilities should be permitted to continue their isolated operation, contrary to the practice of every other utility in the continental United States.

Mr. Phillips further stated that the operational history of these "intrastate" utilities demonstrates that they are opposed only to those interconnections which might subject them to FPC jurisdiction and that the opposition to Section 521 appears to be motivated by the same concern and not to any operating or cost concerns about interconnections.

Mr. Phillips expressed the view that even opponents of certain interconnections should support the enactment of

Section 521, since that Section would permit the airing of the merits of an interconnection dispute before a public body with effective remedial powers. According to Mr. Phillips the merits of this dispute clearly favor the interconnection of Texas with the rest of the country.

Mr. Phillips pointed out that representatives of many electric entities in states near Texas have testified in support of giving the FPC the authority granted it by Section 521.

SUPPLEMENTAL STATEMENT OF S. B. PHILLIPS, JR.,
CHAIRMAN AND CHIEF EXECUTIVE OFFICER
CENTRAL AND SOUTH WEST CORPORATION
ON INTERCONNECTION AND RELATED PROVISIONS
OF S. 1469 SUBMITTED TO THE SUBCOMMITTEE
ON ENERGY CONSERVATION AND REGULATION OF THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

This further statement will address briefly (1) the history of the Texas intertie dispute, including the proceedings pending before various Federal and State agencies, (2) the general nature, advantages and operation of interconnection, and (3) the consequences of interconnection of ERCOT and SWPP. As part of my discussion of point 3, I will discuss not only the clear advantages of interconnection but also the common criticisms of it by Texas Utilities Company ("TU") and Houston Lighting and Power Company ("HL&P") and will show they are without merit. To provide full information on points 2 and 3, I have attached the testimony filed by C&SW with the SEC in Administrative Procedure File No. 3-4951 concerning integration of the operating subsidiaries of C&SW, involving the interconnection of The Electric Reliability Council of Texas ("ERCOT") and the Southwest Power Pool ("SWPP"). This consists of the testimony, and certain Exhibits, of Dr. Allen J. Wood, a consulting engineer with Power Technologies, Inc. ("PTI"), Schnectady, New York; F. George Arey, of Stone and Webster ("S&W"), both leading consulting firms to the electric utility industry; and Jack Wells, Vice President, Engineering and Construction for CSR Services, the service company of the Central and South West Corporation.

Mr. Arey's testimony discusses the possible system configurations for interconnected operation, that of Mr. Wood discusses the fuel savings and other economic and operational advantages of such operation, and that of Mr. Wells discusses the information and other contributions which C&SW provided for the study.

I. CHRONOLOGY AND HISTORY OF
THE TEXAS INTERTIE DISPUTE

A. The Historical Background

Before passage of Part II of the Federal Power Act (16 U.S.C. §§ 824-825r. (1970) (the "Act")), interconnections existed between the TU companies and West Texas Utilities ("WTU") (the service territories of which are wholly in Texas), on the one hand, and certain Oklahoma, Louisiana and Arkansas electric systems on the other. (Public Utility Holding Companies: Hearings on H.R. 5423 Before House Comm. on Interstate and Foreign Commerce, 74th Cong., 1st Session 1284 (1935); and Middle West Corp. and Subsidiary Companies, 15 S.E.C. 309, 338 (1944)). Interconnections also existed between HL&P (the service territory of which is wholly in Texas) and interstate systems to the East. (S. Doc. No. 92, 70th Cong., 1st Sess., pt. 62, 580 (1934)). Before the Act became effective and with intent to avoid the impending jurisdiction of the FPC, the TU companies and HL&P instigated a plan to isolate their operations from any contact --

direct or indirect -- with interstate commerce. These utilities severed existing interconnections and jointly refused to deal (interconnect) with any electric power system which was not electrically isolated from any electric system outside Texas and which would not agree to open its interconnections to avoid participation -- direct or indirect -- in interstate flows of electricity. (See Congressional Research Service, 94th Cong., 2d Sess., The Electric Reliability Council of Texas Intertie Situation (Comm. Print 1976) 2-3 (hereinafter referred to as "Congressional Intertie Study")).

TESCO enforced intrastate isolation upon WTU by installing and maintaining ownership under lock and key of protective relays at certain WTU switching stations to prevent interstate flows of power. Moreover, the interconnection agreement between them provides:

The parties hereto agree that no power or energy transmitted, purchased, sold, delivered or received hereunder by either party hereto is to be transmitted, purchased, sold, delivered or received in interstate commerce, and the parties hereto agree at any time and from time to time to open all the transmission line connections necessary to prevent such transmission or delivery by either party to the other in interstate commerce. The parties further agree that no power or energy will be delivered by either of them to the other under this agreement except power or energy generated within the State of Texas, and that neither party will transmit any power or energy delivered to it hereunder beyond

the limits of the State of Texas or sell any such power or energy for transmission, or consumption beyond the limits of said state.¹

In 1954, out of fear that WTU might operate in interstate commerce and as a warning, TESCO actually severed its ties with WTU for a period of months.

The restraints upon the free flow of electricity across state lines were imposed by a combination of companies, including HL&P, Dallas Power and Light Company ("DP&L"), Texas Electric Service Company ("TESCO") and Texas Power and Light Company ("TP&L") (collectively the "TU companies"), and could not have been maintained by any single company. These companies rely upon each other heavily for support in the provision of economic, reliable service. HL&P and the TU companies have thus chosen to save the expenses of operating in individual isolation. They interchange power extensively with one another, subject, of course, to the assurance that such power has not found, and will not find, its way into the

1 Similar arrangements were provided under contract between TP&L and the United States with respect to power marketed from Denison Dam, a federally-owned project on the Red River (Congressional Intertie Study 21-22). On December 22, 1976, Tex-La Electric Cooperative, Inc., petitioned the FPC for an investigation of the jurisdictional status of TP&L by reason of its receipt of electricity from Denison Dam. The cooperative alleged that, by reason of the location of the Dam and certain of its generators and connectors, the energy TP&L receives from Denison Dam may be in interstate commerce. On January 11, 1977, the FPC gave notice of this petition and invited interventions or protests (Docket E-9578, 42 F.R. 4209, January 24, 1977). On January 25, 1977, the C&SW Companies filed a petition for intervention in this docket.

transmission network of an interstate utility, thereby subjecting HL&P or any of the TU companies to FPC jurisdiction.

In short, the price exacted by the TU companies and HL&P for anyone desiring the benefits of interconnection with them is adherence to their boycott of all who deal with integrated interstate utilities.²

B. The SEC Proceeding

In 1974, certain Oklahoma public bodies filed a complaint with the Securities and Exchange Commission alleging in part that: (a) the maintenance by C&SW of separate interstate and intrastate systems was illegal under the Public Utility Holding Company Act of 1935 and not in the public interest and particularly not in the interest of its Oklahoma customers; and (b) in effect, the practices which kept TU, HL&P, WTU and Central Power and Light Company ("CP&L") (a C&SW subsidiary) isolated from interstate commerce were in violation of the antitrust laws.³

C&SW denied the alleged violations of the Public Utility Holding Company Act of 1935 but undertook an extensive

² See, e.g., p. 1 and note 1 supra.

³ In 1945 the SEC approved the C&SW system as conforming to the requirements of the Public Utility Holding Company Act of 1935. Middle West Corporation, 18 S.E.C. 296 (1945). This approval is still in full force and effect.

engineering and economic study of alternative future modes of operating the C&SW Companies entirely in interstate commerce. Late in 1975 it filed with the SEC proposals to implement operations consistent with the study. In 1976 the SEC commenced an investigation (1) to determine whether C&SW, as its operations were to be modified, was capable of being economically operated as a single integrated and coordinated system and (2) to determine whether its proposals could be reasonably achieved and what contingencies might affect the implementation of the proposals.⁴ Hearings directed to Central and South West's testimony regarding plans for the integration of ERCOT and SWPP (filed herewith with this committee) resumed at the SEC on September 15th, 1977.

C. The Events of May, 1976

On May 4, 1976, WTU commenced wholesale service through facilities previously confined to intrastate service to Davidson, Frederick and Tipton, Oklahoma. Such service resulted in economic and operating advantages for WTU and PSO (R. 4).⁵ That same day, the C&SW companies commenced certain proceedings before the Commission, alleging that the

4 "Notice of and Order of Hearing on Program for Compliance with Section 11(b) of the PUHC Act of 1935" filed January 30, 1976 in SEC Admin. Proc. File No. 3-4951, 6.

5 The day before beginning interstate service, WTU and CP&L filed an action against TESCO and HL&P in the United States District Court for the Northern District of Texas alleging concerted action to restrain trade in the purchase, sale and transmission of electric power in violation of Section 1 of the Sherman Act. (West Texas Utilities Co. and Central Power and Light Co. v. Texas Electric Service Co. and Houston Lighting & Power Co., Docket No. CA3-76-0633F (N. Dist. Tex., filed May 3, 1976)).

TU companies and HL&P were "public utilities" within the meaning of the Federal Power Act and requesting appropriate orders for additional interconnections with those utilities under Section 202(b) of the Act and an investigation of voluntary interconnection and coordination under Section 202(a) of the Act.

Shortly thereafter, counsel for C&SW informed the TU companies and HL&P that CP&L and WTU (with which they were interconnected) were, by reason of WTU's service to Oklahoma, operating in interstate commerce. In midafternoon, the TU companies severed all of their interconnections with neighboring systems connected directly or indirectly to CP&L or WTU, and HL&P severed all of its interconnection with such systems. These actions were taken in spite of the fact that the power flows from WTU to Oklahoma were relatively small in terms of the total interconnected system and certainly had no negative effect upon its reliability. The sole motive for disconnection could only have been a desire to avoid "contamination" from interstate power and concomitant FPC jurisdiction. In fact, both TU and HL&P have subsequently reaffirmed on several occasions that their sole motive in breaking their connections with other ERCOT entities was to preserve their claimed exemption from FPC jurisdiction. (E.g., Tr. of Proceedings Before Public Utility Commission of Texas, May 7, 1976, 87, 94-95, In the Matter of the Emergency

Hearing on Intrastate and Interstate Service of Texas Inter-connected System, Docket No. 14.)

On May 13, 1976, CP&L and WTU filed a motion for reconnection of ERCOT under the emergency provisions of the Act (Section 202(c)) requesting that the FPC order restoration of all interconnections and service which had been interrupted by the opening of interconnections on May 4th by the TU companies and HL&P. Both the TU companies and HL&P opposed the motion of CP&L and WTU for emergency reconnection under Section 202(c), but HL&P indicated its willingness to accept FPC action under Section 202(d) of the Act which contemplates exemptions from FPC jurisdiction for non-jurisdictional entities which interconnect for emergency reasons. Both HL&P in its responsive filing of May 14, 1976 and the TU companies in their responsive filing of May 17, 1976 requested that public hearings be held on the question whether an emergency existed. Both San Antonio and LCRA asked for the emergency restoration of the pre-existing interconnections within Texas but requested an "order" under Section 202(d).⁶

⁶ It is curious that San Antonio and LCRA sought to rely on Section 202(d). As political subdivisions of the State of Texas or as instrumentalities thereof, they are themselves exempt from the jurisdiction of the FPC and could only benefit from the possible application of such jurisdiction to their own suppliers of bulk power. The most plausible explanation is that they took this position in deference to the monopoly power and dominant position of the TU companies and HL&P as bulk power suppliers in Texas.

On June 21, 1976 the C&SW companies moved, inter alia, for public hearings with respect to their request for relief under Sections 202(a) and 202(b) of the Act. The TU companies and HL&P (on June 30th and July 6, 1976, respectively), opposed public hearings on these issues. Numerous electric entities -- both public and investor-owned -- ranging in size from Gulf States Utilities Company to relatively small distribution cooperatives in Missouri and Oklahoma have written the FPC in connection with this proceeding expressing their strong interest in it and requesting hearings on the state of interconnection in the Southwest.

On June 25, 1976, a petition to intervene was filed by the Arkansas Cooperative (the generation and transmission cooperative supplying all Arkansas rural electric cooperatives) supporting the claims of the C&SW companies and viewing the intrastate isolation of the Texas electric systems as a major impediment to the achievement of economy, conservation of resources and reliability of service in the Southwest. This petition also pointed out the restrictions which Texas intrastate isolation imposed on access to power from federally-owned generating facilities at the Denison Dam, as to which public bodies have a statutory preference.⁷

⁷ See 16 U.S.C. § 825s (1970).

On July 6, 1976, the C&SW companies filed a second motion requesting that hearings be held (directed specifically to the question of "emergency" relief). The motion urged the FPC to investigate, in hearings, the existence or nature of a power emergency and the facts respecting electric reliability in order to determine what sort of emergency action, if any, ought to be taken under Section 202(c) or 202(d) of the Act. The C&SW companies contended that current facts relating to any claimed emergency were not properly before the FPC.

D. The FPC Order

The FPC issued its Order on July 21, 1976. All motions by the C&SW companies and others requesting hearings were denied. The FPC found that CP&L and WTU were "public utilities" within the meaning of the Act -- and thus subject to FPC jurisdiction -- but that the TU companies and HL&P were not "public utilities" -- and thus not subject to such jurisdiction. These findings were expressly adopted from a memorandum of the FPC's General Counsel which was appended to the Order. Accordingly, the petition of the C&SW companies under Section 202(b) of the Act for permanent interconnections was denied for jurisdictional reasons.

The FPC also found that an "emergency" sufficient to require reconnection of the broken interconnections and restoration of service in Texas pursuant to the FPC's

powers under Section 202(c) had not been established. The FPC did find, however, that there was a sufficient "emergency," under Section 202(d), to authorize the "temporary" reestablishment of the historic (i.e., pre-May 4) interconnections over the old ERCOT network without any jurisdictional consequences for the TU companies or HL&P. This authorization continues indefinitely (until "further Commission Order"), but, despite the repeated requests of the C&SW companies to reconnect, the TU companies and HL&P refused all such requests.

Finally, the FPC ordered its staff to update its 1972 study of certain economies which would be achieved by interconnection of SWPP and ERCOT. The FPC, however, denied all requests for public hearings in connection with this staff study.

The Oklahoma public bodies, the Arkansas Cooperative and the C&SW companies all filed applications for rehearing with respect to the FPC's order. The applications for rehearing were denied and petitions for review of the FPC actions were filed in the U. S. Court of Appeals for the District of Columbia Circuit where they are pending.

A further request by CP&L and WTU for emergency reconnection of ERCOT under Section 202(c) in connection with the FPC's Emergency Natural Gas Order of February 4, 1977, was noticed for public comment (but not hearing) but was denied in late June of 1977.

E. The NRC Proceedings

CP&L, The City Public Service Board of San Antonio ("San Antonio"), The City of Austin ("Austin"), and Houston Lighting and Power Company ("HL&P") hold joint construction permits, issued on December 22, 1975, for the South Texas

Project ("STP"), a two-unit nuclear facility currently under construction near Bay City, Texas.

The desirability of CP&L's participation in STP has increased as a result of the changing fuel supply situation which became of critical concern to CP&L following the energy crisis of 1973. Low-cost natural gas, used to fuel all its operating generating stations, has become exceedingly expensive. By 1981, by order of the cognizant state agency in Texas, natural gas will be available for use as boiler fuel only at levels 10% below 1975 consumption. Proposed further restrictions on the use of natural gas for electric generation are presently before the Congress in The National Energy Act, H.R. 6831 and S. 1469 and in other proposed legislation. CP&L also projects that STP will become, in comparison with a gas-fired plant, an economical generating plant. Thus, participation in STP has become essential to CP&L (and presumably to the other joint owners as well) in meeting both projected increases in load and as a substitute for natural gas-fired generation.

After HL&P and the TU companies severed their interconnections on May 4, 1976, with CP&L, San Antonio, Austin, the Lower Colorado River Authority ("LCRA"), and WTU as a result of interstate transmission of electricity by WTU, the viability of STP was in doubt. The implementation of HL&P's restriction on the interstate transmission of electricity, if permitted to continue in effect, would make STP useless

or would raise its cost substantially, since the participants cannot share in it unless they are interconnected at many locations or, conceivably, unless a direct current interconnection is constructed at the plant site at a cost of tens of millions of dollars.

The persistent refusal of HL&P and the TU companies to interconnect with companies in interstate commerce -- a refusal that furthers their anticompetitive practices, designs, and agreements -- led CP&L to file, on June 4, 1976, a petition for leave to intervene and request for hearing out of time in connection with the construction permit for STP. The Licensing Board granted CP&L's petition and ordered a hearing, the NRC Staff appealed that decision to the Appeal Board, and on March 18, 1977, the Appeal Board reversed and directed that CP&L's petition be dismissed for lack of jurisdiction (ALAB-381). Review by the Commission is discretionary and on March 31, 1977, it announced that it had decided not to review the decision of the Safety and Licensing Board which, accordingly, is now final for purposes of judicial review. A petition for review of this action has been filed in the U. S. Court of Appeals for the D. C. Circuit.

By letter of January 25, 1977, the Assistant Attorney General in charge of the Antitrust Division of the United States Department of Justice, responding to a specific inquiry from the Commission's Executive Legal Director, recommended that the NRC proceed expeditiously to hear the matters raised by CP&L's petition, without awaiting the filing of an operating license application. In addition, the Antitrust Division noted that any

inquiry by the NRC should also focus on the effect of the disconnection by TU and HL&P on the coordinated planning and operation within Texas previously undertaken by the TIS group, which had included TU and HL&P as well as CP&L and WTU. The Antitrust Division pointed out that the disconnections by TU and HL&P had effectively changed the basis on which it had previously recommended that no antitrust hearings be held in connection with STP, HL&P's Allen's Creek facility, and TU's Commanche Peak facility.

Quite apart from the proceedings below, the Commission in early May received briefs and heard oral argument whether it is appropriate to hold a hearing on the antitrust issues related to the South Texas Project at this stage. By order dated June 15, 1977, the Commission issued a decision denying an immediate full-scale hearing on the antitrust issues and providing only for a mild acceleration of the licensing process with some possibility of a severely limited antitrust review. The Commission directed its Staff to seek the advice of the Antitrust Division of the Department of Justice. The timing and shape of this antitrust review is now essentially unknown.

F. The Texas Proceedings.

On January 7, 1977, HL&P and TU petitioned the Texas Public Utilities Commission requesting that it hold hearings and order CP&L and WTU to return to their transmission arrangements as they existed prior to May 4, 1976 -- in other words, to drop any transmission of electricity to Oklahoma. On January 13, 1977, the Texas PUC called a hearing on HL&P and TU's request. Oral argument was heard by the Texas Commission on January 25, 1977, and discussions among the parties were held at various dates thereafter culminating in actual evidentiary hearings commencing the afternoon

of May 2, 1977.

On May 2, 1977, the Texas PUC issued an interim order, before the start of hearings, directing West Texas Utilities to disconnect or remove the radial tie from its system to the towns of Hollis, Frederick and Tipton, Oklahoma, which tie has permitted efficient and reliable service to those towns. The ostensible purpose of removing such tie was to permit the Texas Interconnect System to be re-established.⁸ On May 4, 1977, WTU complied with the order of the Texas Commission and disconnected the radial tie. On May 18, 1977, WTU appealed the Texas Commission's May 2nd order to the United States District Court for the Western District of Texas on the grounds that the order is arbitrary and capricious and invalid under the Supremacy and Commerce clauses to the Constitution of the United States. Relatively cursory hearings were undertaken by the Texas PUC on May 2, 1977, resulting in reaffirmation by that body of the order to disconnect. Procedures leading to appeals to Federal and State Courts are being perfected.

On April 27, 1977, Central and South West formally petitioned the FPC, suggesting that joint hearing by it and the Texas Commission, pursuant to Sections 209(b) and 307 of the Federal Power Act, would be appropriate in an effort to resolve the Texas dispute. This matter was noticed for public comment

8 ¶10 of the findings of fact of that order provides:

"That the radial tie from WTU into Oklahoma . . . is an impediment to the reconnection of such [Texas] system and is not in the public interest and should be removed or disconnected."

by the FPC by order dated May 13, 1977. A number of electric cooperatives, the Oklahoma State Association of Electric Cooperatives and the Oklahoma Corporation Commission intervened in support of C&SW. But the FPC denied the petition by order of July 5, 1977.

G. Request by Oklahoma Corporation Commission for
FPC Investigation of Adequacy and Sufficiency
of Service.

In its "Petition to Intervene" filed with the FPC on May 26, 1977, the Oklahoma Corporation Commission (the agency charged with regulatory authority over Oklahoma electric utilities) requested an investigation by the FPC, in connection with the discontinuance of service between Texas and Oklahoma, of the adequacy and sufficiency of service between the two states under Section 207 of the Federal Power Act. The Oklahoma Corporation Commission is presently seeking clarification of the FPC's views on this subject by way of a petition for rehearing, and this request has been granted.

II. THE THEORY AND APPLICATION OF INTERCONNECTION

The theory of interconnection is relatively simple -- to achieve economies of scale, to share reserves and thus reduce reserve requirements of separate systems, to preclude duplication of facilities, to reduce fuel and capital costs, to conserve energy and to take advantage of whatever diversity exists among systems. For these reasons, interconnection has long been recognized as having invaluable public benefits. These include a reduction in the size of generating reserves that individual utilities must maintain and improvements in system reliability. The former, and in the typical case, the latter lead to major cost savings which inevitably flow through to consumers. The isolation of systems may result in the maintenance of higher spinning reserves consuming natural gas and oil; the interconnection of systems maximizes the efficient use of these scarce resources for this and other reasons.

In addition, interconnection makes possible interchanges of power wherein power from relatively cheap sources may be made available from one utility system to another with concomitant savings to consumers. Interconnection, both for reliability and economy, becomes increasingly important as the size and cost per kilowatt of generating plants increases, especially as large coal and nuclear plants replace natural gas burning

installations. In the Southwest, this is an especially important consideration, with rapidly rising prices and critical shortages of natural gas. Only through interconnection can the most efficient and economic use of high capital/low fuel cost facilities be achieved. Thus interconnection is crucial to any rational conservation policy.

The electric power system in both the Eastern U.S. and Canada and Western U.S. and Canada are interconnected and operate in what is generally regarded as a highly reliable fashion. This reliability has been greatly furthered because the various interconnected systems exchange information and voluntarily coordinate their operation and system engineering design practices. As a general principle it is not required in these interconnected systems that individual utilities assume the economic burden of providing facilities for use by other systems nor are they normally expected to install the capacity to alleviate the consequences of failures and outages in the other systems. Obviously, capacity which may be available at a particular time can provide emergency and other assistance to systems with which utilities are interconnected.

United States interconnected systems are operated with automatic generation control systems that detect external generation shortages (as opposed to internal shortages) and do not automatically increase generation to supply some other areas'

deficiency. Thus, upon the sudden loss of a unit or plant the sequence of actions that takes place is approximately,

- a) A unit fails in Area 'A' leaving an imbalance of load and capacity.
- b) The imbalance is made up by more or less instantaneous power in-rushes from Area A and all the interconnected generators. This results in c).
- c) For a large interconnected system the frequency remains essentially fixed.
- d) The power flows and rotating generator inertias interact causing the power systems to seek a new operating point.
(This is the transient stability problem.)
- e) The automatic generation control systems of all areas respond. With tie-line biased automatic generation control systems, only the governors within Area 'A' respond through supplementary control action.
- f) As the generation-load balance is restored in the deficient Area A, the unscheduled power flows from external areas are restored to zero.

The ability of the systems to withstand this sudden shock (as well as other types of shocks) and recover from the subse-

quent transients without going into uncontrolled, low frequency, oscillations is the subject of transient stability studies like those directed by F. G. Arey and filed with the SEC which are described in the testimony attached to this Statement. These transient situations only last for short periods (a very few minutes at most) while the governors and prime mover fuel systems restore the systems to equilibrium.

A related question is whether interconnection means that a loss of load will be shared by the interconnected systems to the limit of their interconnected capability even to the extent of interrupting service within their territory to maintain service elsewhere. Or as some have said, if ERCOT and SWPP are interconnected will service in Texas be disrupted to maintain service outside of Texas. As the testimony of Mr. Wood demonstrates this is not a realistic assumption. Commonly, each interconnected system assists others up to the limit of interconnection capability and within the limits set by their own available reserves. Thus interconnected systems have the benefit of others' reserves in capacity shortages but need not ever contribute more than their own reserves. This principle was recently illustrated in the Consolidated Edison blackout.

III. INTERCONNECTION BETWEEN SWPP AND ERCOT

The basic question is whether the FPC should clearly be allowed to decide the advantages and disadvantages of interconnected operation between SWPP and ERCOT. The testimony of Mr. Wood of PTI, together with the supporting testimony of Mr. Arey of Stone & Webster and Mr. Wells of C&SW, provide the answer. I will summarize their basic findings to demonstrate that, as proposed by C&SW, there are no real disadvantages and substantial advantages for both members of ERCOT and SWPP through interconnection. Reference should be made to the testimony itself for full details of the matters I now address.

It is best to begin with a basic description of the design of the possible interconnected systems. To understand the advantages and disadvantages of interconnection, these proposed systems will be compared to a so-called Mode 1 design which assumes that ERCOT does not operate synchronously with any system outside Texas. That is, Mode 1 basically represents the state of affairs in Texas before May 4, 1976, although some adjustments are made in reserve levels to provide a fair basis of comparison. Mr. Arey's testimony describes in detail the design and testing of these system configurations. Three transmission systems were designed, one for each of three possible future modes of operation. In the first, WTU and CPL, are interconnected with ERCOT, and the combined system

is interconnected with the SWPP. This is called Mode 4. In the second, WTU and CPL are separated from ERCOT but interconnected with SWPP. This is called Mode 2. In the third mode, WTU, CPL and the City of San Antonio are separated but interconnected with the SWPP. This is called Mode 2S.^{1/} Each of the three transmission system designs will allow C&SW to realize the economic benefits of interconnected single company operation.

System Security and Reliability in Design

The C&SW transmission system has been designed with sufficient power transfer capacity to allow C&SW to take advantage of the economies of single company operation. These transmission

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Initially, the S&W assignment was design of transmission for Modes 2 and 4 only. A Mode 2S transmission design was added to the assignment as one possible resolution to the situation of the South Texas Project, a two unit nuclear power plant in south Texas, scheduled for service in 1981 and 1982. The four participants in this project have contracted to share this generation capacity as follows: HLP 770 Mw, City of San Antonio 700 Mw, CPL 630 Mw, and City of Austin 400 Mw. The split-up of ERCOT, inherent in a Mode 2 configuration, complicates the distribution of the power generated by STP to the four participants. The study utilizes two approaches to this problem.

1. None of the output of the STP will be available to CPL (Mode 2).
2. CPL and San Antonio share the output of one unit and HLP and Austin share the output of the other unit. (Mode 2S).

system designs have been tested to establish that they meet, as a minimum, the existing reliability criteria of ERCOT and SWPP. To determine reliability, each C&SW transmission system design was tested for two levels of system disturbances: "design level" contingencies and "less credible" contingencies.

"Design level" contingencies are those disturbances which can be expected to occur routinely on a power system, and for which the system is designed so that essentially normal system operation will result following the disturbances. Examples of "design level" disturbances are interruption of a single transmission line or loss of a single generator. A transmission system design meets "design level" testing if transmission lines are not overloaded, system voltages are within acceptable limits, and all generators remain connected to the system following a "design level" disturbance.

The "less credible" contingencies are those disturbances which rarely occur. However, the systems were designed so that, if one of these "less credible" contingencies does occur, neither cascading outages nor an area-wide blackout will follow. Some examples of this type of disturbance are: the sudden loss of all generating units in a power station, interruption of all circuits on a transmission line right-of-way; and a three-phase short circuit on a transmission line with delayed clearing. For the "less credible" type of

contingency, the power system may split up, and electric power service may be lost to some customers. But these events must not escalate into an area-wide blackout covering major cities or an entire power pool.

The C&SW transmission designs met both of these standards.

Transmission Design and Optimization

General

The C&SW transmission systems were designed to establish direct ties between C&SW companies which are capable of carrying the predicted maximum power transfers. The transmission systems have been tested for conformity to the transmission design criteria, and they have been optimized to minimize the transmission cost to C&SW. It should be pointed out, however, that the scheduled transfers between C&SW companies may or may not take place over the direct ties. In interconnected systems throughout the United States, the facilities of a third party often transfer power between two parties. This is because the routing of electricity cannot be mandated only by the construction of direct ties; energy finds its own path. The construction of additional direct ties between C&SW companies in Mode 4 would have little effect on the actual path which is followed.

In the Mode 4 system which S&W designed, the transfers between the C&SW companies will sometimes flow across transmission

lines of other interconnected companies. This is inevitable, as is the likelihood that power transfers between the other interconnected companies will flow across C&SW lines. In fact, there is always a good possibility that a power transfer might reduce loading of circuits, reduce losses, and improve stability, since the power transfer might be in a direction counter to an existing transfer.

It is one of the advantages of interconnected system operations that neighboring facilities can be, and normally are, relied upon to assist in times of trouble, and the S&W transmission design for C&SW does rely on the transmission systems of other companies during the emergencies.

In the event of a generator outage in the South, SWPP and the interconnected systems to the north will immediately provide the power. In the event the ERCOT system can pick up the needed generation, it will do so within a matter of minutes.

The magnitude of the lost generation coming from outside ERCOT will be added to the C&SW scheduled transfers, and the transmission system must be capable of carrying the total transfer. For example, if one fully loaded STP unit (1,250 Mw) were lost at a time when the north-to-south C&SW transfer were 1,000 Mw, there would be an immediate increase in power flow

into Texas to almost 2,250 Mw (1,000 + 1,250). In all modes of operation, the transmission systems are capable of carrying the normal C&SW transfers plus the additional power flows which result from sudden loss of any generator.

Mode 2 -- General

There is an inherent problem in the interconnection of C&SW in a Mode 2 configuration. In the east, there is a gap of about 100 miles between CPL and the nearest SWPP utility, Gulf States Utilities (GSU). The distance from CPL to SWEPCO is about 220 miles. In this area, no interconnections presently exist. West and north of Corpus Christi is a 500-mile stretch of 69 and 128 kv lines through CPL and WTU to PSO, and the Oklahoma border. No EHV transmission facilities exist in the west. In the east and north, there are major 345 and 500 kv transmission lines connecting PSO, SWEPCO, and GSU. It is apparent that the major ties from CPL should be made toward the major transmission to the east. At the same time, reinforcement of the existing WTU transmission will be required.

Mode 4

The Mode 4 design includes direct transmission ties between ERCOT and SWPP, interconnecting non-CSW companies, as well as the direct ties between the CSW companies. These non-CSW ties between TIS and SWPP are included to achieve the objective of interconnecting these two large systems in the

most economical manner, and to achieve a single interconnected system with a higher level of reliability than the two systems operating alone. The cost of these non-CSW ties was included in the transmission cost evaluations.

The ease with which ERCOT and SWPP can be interconnected is illustrated by Exhibit 21 to Mr. Arey's testimony. Maps of ERCOT and SWPP transmission development, as planned through 1986 without any interconnection in mind, have been submitted to the Federal Power Commission (FPC) as part of the response to FPC Order No. 383-3, and, in his Exhibit 21, Mr. Arey has superimposed these maps on each other to illustrate the transmission plans of both ERCOT and SWPP, proceeding independently from each other. This map shows that ERCOT and SWPP can be interconnected with relatively minor interconnection.

An examination of the Extra High Voltage (EHV) transmission system (345 and 500 kv) on these maps shows that, at two places along the ERCOT-SWPP border, the EHV transmission lines of the two systems will soon be essentially contiguous. These two locations are Houston and northeast Texas. There, transmission links on the order of 10 to 30 miles would be required to interconnect ERCOT and SWPP. Along the Texas border, north of Dallas, are additional locations where short EHV links would serve to interconnect ERCOT and SWPP. The distances there are on the order of 70 miles. In addition, there are several locations along the border of ERCOT and SWPP

where 138 kv transmission links could be established with changes in substation switching only, with no transmission construction required at these locations to interconnect ERCOT and SWPP.

A stability test directed by Mr. Arey was run on an ERCOT-SWPP System, interconnected by only 61 miles of 345 kv lines from Welch to Monticello, Hallsville to Martins Lake, and Porter to T. H. Wharton, plus 138 kv transmission links established by changes in substation switching only. The test applied was the loss of the entire STP plant, which was considered to be the most severe stability test possible. This test was stable. Mr. Arey concluded from this that the cost of interconnecting SWPP and ERCOT is therefore limited to the cost of the 61 miles of the three 345 kv links referred to above. He does not believe that any substantial transmission line construction to strengthen the internal transmission system of any ERCOT company would be required for stable, reliable operation in a Mode 4 configuration.

Stability: ERCOT Isolated vs. Mode 4

A selection of stability tests for the year 1986, which were run for the Mode 4 system, were repeated on an ERCOT isolated system, which is ERCOT operating isolated and not interconnected with SWPP. Two of these tests, involving three-phase faults with delayed clearing at Monticello and Martins Lake, were unstable for ERCOT isolated but stable

for Mode 4. And for a highly significant third test -- loss of the entire STP plant -- the system frequency drop for ERCOT isolated was sufficient to introduce the possibility that frequency relays may automatically shed some load. In the Mode 4 test, this frequency drop did not occur. These three tests represent conditions where there is a clear advantage to ERCOT to be interconnected with the SWPP, and system reliability is clearly enhanced by this interconnection. From these tests, Stone & Webster concludes that the interconnected ERCOT/SWPP system offers a higher level of reliability than is available on an isolated ERCOT system.

Modes 2 and 2S

Stability tests were performed on the final Mode 2 and 2S systems. All tests were stable. Therefore the transmission designs for Mode 2 and 2S meet the constraints of the design criteria and represent a viable alternative to Mode 4 for the interconnection of C&SW.

Results and Conclusions

The system designs here described satisfy the objective of reliability at minimum cost to C&SW.

From the economic studies, required to optimize system design, and the load flow and stability studies, required to test system designs, Stone & Webster draws certain conclusions:

1. A mode 4 system development represents a considerable cost savings to C&SW and its consumers in comparison with any other mode of development. For interconnection of ERCOT and SWPP in any mode, a-c ties represent substantial cost savings over d-c ties.

2. Interconnection of ERCOT and SWPP can be successfully accomplished by the construction of a few short, EHV transmission lines without any degradation of electric service in either system.

3. The interconnection of ERCOT with the SWPP, as proposed, will improve the reliability of the ERCOT system.

4. The preferred interconnection of C&SW is in a Mode 4 configuration. Mode 2 represents a viable, though less desirable, alternative to Mode 4 for the interconnection of C&SW.

Other Consequences of Interconnection

Using the system configurations designed and tested by Stone & Webster, as described above, Mr. Wood of PTI exhaustively studied the predicted effects of such systems in operation. His conclusions, as discussed below, show a clear and substantial advantage to interconnected operations and no realistic disadvantages to such operation.

1. Reliability

A reliability test or standard for electric systems has two attributes: adequacy and security. "Adequacy" is defined as a systems' capability to meet system demand within major component ratings and in the presence of unscheduled outage of generation and transmission facilities. This is the "reliability" discussed in Mr. Wood's testimony. "Security", on the other hand, is defined as system capability to withstand system disturbances arising from faults and unscheduled removal of bulk power facilities without further loss of facilities or cascading. The customary manner of achieving security in design

is to test system models against pre-defined standards. This was done by Mr. Arey in his transmission design study.

While the study of reliability, especially as regards a multi-area loss, is complex, expensive and time-consuming, C&SW directed that it be done in order to obtain a complete picture of the consequences of interconnection. The results state a convincing case in favor of interconnection. The dramatic improvement in reliability as measured by the generally accepted test of LOLP^{1/} values when isolated systems are interconnected may be illustrated by considering what happens to the calculated risk levels in 1980 for the various systems in ERCOT and the SWPP with different degrees of interconnection. (These data are summarized on Exhibit 15.)

^{1/}

The loss-of-load probability (LOLP) index is defined as the long-run average number of days in a period of time that load exceeds the available installed capacity. This index may be expressed in any time units for the period under consideration and, in general, can be considered as the expected number of days that the system experiences a generating capacity deficiency in the period. The name of this index is a misnomer since it is not truly a probability but is an expectation in the statistical sense. A year is also commonly used as the period of consideration. In this case, the LOLP index is the long-run number of days per year that the hourly integrated daily peak load exceeds the installed capacity available on that day. This index has the dimensions "days per year." Typical values in U.S. power systems range from less than 0.01 to 10 to 20 days per year.

In the four sub-systems which make up the TU system (TPL, DPL, TESCO and the Texas Municipal Power Pool) only TPL exhibits what have been historically considered satisfactory reserve and LOLP values when considered as an isolated system. However, when they are interconnected, all of the individual sub-systems show a considerable improvement and could be considered as having reasonably satisfactory LOLP values. These data show that it is quite reasonable for individual companies to rely upon interconnected companies for emergency reserve assistance. The position of the three operating subsidiaries of the Texas Utilities Company as forecast for 1980 emphatically illustrates this point.

Further interconnections of the various systems into Modes 1, 2, 2S or 4 exhibit even more dramatic improvements. Systems such as DPL and WTU which had isolated LOLP values between 1 and 100 days per year have improved their reliabilities to LOLP values of 0.01 or 0.02 in Modes 2 or 2S, 0.005 days per year in Mode 1 and for the Mode 4 interconnection, approximately .0002 days per year. This is an improvement of four or five orders of magnitude. Other tests conducted by PTI also reach the conclusion that LOLP values improve with interconnection in place.

When studied by individual system, annual LOLP values are minimized (i.e., they show the greatest reliability) with Mode 4 interconnection. In the four SWPP systems studied

(Southwestern Public Service Company, Oklahoma Gas & Electric, Public Service Company of Oklahoma and Gulf States Utilities), Mode 1 generally exhibited LOLP values which were, or were close to, the maximum values. Mode 4 results were best. In many cases the interconnection of SWPP to portions of the ERCOT system (that is, Modes 2 and 2S) improved the individual system LOLP levels.

On the other hand, the results for the ERCOT systems generally showed improvement by going from Mode 1 to Mode 4 and degradation by adopting Mode 2 or 2S. This degradation occurs in 2 and 2S because the total available reserves have been reduced. The LOLP values for the Texas Systems show a tendency to become worse with time because the reserve levels in ERCOT descend to less than 20% in 1986 from highs of 25 to 35% earlier. However, in no case, even with Mode 2 or 2S is the computed reliability level of any area considered to be extraordinarily high.

It is clear from these results that there are substantial reliability benefits available to all of the systems studied by adopting Mode 4. Reliability levels are always increased over those from Mode 1 when considering Mode 4. Reliability in all of ERCOT is decreased for Modes 2 and 2S.

Conclusions Drawn From Loss of Load Probability Studies

Based upon the designs studied, the Mode 4 interconnection offers a substantial increase in reliability of both the areas within ERCOT and those within SWPP. If the ERCOT system remains divided into two separated systems and Mode 2 or 2S is adopted, the calculated reliability levels of the ERCOT systems will be adversely affected relative to those for Mode 1. Assuming that a computed LOLP value in the range of 0.1 to 1 day per year would be satisfactory, the expected reliability even with Modes 2 or 2S is satisfactory. If it is felt that some remedy for this is necessary, then additional generation capacity will need to be considered.

It appears from these data that it may well be desirable to consider additional capacity in the 1980 to 1990 period since the expected capacity reserves within ERCOT are forecast to fall below 20% by 1986.

Further, this study demonstrates that all of the systems depend to a greater or lesser degree upon their interconnections for satisfactory reliability levels. This is true for the systems which go to make up the TU areas as well as for the remaining systems within the study area.

Finally, the study demonstrates that a Mode 4 interconnection could permit delaying generation installations. With current economic forecasts this might not result in lower

expected revenue requirements. In the future (as it has in the past) it might result in a major savings if new capacity could be deferred. Interconnections permit the sharing of reserve capacity and provide one more means for sharing in available economic energy transfers.

FUEL COST SAVINGS

The question of fuel cost savings necessarily turns on the availability and relative price of various fuels and the regulatory constraints that apply. All of these are changing almost daily, but C&SW has made a reasonable forecast based on up-to-date information and the increasing national emphasis on conservation. The investment, fuel, and operating cost assumptions are specifically set out in the testimony of Mr. Wood (at 78 - 83).

The models used as a basis for the fuel case projections recognize CSW's obligation to install sufficient interconnection transmission circuit capability to deliver the expected economic interchange of power between operating subsidiaries. In addition, the interconnection costs between SWPP and ERCOT required for Mode 4 were all charged to CSW. But, consistent with past practice, no attempt was made to estimate potential charges for the transfer of power via

interconnected systems (i.e., "wheeling") which might be negotiated between CSW and any interconnected system in a Mode 4 configuration.

The following table summarizes the revenue requirement savings for the C&SW companies with two alternate forms of interconnection as against a mode of operation (Mode 1B) similar to that followed historically, except that WTU and CPL are jointly dispatched as are SWEPCO and PSO. Reserve levels are approximately the same in all three modes.

Mode	Fuel Costs ^{1/}	Millions of Dollars Savings	
		Total	Present Value
2A	Low (A)	848	49
2A	High (B)	1638	182
4	Low (A)	1702	272
4	High (B)	2349	393

^{1/} Fuel oil costs were assumed to be approximately \$2.10 per MMBtu, with escalation at 6% and 10% (6% after 1984) respectively throughout the study period for the low and high cost figures.

Natural gas costs were based on company contract figures or, if a contract expired prior to 1984, the fuel oil cost was used. After 1983, it was assumed that natural gas would be equal in cost to fuel oil.

(Cont.)

The Mode 2A plan is used for this comparison rather than 2 because it currently appears economically advantageous to replace the unavailable STP nuclear capacity in Mode 2 by advancing the installation of the second Coletto Creek unit.

The indicated savings again arise primarily from anticipated reductions in future operating costs for the generation system. The interconnected Modes 2, 2A, 2S and 4 are all anticipated to offer the opportunity to save future oil and gas consumption. Again taking Mode 1B as reference these potential oil and gas savings are equivalent to approximately 39 million barrels of oil for Modes 2A or 4.

(continuation F.N. 1/)

Coal costs were calculated based on mine-mouth railhead and transportation costs, using 1976 figures. Low fuel costs are based on 6% escalation; high fuel costs are based on 10% escalation through 1984, 6% thereafter.

Lignite costs were based on a 1984 fuel costs ranging from .95/MMBtu to 1.59/MMBtu, at a compound escalation rate of 6% per year for both low and high fuel costs.

Nuclear fuel costs calculations were based on contract rates and other current data. Low fuel cost assumptions were based on reprocessing and uranium ore at a 1977 price of \$41/MMBtu with 5% escalation compounded annually. High fuel costs were based on no reprocessing, charges for transportation and storage, and escalation at 8% compounded annually.

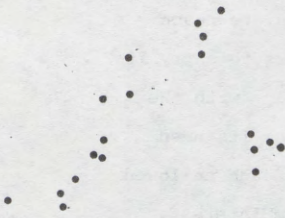
Conclusion

It is clear from this well-documented discussion that full interconnection of the Electric Reliability Council of Texas with the Southwest Power Pool would result in major improvements in electric reliability, in significant savings of scarce fuels and in much reduced costs to consumers. The large Texas utilities have refused even to study the problem in a serious way and have chosen, ostrich-like, to attempt to continue their traditional isolation in an effort to maintain their exemption from Federal jurisdiction.

Central and South West Corporation seeks passage of Section 521 to remove all question of the right and duty of the Federal Power Commission to hear the facts, to reach the appropriate conclusions and to issue orders to carry its conclusions into effect. It is late in the day, with the nation faced with an enduring crisis in meeting its need for energy, to allow technicalities -- even though hallowed by tradition -- to block pursuit of the public interest.

The pathetic story of the non-resolution of the Texas intertie problem proves beyond any question the need to clarify and broaden the statutory mandate to bring about broad inter-connection among electric utilities as it becomes increasingly appropriate in the public interest.

Central and South West Corporation



1976 Annual Report

Notice of Annual Meeting

The Annual Meeting of Stockholders will be held at 10:45 a.m., Thursday, April 21, 1977, at the Sheraton Inn, Sky Line East, Tulsa, Oklahoma. A formal notice of this meeting, together with a proxy statement and form of proxy, will be mailed to each stockholder on or about March 15, 1977. Please vote your shares by signing and returning your proxy as soon as possible.

The 57,713,102 shares of Central and South West Corporation common stock, outstanding at the end of the year, are owned by approximately 42,000 stockholders living in each of the fifty states and in many foreign countries.

Automatic Dividend Reinvestment and Stock Purchase Plan

The Corporation is offering to the holders of its common stock the opportunity to purchase additional shares through an Automatic Dividend Reinvestment and Stock Purchase Plan. The Plan provides that holders may automatically reinvest their cash dividends in new issue shares of common stock of the Corporation. If stockholders elect to reinvest their cash dividends, they may also make optional cash payments to purchase additional shares. No service fees or brokerage commissions will be charged for purchases in the Plan. Shareholders may join the Plan at any time. For further information, stockholders may write to The First National Bank of Chicago, Shareholder Services Department, Box 1762, Chicago, Illinois 60690.

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 - IBC Directors and Officers of Central and South West Corporation
-

Central and South West System

Central and South West Corporation
Incorporated in 1925 Under the Laws of Delaware
300 Delaware Avenue
Wilmington, Delaware 19899

CSR Services, Inc.
One Main Place
Dallas, Texas 75250

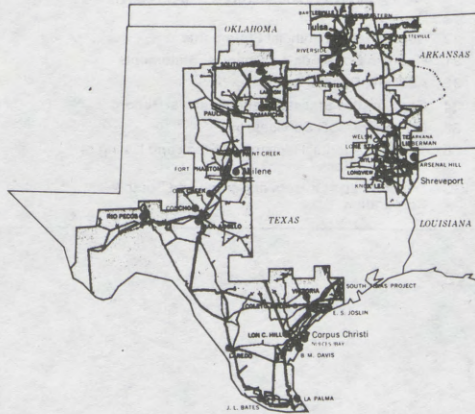
Operating Subsidiaries
Central Power and Light Company
Corpus Christi, Texas
Public Service Company of Oklahoma
Tulsa, Oklahoma
Southwestern Electric Power Company
Shreveport, Louisiana
West Texas Utilities Company
Abilene, Texas

Central and South West Corporation, a public utility holding company, owns all of the common stock of four operating subsidiaries. CSR Services, Inc. (wholly-owned by Central and South West Corporation) performs (at cost) various accounting, tax, engineering, legal and other services for the Corporation and the operating companies.

The operating subsidiaries provide electric service to a population of more than three million people in a widely-diversified area covering 152,000 square miles. Central Power and Light Company operates in south Texas, and West Texas Utilities Company in central and western Texas. Southwestern Electric Power Company operates in northwestern Louisiana, northeastern Texas and western Arkansas, and Public Service Company of Oklahoma in eastern and southwestern Oklahoma.

Principal cities served by the System companies are Corpus Christi, Abilene, Laredo and San Angelo in Texas; Tulsa and Lawton in Oklahoma; Shreveport-Bossier City in Louisiana; and Texarkana in Arkansas and Texas.

- System Service Area
- Principal Generating Stations
- UNDER CONSTRUCTION
- Principal Transmission System:
 - 138,000 to 345,000 volts
 - 69,000 to 138,000 volts
 - - - Leased from others
 - Principal interconnections



Highlights

Central and South West Corporation and Subsidiary Companies

Summary of Consolidated Financial and Operating Statistics

Financial Statistics (000)	1976	1975	Percent Increase
Operating Revenues	\$926,126	\$740,153	25.1
Fuel	443,852	289,875	53.1
Wages and Employee Benefit Plans	80,540	74,184	8.6
Other Operating Expenses and Taxes	183,373	168,369	8.9
Federal Income Taxes	76,076	74,315	2.4
Net Operating Income	142,285	133,410	6.7
Net Income for Common Stock	90,210	87,588	3.0

Common Stock Data

Net Income per Share	\$1.75	\$1.72	1.7
Dividends Paid per Share	\$1.20	\$1.16	3.5
Common Shares Outstanding (average)	51,568,000	51,060,000	1.0

Operating Statistics

Kilowatt-hour Sales (000)	35,883,100	32,946,100	8.9
System Coincident Peak Load (kilowatts)	6,825,100	6,506,400	4.9
Estimated System Capability (at time of peak) (a) (kilowatts)	9,160,000	8,540,000	7.3
Operating Employees (year-end)	5,832	5,907	(1.3)
Electric Customers (year-end)	1,180,900	1,146,800	3.0
Average Kilowatt-hour Sales per Residential Customer	8,596	8,771	(2.0)
Average Residential Rate per Kilowatt-hour	3.57¢	3.13¢	14.1

(a) Includes net purchased power of 425,000 kilowatts and 635,000 kilowatts, respectively.

Letter to Stockholders

March 4, 1977

□ Planning a future electric power supply for the service area of the Central and South West System has become increasingly challenging because of unusual weather, the uncertainties of energy conservation by customers and the availability of fuel supplies. Historically, additions to generating capability have been aimed to meet maximum demand during the summer when air conditioning load is the heaviest. Four consecutive cool summers, however, have raised questions as to the extent of the summer peak demand under normal conditions.

Nevertheless, management of the Central and South West System during 1976 continued its plans to assure a reliable and economic power supply. Special attention has been given to the development of long-term supplies of coal and lignite fuel for future generation in view of existing shortages and restrictions for the System's basic fuel, natural gas. Coal arranged under contract and the acquisition of interests in lignite acreage during the past few years are the planned sources of fuel for more than six million kilowatts of fossil-fueled generating capacity that is envisioned for service during the coming decade and a half.

□ Plans for future realignment of System operations on a fully interstate, synchronous basis continue to develop. This mode of operation promises very significant long-range economies; however, it is being vigorously opposed in various proceedings by certain other electric utility companies in Texas. A special section in this Annual Report describes the controversy more fully.

□ In order to achieve an earnings level necessary to attract capital for financing the System's substantial construction program, three of the four operating companies applied for rate relief during the year. Increased rates totaling \$32 million annually have been approved and petitions for \$38 million are pending approval. In spite of all efforts by management to control capital expenditures and operating costs, there will doubtless be further requests for higher electric rates.

□ The sale of additional common stock by the Corporation in December provided \$100 million of new equity capital. The System's consolidated capitalization structure at the end of the year was one of the most conservative in the electric utility industry, which enables considerable flexibility in meeting future capital needs. In view of long-term requirements, however, sale of common stock by the Corporation is expected to be at more regular intervals than in the past.

□ The Central and South West operating companies have, since the oil embargo of 1973, recognized the need for conservation and have advised their customers on methods of efficient energy use. More comprehensive energy-savings programs will be necessary because the System serves a dynamic portion of the Nation's "sunbelt" where energy sources are needed to meet the demands of industries and individuals that are attracted to the area in large numbers.

The severe cold weather that blanketed the Nation in early 1977 brought abruptly to the public's attention the need for a national program for the limitation of energy consumption, for the development of new fuel sources and for the interchange of electric power economically from one region to the other. The realization of these goals is imperative if the Nation is to have a viable economic future.

Bill J. Harris
President and Chief Operating Officer

S.B. Phillips, Jr.
Chairman and Chief Executive Officer

Review of 1976

Net Income and Dividends

Consolidated net income for common stock in 1976 totaled \$90,210,000, as compared with \$87,588,000 in 1975—an increase of 3%. For the five-year period, 1972 through 1976, consolidated net income for common stock has grown at an average annual compound rate of 6.2%.

Earnings per common share were \$1.75 based on 51,568,000 average number of shares outstanding. This compares with \$1.72 in 1975 on 51,060,000 average number of shares. The improved earnings during 1976 resulted largely from increased energy sales and from higher electric rates charged to customers.

The Corporation's Board of Directors raised the quarterly dividend rate to 30 cents per share in January, 1976. Dividends paid to the common stockholders during 1976 totaled \$1.20 per share, with quarterly payments of 30 cents made on February 27, May 28, August 31 and November 30.

A further dividend increase in the quarterly rate to 31½ cents was authorized at the Directors' January, 1977 meeting. This is the twenty-fifth consecutive year that the Corporation has raised its dividend. The initial payment at the new rate was made to stockholders on February 28, 1977.

Year	Consolidated Net Income Per Share	Dividends Paid Per Share
1976.....	\$1.75.....	\$1.20.....
1975.....	1.72.....	1.16.....
1974.....	1.76.....	1.12.....
1973.....	1.72.....	1.08.....
1972.....	1.63.....	1.04.....
1971.....	1.50.....	1.00.....
1970.....	1.43.....	0.95.....
1969.....	1.33.....	0.90.....
1968.....	1.18.....	0.85.....
1967.....	1.17.....	0.80.....
(Years prior to 1973 adjusted for two-for-one stock split)		

Electric Energy Sales

Electric energy sales to the 1,181,000 customers served by the System's four operating companies totaled 35.9 billion kilowatt-hours—8.9% more than the previous year.

<i>Electric Energy Sales</i> (millions of KWH)			
	1976	1975	Gain
Residential	8,556	8,494	0.7%
Commercial	6,894	6,557	5.1
Industrial	10,600	9,626	10.1
Other	996	941	6.0
Total (above)	27,046	25,618	5.6%
To Other Utilities	8,837	7,328	20.6
Total	35,883	32,946	8.9%

Mild summer weather in the service area reduced anticipated energy use for air conditioning by both residential and commercial customers. Temperatures from May through October averaged 24% below normal and 18% below 1975. It was the fourth consecutive year that summer temperatures were lower than normal.

Primarily because of higher prices paid by the System for fuel, the average cost of electricity to the retail customers rose 15% to 2.96 cents per kilowatt-hour. Evidence suggests that this higher-priced energy resulted in reduced use by customers.

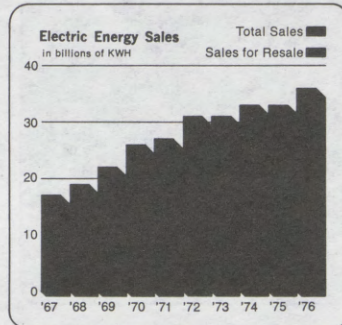
The adverse impact of below-normal temperatures and energy conservation on System sales is shown by the 2% decline in average annual consumption per residential customer to 8,596 kilowatt-hours.

In contrast, improved economic conditions in the service area during 1976 were

reflected in the 10.1% gain in System sales to industrial customers. Increases in energy sales to some of the leading industries were as follows: oil and natural gas extraction 6%, chemical 17%, primary metal 8%, petroleum refining 12% and food processing 5%.

Sales to other electric utility systems during 1976 totaled 8.8 billion kilowatt-hours, or 20.6% more than in 1975. The availability of System generating capacity helped avert power shortages of neighboring utilities.

The System's 1976 peak demand of 6,825,100 kilowatts occurred on August 10—4.9% over the peak of the previous year. System total capability of 9,160,000 kilowatts at the time of the 1976 maximum demand provided a 34% reserve margin. The annual load factor was 55.7% in 1976. It has shown little change in recent years.



Operating Revenues and Service Area Growth

Operating revenues increased 25.1% to \$926,126,000 from \$740,153,000 in 1975.

Operating Revenues (thousands)	1976	1975	Gain
Residential	\$305,113	\$266,034	14.7%
Commercial	221,638	185,010	19.8
Industrial	245,108	181,844	34.8
Other	28,905	24,182	17.1
Total (above)	\$800,164	\$657,070	21.8%
From Other Utilities	125,962	83,083	51.6
Total	\$926,126	\$740,153	25.1%

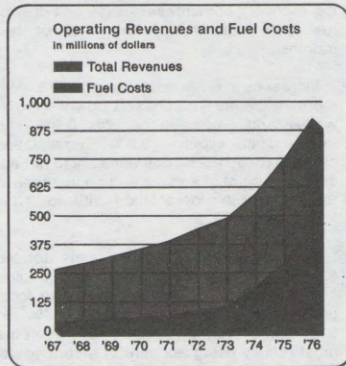
Revenues collected under automatic fuel-adjustment clauses accounted for \$126 million, or 68% of the \$186 million revenue gain. Rate increases accounted for \$10 million, or 5%. The balance of \$50 million represented growth from operations, equivalent to 7% over the previous year.

System residential customers paid an average electric bill of \$306.33 during 1976, up 12% from \$274.70 in 1975. Approximately 85% of the increase was due to revenues collected under automatic fuel-adjustment clauses. Residential customers paid an average of 3.57 cents per kilowatt-hour in 1976, or 14.1% more than in 1975. In spite of this rise, the System's residential rate compares favorably with the industry average of 3.74 cents.

The economy of the service area rebounded sharply in 1976, most notably in the industrial sector. Furthermore, new business investment during the year was encouraging. Industrial demand added during

1976 included 75,000 kilowatts from new plant locations and 200,000 kilowatts from plant expansions, or a total of 275,000 kilowatts. This compares with 245,000 kilowatts in 1975, and an annual average of 229,000 kilowatts during the previous five years. Approximately \$22 million of revenues are expected from the new industrial load added in 1976.

Residential construction rose sharply from the depressed level of 1975. Single-family home completions totaled 17,000, as compared with 12,200 in 1975, and new multi-family units numbered 5,800, up 43% from 4,050 in 1975. Total-electric homes accounted for 37% of the single-family residences and 65% of the multi-family units built during 1976. This trend toward total-electric construction in the service area reflects concern for the future availability of natural gas supplies.



Operating Expenses and Taxes

Every effort was made to control costs during the year, but inflation's impact affected practically all phases of operations.

Fuel for System generation continued to be the most rapidly rising expense item. It increased 53.1% to \$443,852,000, equivalent to 48% of System revenues, as compared with 39% in 1975, and 19% in 1972. This trend is due to the substantial rise in the cost of intrastate natural gas since the oil embargo in 1973.

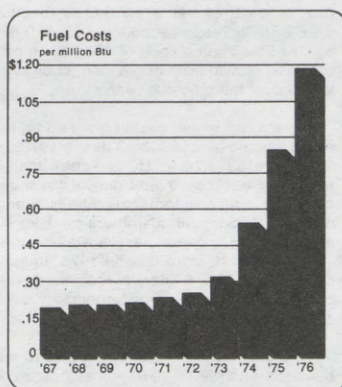
Unit cost of System fuel rose to \$1.18 per million BTU in 1976, as compared with 84 cents in 1975 and 25 cents in 1972. It is estimated that System fuel costs will average approximately \$1.45 per million BTU during 1977. Application of automatic fuel-adjustment clauses to nearly all of the System's kilowatt-hour sales makes possible the recovery of increases in the unit cost of fuel from customers within one or two months.

Increases in other costs during 1976 were more moderate—purchased power 12.6%, wages and employee benefits 8.6% and maintenance expense 3.8%. Depreciation charges rose 10.2%, due primarily to net additions to plant in service and an increase in the composite depreciation rate to 3.3% from 3.2% in 1975.

Federal, state and local taxes totaled \$127,256,000, an increase of 5.3% over 1975. Revenue-related taxes paid to local governments, which increased 17% to \$14,802,000 during the year, have been the most rapidly rising tax item in recent years. This cost increase results principally from the escalation in the amount of revenues collected under fuel-adjustment clauses.

The System companies normalize the income tax consequences resulting from essentially all timing differences between book and tax deductions. This conservative accounting practice enhances the quality of earnings and improves the cash flow from operations.

The consolidated effective Federal income tax rate of 43.9% in 1976, as compared with approximately 37% for the utility industry as a whole, is another indication of the System's conservative accounting practices. The difference between System's income tax rate and the statutory rate of 48% was due primarily to exclusion from taxable income of allowance for funds used during construction. (Refer to the Notes on page 31 for further information.)



Financing

Funds from the sale of securities by the System companies during 1976 totaled \$179,637,000—the largest annual financing in the System's history. The proceeds were applied toward the 1976 construction program and will provide funds for some of the capital needs during 1977. Internally-generated funds during 1976 were also at a record high, amounting to \$145,335,000. The latter source provided 52% of 1976 capital requirements.

In April, Southwestern Electric Power Company sold \$45 million 8¾% First Mortgage Bonds, due in 2006 at an interest cost to the Company of 8.82%. In addition, that Company participated in an \$8.1 million offering of 6.20% Pollution Control Bonds. In June, Public Service Company of Oklahoma offered to the public through underwriters 250,000 shares of 8.88% Series Preferred Stock, at a cost of money of 8.85%.

Central and South West Corporation sold 6,250,000 additional shares of its common stock to underwriters on December 14, at a price of \$16.131 per share. The shares were reoffered to the public at \$16⅞, or 22% above the book value of the common stock. Net proceeds of \$100,819,000 to the Corporation were used to repay \$37,375,000 of short-term borrowings. The balance will provide funds for the construction programs of the operating companies.

Consolidated capitalization on December 31, 1976 consisted of long-term debt 46.9%, preferred stock 8.5% and common stock equity 44.6%. The System had no short-term debt outstanding at the end of the year. Embedded interest cost of long-term debt outstanding was 6.71%, as compared with 6.57% at the end of 1975.

The Corporation has received approval from the Securities and Exchange Commission to issue a maximum of \$115 million of commercial paper or bank loans. The Corporation's commercial paper is given the highest rating by both Standard and Poor's Corporation (A-1) and by Moody's Investors Service, Inc. (Prime-1).

During 1977, public financing is expected to consist of first mortgage bonds and preferred stock by the operating companies. The first mortgage bonds and the preferred stocks of the operating companies are rated "double A" by Moody and Standard & Poor.

During the first quarter of 1977, the Corporation expects to make the following capital contributions to the operating companies—Central Power and Light Company \$40 million, Public Service Company of Oklahoma \$30 million and Southwestern Electric Power Company \$10 million.

Construction Expenditures

In 1976, the System's four operating companies spent \$280 million for net additions to electric utility plant. Cash outlays for construction in 1977 are expected to be \$500 million. During the five years, 1977 through 1981, new plant expenditures are projected at \$2.7 billion.

The System added 775,000 kilowatts of generating capability in 1976 at an average cost of \$128 per kilowatt. New generating capability scheduled for service in 1977 includes a 528,000-kilowatt coal-fired unit in east Texas at a cost of \$240 per kilowatt and a 200,000 kilowatt gas/oil-fired plant in west Texas at a cost of \$133 per kilowatt.

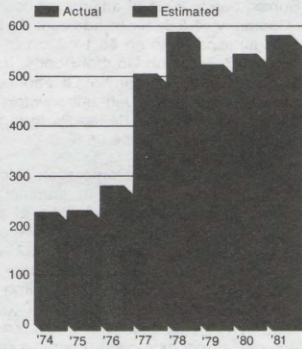
Year	Kilowatts
1977.....	728,000
1978.....	264,000
1979.....	450,000
1980.....	1,528,000
1981.....	315,000
Total.....	3,285,000

During the period 1978 through 1981, planned new generating capability includes five coal-fired units totaling 2,242,000 kilowatts and a 315,000 kilowatt portion of a jointly-owned nuclear unit. The coal plants will be located in east and south Texas (1,078,000 kilowatts), in Oklahoma, near Tulsa (900,000 kilowatts), and in northwestern Arkansas (264,000 kilowatts). The jointly-owned nuclear plant's location is in south Texas. The average investment cost per kilowatt for the five coal units is estimated at \$329 and for the nuclear unit \$550.

System planning, 1982 through 1986, includes 2,224,000 kilowatts of coal and lignite capability and 1,715,000 kilowatts of nuclear facilities. Changes in load growth estimates could alter the type and timing of some of the units currently scheduled for this period.

If the construction program is implemented as planned, coal and nuclear would represent 26% of total generating capability in 1981, and by 1986 coal, lignite and nuclear would account for 46%.

Cash Construction Expenditures
in millions of dollars



Fuel Supply

Summary. Natural gas was the System's primary fuel during 1976—accounting for 97% of generation. Oil burning of 1,633,000 barrels represented the remainder. Projected fuel use in 1977 is natural gas 92%, coal 6% and oil 2%. It is anticipated that fuel mix in 1981 will be natural gas 63%, coal 33%, nuclear 3% and oil 1%. Coal, lignite and nuclear are expected to provide approximately 62% of the System's fuel needs in 1986, with the balance being natural gas and oil.

	Percent Generation by Type of Fuel					
	Actual			Estimated		
	1976	1977	1978	1979	1980	1981
Natural Gas	97%	92%	88%	83%	67%	63%
Oil	3	2	2	2	1	1
Coal	—	6	9	15	32	33
Nuclear	—	—	—	—	—	3
Total	100%	100%	100%	100%	100%	100%

Natural Gas. The System receives natural gas under long-term contracts with major pipeline companies (66% of purchases in 1976) and with producers directly at the well head (30%). The remaining portion is obtained from wells in which the operating companies have an ownership interest or from short-term contracts and spot purchases. The long-term contracts are subject to price escalation provisions that include price increases at stated intervals, adjustments relating to supplier costs and price index changes.

The System's major gas suppliers during 1976 were Public Service Company of Oklahoma's subsidiary Transok Pipe Line Company (39% of the total), Exxon Company (14%) and Coastal States Gas Producing Company (17%). In addition, Lone Star Gas

Company, Houston Pipeline Company and Delhi Gas Pipeline Company provided 6% to 9% each. The remaining 9% came from smaller suppliers. Importantly, 64% of the System's gas supply during 1976 came from dedicated and owned reserves.

Curtailments by the System's gas suppliers were minimal during 1976; however, extreme cold weather early in 1977 resulted in major curtailments by two suppliers in Texas. Periods of 100% curtailment by any one supplier were limited to only a few days. In spite of the severe weather in January, 1977, slightly less than 10% of generation was provided by fuel oil.

The Texas Railroad Commission has issued orders prohibiting Texas gas suppliers from entering into new contracts for sale of natural gas for boiler fuel use. The orders also require that deliveries under existing contracts be reduced from their 1974 or 1975 highest level by 10% in 1981 and by 25% in 1985. System plans meet these requirements.

Oil. Over the last few years, the operating companies have modified their gas-fired generating units to burn oil. Approximately 25% of capability is now equipped to burn oil on a continuous basis and another 54% can burn oil for shorter periods.

At the end of 1976, fuel-oil storage capacity was 4,936,000 barrels. Fuel-oil inventory was 2,695,000 barrels, at an average cost of \$10.69 per barrel. This supply is equivalent to approximately 4% of total fuel use anticipated during 1977.

Coal and Lignite. During 1976, Central Power and Light Company negotiated a 25-year contract with Colowyo Coal Company, a subsidiary of W.R. Grace & Co. and Hanna

Mining Company. The contract provides for a supply of 30 million tons of low-sulphur coal from Colorado for Central Power and Light Company's Coletto Creek plant (550,000 kilowatts) scheduled for operation in 1980. Initial delivery is expected in 1979 at an estimated cost of \$1.44 per million BTU.

As reported in last year's Annual Report, both Public Service Company of Oklahoma and Southwestern Electric Power Company have contracted for low-sulphur coal from Wyoming for six new generating units, with a total capability of 2,748,000 kilowatts. Coal delivery to Southwestern Electric Power Company began late in 1976 at a price of 89¢ per million BTU. The estimated cost of the supply delivered in 1979 to Public Service Company of Oklahoma is \$1.28 per million BTU. In all instances, contracted coal supplies meet Federal and state air quality standards without the necessity of installing expensive scrubber devices.

The System plans to use lignite for a substantial portion of future generating capacity. Leases have been acquired on acreage in east Texas and western Louisiana that is estimated to have more than 500 million tons of lignite reserves, sufficient for a thirty-year supply for more than 3 million kilowatts of generating capacity. It is expected that the first lignite-burning plant will be in operation in 1984.

Nuclear. Two of the System's operating companies are planning nuclear facilities for power generation in the 1980's. Central Power and Light Company is a participant in a plant (South Texas Project) consisting of two 1,250,000 kilowatt units scheduled for service in 1981 and 1982. The Company's share is 25.2%, or 315,000 kilowatts in each unit. Public Service Company of Oklahoma

is building two 1,150,000 kilowatt units for service in 1983 and 1985, of which an ownership of 450,000 kilowatts in each unit has been dedicated to other utility systems.

Westinghouse Electric Corporation is expected to provide a uranium concentrate supply for the initial core for each of the two South Texas Project nuclear units. Westinghouse has stated that it will not fulfill its obligation to supply the total fuel requirements of these units as originally contracted. The project manager, Houston Lighting & Power Company, is considering alternate sources for later fuel loadings.

Public Service Company of Oklahoma is negotiating in a number of areas for a fuel supply for its two nuclear units.

Regulatory Developments

During the year, three System companies—Central Power and Light Company, Public Service Company of Oklahoma and Southwestern Electric Power Company filed requests with regulatory authorities for higher electric rates. The effect of inflation on operating costs and construction expenditures, as well as current outlays for more expensive coal and nuclear facilities needed for a future power supply, dictated these actions for rate relief.

Central Power and Light Company. On September 1, 1976, the Public Utility Commission of Texas assumed jurisdiction over rates for electric customers in rural areas and unincorporated communities. Rates in incorporated municipalities continued, as in the past, to be regulated by their respective governing bodies, but provision was made for an electric utility to appeal a municipality's action to the Texas Commission.

On August 23, 1976, Central Power and Light Company filed higher electric rate schedules for \$26.3 million in 107 incorporated communities it serves in Texas, and on August 27 put into effect increased electric rates for \$10.3 million in rural areas. The total of \$36.6 million was equivalent to an increase of approximately 11½%.

As the result of an appeal by Central Power and Light Company to the Texas Commission, when several towns rejected the Company's request, the Commission on January 5, 1977 issued a rate order authorizing a revenue increase of \$23.4 million, or 64% of the \$36.6 million requested. These rates, equal to a 7.4% increase, became effective in substantially all of the Company's service area on January 24, 1977. Late in February, a portion of this increase was challenged by several of the cities affected.

The decision was significant because it was the first electric utility rate order issued by the Texas Commission. Furthermore, it recognized certain factors necessary to preserve the financial integrity of an electric utility. Highlights of the decision were—(1) the inclusion of all construction work in progress in the Company's rate base, (2) the adoption of period-end rate base upon which rate of return was determined and (3) the relative promptness of the Commission's rate order (approximately three months after the Company's filing).

The inclusion of construction work in progress in rate base was favorable because it substituted the benefits of cash earnings in the Company's income statement for the non-cash item of allowance for funds used during construction. Inclusion of construction work in progress in rate base also recognized the principle that present customers should contribute to the adequacy of a future supply of electricity. The Commission's rate order authorized a 14% return on period-end common stock equity.

Public Service Company of Oklahoma. As reported previously to stockholders, the Oklahoma Supreme Court issued an opinion declaring that the Corporation Commission of the State of Oklahoma lacked jurisdiction to enter a May 15, 1975 order restructuring the rates of Public Service Company of Oklahoma.

The Court's action resulted from a filing by a group of industrial customers contending that the Oklahoma Commission's notice of proceedings regarding a rate increase was unconstitutional because it failed to state that the increase would be other than pro rata on the basis of previous rate structures. Upon a petition for a rehearing filed by Public Service Company of Oklahoma and

the Oklahoma Commission, the Court has allowed oral argument.

During 1976, Public Service Company of Oklahoma collected \$14.9 million of revenues under the general rate increase authorized by the Oklahoma Corporation Commission in May, 1975.

On December 6, 1976, Public Service Company filed a request for a further general rate increase with the Oklahoma Commission seeking additional annual revenues of \$18.5 million, or approximately 9%.

Public Service Company has also requested a rate increase from the Federal Power Commission for service provided under its contract with Grand River Dam Authority, an agency of the State of Oklahoma. During the past few years, adjustments permitted under the contract have not enabled the Company to increase its charges to the Authority commensurate with its higher cost of providing service (particularly fuel costs). This inequity means that other customers of Public Service Company are subsidizing the service being provided to the Authority. The amount requested under the rate application with the FPC totals approximately \$9 million.

Southwestern Electric Power Company. On July 21, 1976, higher electric rates, amounting to \$9.8 million of additional annual revenues, were requested in the Company's service area in Texas; and on August 25, substantially all of the increase became effective. In November, Southwestern Electric Power filed for a \$10.3 million rate increase in Louisiana and in December it requested a \$7.9 million increase in Arkansas.

All of the applications were based on forward test years that included construction work in progress in rate base and an esti-

mated cost of certain projected financings. The additional revenues requested were designed to produce a 15% return on period-end common stock equity.

The higher electric rates now being collected in Texas and the amounts sought in Louisiana and Arkansas are the first general rate increases ever implemented or requested by Southwestern Electric Power.

Management Changes

At the October, 1976 meeting of the Corporation's Board of Directors, S.B. Phillips, Jr. was elected to the newly-created position of Chairman of the Board and Chief Executive Officer. Mr. Phillips had been President of the Corporation since 1965.

Bill J. Harris succeeded Mr. Phillips as President and was also named the Corporation's Chief Operating Officer. Mr. Harris had been Vice President-Fuel for Public Service Company of Oklahoma. Prior to that position, he had been President of Transok Pipe Line Company, a fuel subsidiary of Public Service Company of Oklahoma.

The Board also named Frederick J. Herr, Jr. to the position of Vice Chairman and Chief Financial Officer, and Vice President Robert L. Range to the additional post of Assistant to the Chairman. Mr. Herr had been the Corporation's Financial Vice President. Leroy J. Scheuerman continues as the Corporation's Treasurer and Secretary.

At the January, 1977 Board of Directors meeting, Philip I. McConnell was elected Vice President and General Counsel of the Corporation. Previously he had been associated with Southwestern Bell Telephone Company.

*A Compendium of
Securities and Exchange Commission
Proceedings and Related Matters*

Introduction. The year 1976 brought a number of important developments, operational and legal, in plans for the regular operation of all System facilities coordinated on a synchronous, interstate basis. These plans have several antecedents.

In March 1974, a group of wholesale customers of Public Service Company of Oklahoma filed allegations with the Securities and Exchange Commission to the effect that the System's simultaneous maintenance of interstate and intrastate operations was impermissible under the Public Utility Holding Company Act of 1935.

The System undertook a study, conducted by Power Technologies, Inc., independent consultants of Schenectady, N.Y., to evaluate the relative economic advantages to its customers of alternative future modes of operation. In December 1975, it filed with the SEC a proposal, based on the results of this study, to end the isolated intrastate operation of Central Power and Light Company and West Texas Utilities Company and construct additional interconnections for the regular interstate operation of the System.

The Corporation believes that, as the PTI study showed, interstate operation of the System offers economies for the future as compared to other modes, most importantly because it will permit greater load fac-

tors for coal, lignite and nuclear plants. These plants, which will have higher capital costs but lower fuel costs than present units, can in interconnected operation serve customers throughout the System, thus maximizing their cost effectiveness. In the past, when inexpensive natural gas supplies were available, gas could be burned efficiently in small units, and such unified operation was not as important.

Without interconnections to the larger systems of Houston Lighting & Power Company and Texas Utilities Company, which the Central and South West System borders over most of its extent, a significantly greater number of transmission lines would be required to realize optimum economies from synchronous interstate operation. The higher construction costs necessary to build these lines would significantly reduce the economies of interstate operation.

For this reason, the Corporation has also endeavored to induce Houston Lighting & Power and Texas Utilities to join it in moving to interstate operations. Those companies have vigorously opposed such a move because interstate operation would bring with it Federal Power Commission regulation of their wholesale rates.

Operating Developments. On May 4, 1976, West Texas Utilities began

the sale of power from its intrastate system across the Oklahoma border to a portion of Public Service of Oklahoma's territory. On August 28, 1976, the System connected other existing lines to permit synchronous operation of the whole System in interstate commerce.

When West Texas Utilities commenced the interstate sales in May, Texas Utilities and Houston Lighting & Power immediately responded by breaking their ties to West Texas Utilities and Central Power and Light Company. Texas Utilities and Houston Lighting & Power have remained unconnected from the System while the municipally-owned electric utilities of the cities of Austin and San Antonio, Texas, and the Lower Colorado River Authority have stayed connected. The System has experienced no material operating problems in this mode of operation but has continually supported a reinstitution of the ties with Houston Lighting & Power and Texas Utilities. Such reconnection would not be compatible with synchronous operation of the System until additional transmission facilities are added.

Optimum economies from synchronous operation of the System cannot be realized until present facilities are supplemented with additional interconnections. The System is proceeding with the design of transmission additions to permit realization of such

economies and to ensure stable and reliable operation, whether or not Houston Lighting & Power and Texas Utilities reinterconnect with it. Such transmission could be added in stages, but sufficient facilities to realize the operating economies projected by the Corporation in its filings with the SEC could probably not be installed before the early 1980's. Construction of transmission additions is subject to further filings with the SEC and the Public Utility Commission of Texas.

Central Power and Light is a 25.2% co-owner of the South Texas Project nuclear generating station, currently under construction. One 1,250,000 kilowatt unit is scheduled for service prior to the peak season in 1981 and the second prior to the peak season in 1982. The other participants are Houston Lighting & Power, which manages the project, and the municipally-owned electric systems of the cities of San Antonio and Austin.

Because of stability problems, it is not normally feasible from an engineering standpoint to operate a generating unit unless all participants are in synchronism with one another. This requires a permanent interconnection of their transmission systems at a number of points. Under existing law all participants would be subject to FPC jurisdiction if any one participant were. This operating exigency has become a particular focus of

concern because of the May 4, 1976 action by Houston Lighting & Power. Construction on the South Texas Project has proceeded, however, pending resolution of issues raised in legal proceedings noted below.

SEC Proceedings. On January 30, 1976, the SEC issued a notice and order instituting hearings under the Public Utility Holding Company Act of 1935 to consider the System's proposed operating changes.

The order directed that, without prejudice to further examination of other matters, hearings be held on the questions of whether (1) the System, as its operations were proposed to be changed, was capable of economical operation in satisfaction of the Act, (2) the proposals for changes in System operation represented a reasonable prospect of being achieved and (3) what contingencies might affect the carrying out of such proposals.

Texas Utilities and Houston Lighting & Power are participating in the SEC proceedings in opposition to the System. They have stated that they will not voluntarily cooperate in implementing the System's proposals by maintaining interconnections with the System. They further claim that they would be adversely affected if Central Power and Light and West Texas Utilities did not operate on an intrastate basis interconnected with them.

Various public power entities and the Oklahoma Commission are participating either in support of the System's position or without taking a position. An SEC administrative law judge held initial hearings on the matter in October 1976. Further testimony will be offered by the System later in the spring of 1977.

On January 7, 1977, Houston Lighting & Power and Texas Utilities filed formal motions with the SEC requesting that the administrative law judge assigned to the proceedings to enter a finding that the operating companies are not capable of integrated operation under the Public Utility Holding Company Act, to require the filing by the Corporation of a plan for integration of the System or a plan for divestiture of some or all portions thereof and to restrain the Corporation from taking any unilateral action to further integration without Commission approval. The motions were denied by the administrative law judge but may be appealed to the full Commission.

Other Legal Proceedings. In furtherance of their attempt to secure participation by Houston Lighting & Power and Texas Utilities in the System's planned interstate operations, various of the operating companies commenced several additional legal actions during 1976.

They filed suit in Federal Court in

Dallas against Houston Lighting & Power and a Texas Utilities subsidiary alleging that the requirement of intrastate operation imposed by these companies as a condition of interconnection violated the antitrust laws.

Central Power and Light filed a petition with the Nuclear Regulatory Commission similarly asserting that Houston's insistence on intrastate operation violated the antitrust provisions governing the licensing of the South Texas Project.

The operating companies filed a petition with the Federal Power Commission asking that Houston Lighting & Power and the Texas Utilities companies be ordered to resume and maintain interconnections and that the FPC study the desirability of all Texas systems interconnecting with those in surrounding states.

Houston Lighting & Power and Texas Utilities commenced proceedings in January 1977, before the Public Utility Commission of Texas, seeking to force Central Power and Light and West Texas Utilities back to intrastate operation and to secure findings adverse to the System respecting the reliability and economy of interstate operation. Proceedings before the Texas Commission to consider the System's proposals seem probable in 1977.

None of these matters has been

resolved. The System had a heartening response at the NRC, where a hearing has been ordered (subject to an appeal on procedural grounds taken by the NRC staff) and the U.S. Department of Justice has advised the NRC that it believes the antitrust issues raised deserve early consideration. The System had an unfavorable reception at the FPC, where its claims were rejected after long delay and without hearing in an order which is now being appealed.

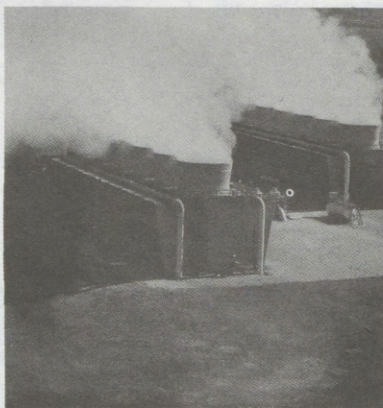
Houston Lighting & Power filed a counterclaim and third party complaint against the Corporation in the Federal Court suit, asking injunctive relief to prohibit interstate operation by Central Power and Light and West Texas Utilities. In the alternative, the filing asks for damages of up to \$1 billion for alleged costs that Houston Lighting & Power says it would incur if forced to operate in interstate commerce. The Corporation does not believe that interstate operation would entail additional costs for Houston Lighting & Power and would not implement its plans for interstate operation of all the Texas systems if the costs of such operation exceeded their benefits. Apart from other defenses, the Corporation does not believe Houston Lighting & Power's damage claim would be sustainable.

Stockholders will continue to be advised periodically of important developments in these matters.

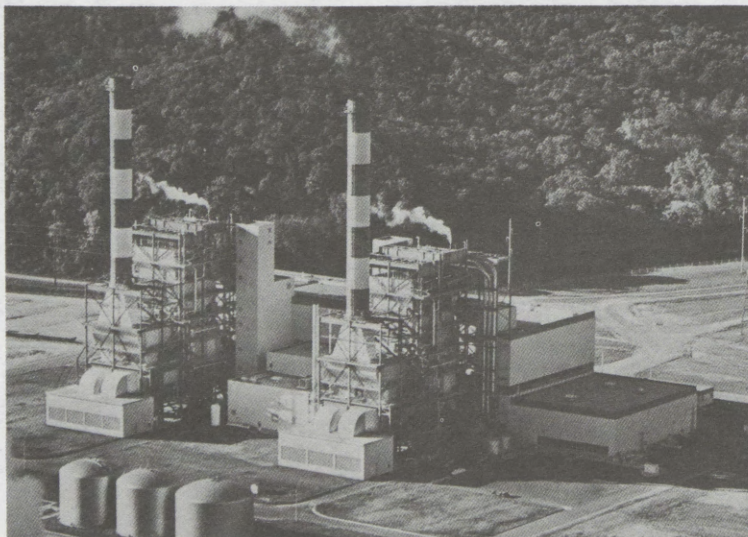
Electric Utilities and Their Investment Dollars

The electric utility industry is the most capital intensive industry serving the nation's economy. Approximately \$4 million of investment in plant and equipment are necessary to obtain \$1 million of revenues. Future investment requirements for electric utilities are expected to become even greater. Search for fuel supplies, construction of high-cost coal and nuclear power plants, installation of ultra-high voltage transmission and underground distribution lines, and expenditures for environmental preservation typify the billions of investment dollars needed by the electric utility industry.

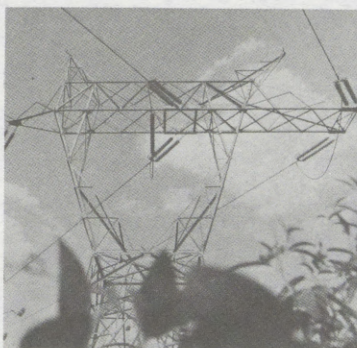
This section of the Annual Report illustrates some examples where the investment dollar of the Central and South West System is spent.



Water cooling towers for a power plant in Oklahoma cost \$1 million each. Water is shown evaporating from the towers.



Power plant in Oklahoma with a total capability of 900,000 kilowatts provides sufficient electric energy for a community of one million people. Total cost of the plant was \$112 million.



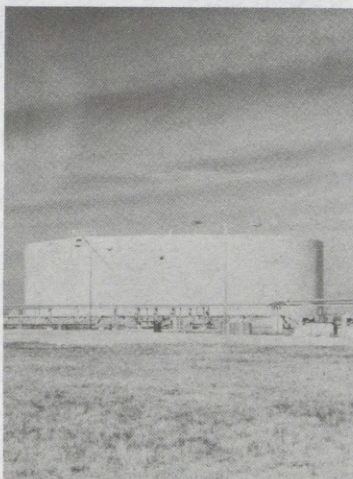
Transmission tower supports high voltage lines that cost approximately \$120,000 per mile to enable movement of electric energy to load centers.



Three 110-car trains transport low-sulphur coal from Wyoming to a new power plant in east Texas. Each coal car cost \$29,000, and the total investment in the three trains was \$11 million.



Construction of 18-mile pipeline for essential water supply for a power plant in east Texas will require an investment of more than \$3 million.



Oil storage capacity of 4,936,000 barrels provides stand-by fuel for System generation. The 100,000-barrel tank (above) in west Texas cost \$329,000.

Management's Comments on Five-Year Summary of Consolidated Operations

A five-year summary of the Central and South West System's consolidated operations is presented on the adjoining page. Related statistical and financial data are shown on pages 34 and 35. Detailed comments and information regarding the System's operations for the year 1976 are presented elsewhere in this Annual Report.

Electric Operating Revenues

Increases in electric operating revenues resulted primarily from the application of fuel-adjustment clauses to recover higher costs of fuel consumed, from higher kilowatt-hour sales and from rate increases (\$8½ million in 1973, \$5 million in 1974, \$12 million in 1975, and \$10 million in 1976). Energy sales growth and resulting revenues since 1973 have been adversely affected by milder than normal temperatures, which reduced winter heating and summer cooling loads, by reduction of kilowatt-hour consumption by customers in response to higher unit energy costs, and (particularly in the case of industrial sales) by unfavorable economic conditions.

Expenses

Fuel. Increases in the cost of fuel for electric generation resulted mainly from the higher unit price of natural gas, with the remaining portion from larger amounts of System generation. The higher cost of fuel was included in rates charged to substantially all customers by means of fuel-adjustment clauses within one or two months after a fuel-cost change. The cost of fuel for electric generation was charged to expense as used. No portion was deferred to expense in subsequent periods.

Maintenance. This item rose because of the increased amount of plant and rising costs of equipment, supplies, and wages.

Power Purchased for Resale. Changes in purchased power were mainly attributable to the varying amounts of System capacity available each year to meet anticipated peak demand.

Depreciation. The increase in depreciation expense was due to the higher dollar value of plant in service and changes made in the System's composite depreciation rate in 1973 from 3.0% to 3.2%, and from 3.2% to 3.3% in 1976.

Taxes Other than Federal Income. Addition of new plant and higher tax rates contributed to increased property taxes. Gross receipts taxes rose due to increased revenues.

Federal Income Tax Expense. The increase in income tax expense was primarily caused by changes in the amount of taxable income. The provision for deferred Federal income taxes rose because liberalized depreciation for tax purposes was taken on a larger amount of property during the period. The changes in the amount of deferred investment tax credits were due principally to changes in the amount of property additions and the increase in the tax credit rate in 1975 from 4% to 10% under the Tax Reduction Act of 1975.

Allowance for Funds Used During Construction. The variation of this item was related to the estimated cost of funds applicable to utility plant in process of construction, which, in turn, fluctuated with the magnitude of construction expenditures.

Interest Charges and Preferred Stock Dividends. The rise in interest charges and preferred stock dividends resulted from the issuance of additional securities at higher rates than in previous years and from refunding of low-interest rate debt issues.

Financial Section

Central and South West Corporation and Subsidiary Companies

Five-Year Summary of Consolidated Operations

(thousands of dollars)

	1976	1975	1974	1973	1972
Electric Operating Revenues	\$926,126	\$740,153	\$595,049	\$483,594	\$438,444
Expenses:					
Fuel	\$443,852	\$289,875	\$186,466	\$100,290	\$ 82,155
Other operating	92,481	85,459	80,041	75,654	73,726
Power purchased for resale	19,400	17,229	14,718	19,084	16,546
Maintenance	31,700	30,541	26,949	25,122	23,118
Depreciation	69,152	62,762	56,298	50,681	45,686
Taxes, other than Federal income	51,180	46,562	39,192	36,120	33,752
Federal income tax expense	76,076	74,315	68,478	66,699	59,503
Interest and preferred dividends	67,039	58,204	50,811	39,984	35,857
Allowance for funds used during construction	(14,133)	(10,584)	(6,712)	(9,398)	(3,851)
Other (net)	(831)	(1,798)	(2,046)	(879)	(724)
Total	\$835,916	\$652,565	\$512,195	\$403,357	\$365,768
Income for Common Stock Before Cumulative Effect of Accounting Change	\$ 90,210	\$ 87,588	\$ 82,854	\$ 80,237	\$ 72,676
Cumulative Effect of Accounting Change	—	—	1,299	—	—
Net Income for Common Stock	\$ 90,210	\$ 87,588	\$ 84,153	\$ 80,237	\$ 72,676
Earnings per Share Before Cumulative Effect of Accounting Change	\$1.75	\$1.72	\$1.76	\$1.72	\$1.63
Cumulative Effect of Accounting Change	—	—	.03	—	—
Earnings per Share of Common Stock	\$1.75	\$1.72	\$1.79	\$1.72	\$1.63
Average Common Shares Outstanding (000)	51,568	51,060	47,118	46,718	44,718

Central and South West Corporation Common Stock, \$3.50 Par Value

Price Range and Dividends Paid Per Share

	1976			1975		
	Market Price		Dividends Paid	Market Price		Dividends Paid
	High	Low		High	Low	
First quarter	\$18 1/8	\$14 1/4	\$.30	\$17	\$14 1/2	\$.29
Second quarter	15 7/8	13 1/4	.30	18 1/8	13 3/4	.29
Third quarter	17 3/4	14 3/4	.30	17 1/2	13 1/2	.29
Fourth quarter	17 7/8	15 1/8	.30	17 7/8	13 3/8	.29

Prices are as quoted on the New York Stock Exchange (composite tape when applicable).

Note: The Corporation's Board of Directors voted an increase in the quarterly dividend rate to 31 1/2¢ per share, payable February 28, 1977, to stockholders of record January 31, 1977.

Central and South West Corporation and Subsidiary Companies

Balance Sheets/as of December 31

Assets	1976	1975
	Consolidated	
Electric Utility Plant:		
At original cost—		
Production	\$1,014,973,000	\$ 884,591,000
Transmission	438,437,000	401,533,000
Distribution	809,480,000	766,435,000
General	99,315,000	91,217,000
Construction work in progress	303,211,000	246,181,000
	\$2,665,416,000	\$2,389,957,000
Less—Accumulated depreciation	633,218,000	569,277,000
	\$2,032,198,000	\$1,820,680,000
Investments and Other Properties:		
Construction fund for pollution control facilities	\$ 17,782,000	\$ 13,509,000
Other property	997,000	1,166,000
	\$ 18,779,000	\$ 14,675,000
Current Assets:		
Cash	\$ 9,742,000	\$ 11,836,000
Temporary cash investments	61,225,000	12,816,000
Special deposits	8,410,000	9,536,000
Accounts receivable, less allowance for uncollectible accounts	71,266,000	52,453,000
Materials and supplies, at average cost	22,879,000	24,169,000
Fuel inventory, at average cost	32,267,000	25,539,000
Prepayments	8,501,000	4,596,000
	\$ 214,290,000	\$ 140,945,000
Deferred Charges:		
Unamortized debt issuance cost	\$ 1,476,000	\$ 1,310,000
Other	9,796,000	4,684,000
	\$ 11,272,000	\$ 5,994,000
	\$2,276,539,000	\$1,982,294,000

The accompanying notes are an integral part of these consolidated financial statements.

1976

Operating Subsidiaries

Central Power and Light Company	Public Service Company of Oklahoma (Consolidated)	Southwestern Electric Power Company	West Texas Utilities Company
\$356,527,000	\$400,592,000	\$161,245,000	\$ 96,609,000
137,055,000	120,319,000	125,777,000	55,286,000
257,456,000	235,716,000	233,243,000	83,065,000
34,889,000	24,021,000	31,041,000	9,364,000
84,341,000	51,032,000	142,011,000	25,827,000
\$870,268,000	\$831,680,000	\$693,317,000	\$270,151,000
199,466,000	212,058,000	142,582,000	79,112,000
\$670,802,000	\$619,622,000	\$550,735,000	\$191,039,000
\$ —	\$ —	\$ 17,782,000	\$ —
350,000	470,000	44,000	60,000
\$ 350,000	\$ 470,000	\$ 17,826,000	\$ 60,000
\$ 3,780,000	\$ 1,731,000	\$ 2,059,000	\$ 1,573,000
2,598,000	6,890,000	—	1,400,000
3,094,000	4,643,000	19,000	654,000
18,687,000	26,201,000	15,903,000	11,487,000
7,462,000	8,689,000	4,643,000	2,085,000
7,333,000	7,026,000	8,274,000	9,634,000
608,000	6,874,000	846,000	173,000
\$ 43,562,000	\$ 62,054,000	\$ 31,744,000	\$ 27,006,000
\$ 402,000	\$ 489,000	\$ 585,000	\$ —
163,000	7,658,000	1,844,000	131,000
\$ 565,000	\$ 8,147,000	\$ 2,429,000	\$ 131,000
\$715,279,000	\$690,293,000	\$602,734,000	\$218,236,000

Central and South West Corporation and Subsidiary Companies

Balance Sheets/as of December 31

Capitalization and Liabilities	1976		1975	
	Consolidated			
Capitalization:				
Common stock	\$	201,996,000	\$	179,963,000
Paid-in surplus		406,419,000		327,208,000
Retained earnings (including at December 31, 1976, \$80,716,000 of subsidiaries' retained earnings not available for cash dividends)		210,266,000		181,771,000
Total common stock equity (see Statements of Common Stock Equity)	\$	818,681,000	45%	\$ 688,942,000 42%
Preferred stocks and premium (see Statements of Preferred Stocks)		155,874,000	8	130,787,000 8
Long-term debt (see Statements of Debt)		862,438,000	47	816,570,000 50
Total capitalization		\$1,836,993,000	100%	\$1,636,299,000 100%
Current Liabilities:				
Long-term debt due within twelve months	\$	6,822,000	\$	816,000
Notes payable to parent company		—		—
Accounts payable		78,439,000		56,162,000
Preferred dividends declared or accrued		1,748,000		1,193,000
Customers' deposits		17,851,000		15,256,000
Accrued taxes		32,438,000		30,244,000
Accrued interest		18,750,000		17,728,000
Other		5,341,000		3,752,000
		\$ 161,389,000		\$ 125,151,000
Accumulated Deferred Taxes	\$	205,673,000	\$	176,486,000
Deferred Investment Tax Credits	\$	65,002,000	\$	40,784,000
Other Deferred Credits	\$	3,684,000	\$	256,000
Reserve For Catastrophe	\$	3,798,000	\$	3,318,000
		\$2,276,539,000		\$1,982,294,000

The accompanying notes are an integral part of these consolidated financial statements.

1976

Operating Subsidiaries

Central Power and Light Company	Public Service Company of Oklahoma (Consolidated)	Southwestern Electric Power Company	West Texas Utilities Company
\$168,888,000	\$157,230,000	\$135,660,000	\$ 54,450,000
20,000,000	5,000,000	20,000,000	—
62,517,000	42,438,000	36,612,000	29,253,000
\$251,405,000	\$204,668,000	\$192,272,000	\$ 83,703,000
43,569,000	69,926,000	36,088,000	6,291,000
257,935,000	269,333,000	263,170,000	72,000,000
\$552,909,000	\$543,927,000	\$491,530,000	\$161,994,000
\$ 6,070,000	\$ 752,000	\$ —	\$ —
14,660,000	—	12,500,000	9,000,000
26,846,000	28,250,000	11,840,000	12,131,000
428,000	1,254,000	—	66,000
5,488,000	6,431,000	-4,448,000	1,484,000
13,435,000	11,545,000	2,945,000	4,443,000
5,896,000	5,485,000	5,126,000	2,337,000
538,000	3,353,000	1,138,000	136,000
\$ 73,361,000	\$ 57,070,000	\$ 37,997,000	\$ 29,597,000
\$ 63,695,000	\$ 66,420,000	\$ 53,673,000	\$ 21,885,000
\$ 21,516,000	\$ 21,097,000	\$ 17,629,000	\$ 4,760,000
\$ —	\$ 1,779,000	\$ 1,905,000	\$ —
\$ 3,798,000	\$ —	\$ —	\$ —
\$715,279,000	\$690,293,000	\$602,734,000	\$218,236,000

Additions to electric utility plant of subsidiary companies are estimated to be \$500,000,000 in 1977.

Central and South West Corporation and Subsidiary Companies

Statements of Income/for the years ended December 31

	1976	1975
	Consolidated	
Electric Operating Revenues	\$926,126,000	\$740,153,000
Operating Expenses and Taxes:		
Fuel	\$443,852,000	\$289,875,000
Other operating	92,481,000	85,459,000
Power purchased for resale	19,400,000	17,229,000
Maintenance	31,700,000	30,541,000
Depreciation	69,152,000	62,762,000
Taxes, other than Federal income	51,180,000	46,562,000
Federal income taxes—current	24,916,000	46,605,000
Provision for deferred Federal income taxes (net)	27,299,000	20,753,000
Deferred investment tax credits (net)	23,861,000	6,957,000
Total	\$783,841,000	\$606,743,000
Operating Income	\$142,285,000	\$133,410,000
Other Income and Deductions:		
Allowance for funds used during construction	\$ 14,133,000	\$ 10,584,000
Other (net)	831,000	1,798,000
Total	\$ 14,964,000	\$ 12,382,000
Total Income Before Interest Charges	\$157,249,000	\$145,792,000
Interest Charges:		
Interest on long-term debt	\$ 55,329,000	\$ 48,178,000
Amortization of debt issuance cost	244,000	204,000
Interest on short-term debt and other	2,214,000	1,680,000
Total	\$ 57,787,000	\$ 50,062,000
Net Income Before Preferred Stock Dividends of Subsidiaries	\$ 99,462,000	\$ 95,730,000
Preferred Stock Dividends of Subsidiaries	9,252,000	8,142,000
Net Income for Common Stock	\$ 90,210,000	\$ 87,588,000
Earnings Per Share of Common Stock	\$1.75	\$1.72
Average Common Shares Outstanding	51,568,000	51,080,000

The accompanying notes are an integral part of these consolidated financial statements.

1976

Operating Subsidiaries

Central Power and Light Company	Public Service Company of Oklahoma (Consolidated)	Southwestern Electric Power Company	West Texas Utilities Company
\$348,472,000	\$297,856,000	\$187,320,000	\$111,687,000
\$181,726,000	\$144,051,000	\$ 61,486,000	\$ 56,589,000
33,371,000	26,031,000	19,975,000	10,987,000
11,440,000	7,150,000	18,499,000	1,520,000
9,577,000	11,093,000	7,922,000	3,108,000
24,394,000	21,428,000	15,855,000	7,475,000
18,637,000	17,863,000	9,767,000	4,805,000
6,664,000	9,793,000	713,000	7,744,000
8,745,000	7,826,000	8,666,000	2,062,000
8,263,000	6,756,000	7,480,000	1,362,000
\$302,817,000	\$251,991,000	\$150,363,000	\$ 95,652,000
\$ 45,655,000	\$ 45,865,000	\$ 36,957,000	\$ 16,035,000
\$ 4,594,000	\$ 1,984,000	\$ 6,466,000	\$ 1,089,000
85,000	372,000	123,000	177,000
\$ 4,679,000	\$ 2,356,000	\$ 6,589,000	\$ 1,266,000
\$ 50,334,000	\$ 48,221,000	\$ 43,546,000	\$ 17,301,000
\$ 17,605,000	\$ 17,540,000	\$ 16,110,000	\$ 4,074,000
35,000	168,000	41,000	—
709,000	589,000	416,000	355,000
\$ 18,349,000	\$ 18,297,000	\$ 16,567,000	\$ 4,429,000
\$ 31,985,000	\$ 29,924,000	\$ 26,979,000	\$ 12,872,000
2,566,000	3,906,000	2,516,000	264,000
\$ 29,419,000	\$ 26,018,000	\$ 24,463,000	\$ 12,608,000

Central and South West Corporation and Subsidiary Companies

Consolidated Statements of Funds Provided for Gross Additions
to Electric Utility Plant/for the years ended December 31

	1976		1975	
Funds Provided from Operations:				
Net income for common stock	\$ 90,210,000		\$ 87,588,000	
Depreciation, including amounts charged to other accounts	77,734,000		69,024,000	
Deferred taxes and investment tax credit (net), including amounts charged to other accounts	53,239,000		30,056,000	
Allowance for funds used during construction	(14,133,000)		(10,584,000)	
Total from operations	\$207,050,000		\$176,084,000	
Less—Dividends on common stock	61,715,000		58,396,000	
Reinvested funds provided from operations	\$145,335,000	52%	\$117,688,000	51%
Net Funds Provided by Investors:				
Central and South West Corporation common stock	\$101,537,000		\$ 65,446,000	
Subsidiary long-term debt	53,100,000		102,474,000	
Subsidiary preferred stock	25,000,000		—	
Retirement of long-term debt	(922,000)		(23,298,000)	
Funds held for pollution control facilities	(4,272,000)		—	
Net funds provided by investors	\$174,443,000	62%	\$144,622,000	63%
Other Funds Provided (Used):				
Change in temporary cash investments and special deposits	\$ (47,283,000)		\$ (10,750,000)	
Change in short-term debt	—		(25,975,000)	
Change in fuel inventory	(6,728,000)		(8,134,000)	
Other	14,543,000		12,908,000	
Total other funds provided (used)	\$ (39,468,000)	(14%)	\$ (31,951,000)	(14%)
Net Additions to Electric Utility Plant	\$280,310,000	100%	\$230,359,000	100%
Allowance for funds used during construction	14,133,000		10,584,000	
Gross Additions to Electric Utility Plant	\$294,443,000		\$240,943,000	

The accompanying notes are an integral part of these consolidated financial statements.

Central and South West Corporation and Subsidiary Companies

Consolidated Statements of Common Stock Equity/for the years ended December 31, 1976 and 1975

	Common Stock \$3.50 Par, Authorized 58,300,000 Shares		Paid-in Surplus	Retained Earnings
	Shares Outstanding	Amount		
Balance, December 31, 1974	47,117,892	\$164,913,000	\$247,367,000	\$182,024,000
Add (Deduct):				
Net income for common stock	—	—	—	87,588,000
Cash dividends on common stock, \$1.16 per share	—	—	—	(58,396,000)
Transfer in connection with increase in par value of common stock of subsidiary company	—	—	29,445,000	(29,445,000)
Sale of common stock	4,300,000	15,050,000	50,396,000	—
Balance, December 31, 1975	51,417,892	\$179,963,000	\$327,208,000	\$181,771,000
Add (Deduct):				
Net income for common stock	—	—	—	90,210,000
Cash dividends on common stock, \$1.20 per share	—	—	—	(61,715,000)
Sale of common stock	6,295,210	22,033,000	79,211,000	—
Balance, December 31, 1976	57,713,102	\$201,996,000	\$406,419,000	\$210,266,000

Consolidated Statements of Preferred Stocks/as of December 31

	1976	1975
Central Power and Light Company:		
4% Series, 100,000 shares	\$ 10,000,000	\$ 10,000,000
4.20% Series, 75,000 shares	7,500,000	7,500,000
7.12% Series, 260,000 shares	26,000,000	26,000,000
Premium	69,000	69,000
	\$ 43,569,000	\$ 43,569,000
Public Service Company of Oklahoma:		
4% Series, 97,900 shares	\$ 9,790,000	\$ 9,790,000
4.24% Series, 100,000 shares	10,000,000	10,000,000
7.92% Series, 250,000 shares	25,000,000	25,000,000
8.88% Series, 250,000 shares	25,000,000	—
Premium	136,000	49,000
	\$ 69,926,000	\$ 44,839,000
Southwestern Electric Power Company:		
5% Series, 75,000 shares	\$ 7,500,000	\$ 7,500,000
4.65% Series, 25,000 shares	2,500,000	2,500,000
4.28% Series, 60,000 shares	6,000,000	6,000,000
8.84% Series, 200,000 shares	20,000,000	20,000,000
Premium	88,000	88,000
	\$ 36,088,000	\$ 36,088,000
West Texas Utilities Company:		
4.40% Series, 60,000 shares	\$ 6,000,000	\$ 6,000,000
Premium	291,000	291,000
	\$ 6,291,000	\$ 6,291,000
Total Consolidated	\$155,874,000	\$130,787,000

The accompanying notes are an integral part of these consolidated financial statements.

Central and South West Corporation and Subsidiary Companies

Consolidated Statements of Debt/as of December 31
(thousands)

	1976	1975		1976	1975
Central Power and Light Company:			Southwestern Electric Power Company:		
First mortgage bonds—			First mortgage bonds—		
3 1/4% due 1977	\$ —	\$ 6,000	3 1/4% due 1978	\$ 7,000	\$ 7,000
3 % due 1980	10,000	10,000	3 % due 1979	4,500	4,500
3 1/2% due 1982	10,000	10,000	27 1/2% due 1980	6,000	6,000
3 1/2% due 1984	18,000	18,000	3 1/4% due 1982	6,000	6,000
3 1/4% due 1986	10,000	10,000	3 1/4% due 1984	10,000	10,000
4 % due 1988	12,000	12,000	4 1/2% due 1987	10,000	10,000
4 3/4% due 1989	11,000	11,000	4 1/2% due 1993	30,000	30,000
6 1/2% due 1998	28,000	28,000	7 % due 1997	20,000	20,000
8 3/4% due 2000	25,000	25,000	9 % due 1999	35,000	35,000
7 % due 2001	36,000	36,000	7 1/2% due 2001	30,000	30,000
8 % due 2003	46,000	46,000	9 1/4% due 2005	40,000	40,000
9 3/4% due 2004	40,000	40,000	8 1/4% due 2006	45,000	—
Installment Sales Agreement—			6.2% due 2006	7,100	—
Pollution Control Bonds 7 1/8% due 2004	9,825	9,825	6.2% due 2006	1,000	—
Note payable, 6 1/2% due 1995	2,640	2,710	Installment Sales Agreement—		
Unamortized discount on bonds	(530)	(550)	Pollution Control Bonds 7 1/8% due 2004	12,515	12,515
	<u>\$257,935</u>	<u>\$263,985</u>	Unamortized discount and premium on bonds	(945)	(504)
				<u>\$263,170</u>	<u>\$210,511</u>
Public Service Company of Oklahoma:			West Texas Utilities Company:		
First mortgage bonds—			First mortgage bonds—		
27 1/4% due 1978	\$ 10,000	\$ 10,000	3 % due 1978	\$ 5,000	\$ 5,000
3 1/4% due 1981	10,000	10,000	3 1/4% due 1981	8,000	8,000
3 1/4% due 1983	6,000	6,000	3 1/4% due 1985	7,500	7,500
3 % due 1984	12,500	12,500	3 1/4% due 1988	8,500	8,500
4 1/4% due 1987	12,000	12,000	4 1/2% due 1991	8,000	8,000
3 1/4% due 1988	16,000	16,000	7 1/4% due 1999	12,000	12,000
4 1/4% due 1993	10,000	10,000	7 1/4% due 2003	23,000	23,000
5 1/4% due 1996	25,000	25,000			
7 1/4% due 1999	25,000	25,000			
7 3/4% due 2002	30,000	30,000			
8 1/4% due 2004	35,000	35,000			
8 3/4% due 2005	50,000	50,000			
Other long-term debt	368	474			
Unamortized discount on bonds	(1,307)	(1,388)			
				<u>\$ 72,000</u>	<u>\$ 72,000</u>
Transok Pipe Line Company:			Total Consolidated		
First mortgage bonds—				<u>\$862,438</u>	<u>\$816,570</u>
3 1/2% due serially to 1980	1,035	1,380			
4.9% due serially to 1980	—	78			
4 7/8% due serially to 1980	875	1,204			
6 5/8% due 1980	15,000	15,000			
9 % due 1980	12,000	12,000			
Unamortized discount on bonds	(138)	(174)			
	<u>\$269,333</u>	<u>\$270,074</u>			

The accompanying notes are an integral part of these consolidated financial statements.

Central and South West Corporation and Subsidiary Companies

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS:

(1) Summary of Significant Accounting Policies.

PRINCIPLES OF CONSOLIDATION. The consolidated financial statements include the accounts of Central and South West Corporation and its subsidiary companies (Companies). All significant intercompany items have been eliminated.

ELECTRIC UTILITY PLANT. Electric utility plant includes an allowance for funds used during construction (AFC), whereby amounts based upon interest charges on borrowed funds and a return on other capital used to finance construction are credited to the income statement and debited to construction work in progress on the balance sheet and accordingly are capitalized in the same manner as construction labor and material costs. AFC does not represent a current source of cash funds. Under established regulatory practices, the operating companies are permitted to earn a fair rate of return on such costs and recover them in rates charged for utility services. The annual rates used in computing AFC were 6½% for West Texas Utilities Company and 7% for Central Power and Light Company (CPL) and Southwestern Electric Power Company (SWEPC). Public Service Company of Oklahoma (PSO) used a 6½% rate for the first five months of 1975 and a rate of 7% was used thereafter. When the operating companies are permitted to include certain amounts of construction work in progress in their rate bases, AFC is not recorded on such amounts.

Provisions for depreciation of electric utility plant are computed by the subsidiary companies, on the straight-line method, substantially at individual rates applied to the various classes of depreciable property, which were equivalent to an annual composite rate of approximately 3.3% in 1976 and 3.2% in 1975. The subsidiary companies follow the practice of charging maintenance, repairs, and minor renewals to maintenance expense. Renewals and betterments of property units are charged to electric utility plant. The original cost of depreciable property retired is removed from electric utility plant and charged to accumulated depreciation, which is credited with salvage less removal cost.

FEDERAL INCOME TAX EXPENSE. The provision for deferred Federal income taxes results principally from the tax deduction for accelerated methods of depreciation and other writeoffs of property costs, as provided by Federal income tax laws, being greater than book depreciation of such costs. Taxes deferred in prior years are credited to income when book depreciation of those property costs exceeds the related tax deductions. Provisions for deferred investment tax credits are recorded for the reduction in Federal income taxes payable arising from the investment tax credit and are amortized to income over the lives of the related properties. Total Federal income tax expense amounted to \$77,960,000 in 1976 and \$76,011,000 in 1975, as reflected below.

	1976			1975		
	Federal Income Taxes	Deferred Federal In- come Taxes	Invest- ment Tax Credits	Federal Income Taxes	Deferred Federal In- come Taxes	Invest- ment Tax Credits
Provision	\$25,054,000	\$32,171,000	\$25,834,000	\$45,955,000	\$25,194,000	\$9,500,000
Amortization of amounts previously deferred	—	(3,477,000)	(1,622,000)	—	(3,379,000)	(1,259,000)
Total	\$25,054,000	\$28,694,000	\$24,212,000	\$45,955,000	\$21,815,000	\$8,241,000
Less amounts charged (credited) to other accounts	138,000	1,395,000	351,000	(650,000)	1,062,000	1,284,000
	\$24,916,000	\$27,299,000	\$23,861,000	\$46,605,000	\$20,753,000	\$6,957,000

Total Federal income tax expense was provided at effective rates of 43.9% and 44.3% in 1976 and 1975, respectively, which is less than the amount computed by applying the statutory rate of 48% to income before Federal income taxes. These differences were primarily due to the exclusion from taxable income of AFC.

ELECTRIC REVENUES AND FUEL. Revenues are included in income as billed to customers on a cycle billing basis. The Companies charge to expense the cost of fuel as it is consumed.

RESERVE FOR CATASTROPHE. CPL has made a provision for a reserve for catastrophe to reserve against unusual and uninsured weather, storm, and casualty losses and damages to its property. In CPL's recent rate order issued in January, 1977, the Public Utility Commission of Texas did not allow the provision in the cost of service. Consequently, the reserve at that date will be maintained to be used for the purpose for which it was provided.

- (2) **Construction Fund for Pollution Control Facilities.** At December 31, 1976 and 1975, \$9,267,000 and \$4,816,000, respectively, of the fund had been expended to finance pollution control facilities at SWEPC's Welsh Power Plant. The unexpended balance of \$8,515,000 and \$7,699,000, respectively, represents funds held by trustees prior to use by SWEPC for specific construction purposes and an additional amount of \$994,000 was held in 1975 by a trustee and expended by CPL during 1976.

- (3) **Pension Plan.** The Companies have a contributory pension plan covering substantially all their employees. Pension cost accruals were approximately \$5,987,000 in 1976 and \$5,072,000 in 1975, including approximately \$1,189,000 and \$998,000 charged to construction in 1976 and 1975, respectively. The Companies' policy is to accrue normal cost plus amortization of prior service cost over forty years. The Companies' general policy is to fund pension cost annually as it is accrued. The actuarially computed value of vested benefits does not exceed the total pension fund.

The Companies' pension plan was amended effective January 1, 1976, to conform with the requirements of the Employee Retirement Income Security Act of 1974.

- (4) **Short-Term Borrowing.** The Corporation may issue short-term notes to banks and commercial paper in connection with loaning funds to, or investing in, its subsidiaries. Operating subsidiaries also may issue short-term notes to banks. The average interest rate for commercial paper during the years 1976 and 1975 was 5.5% and 7.3%, respectively. The maximum amount of short-term borrowings outstanding at any month-end during 1976 and 1975 amounted to \$46,300,000 and \$39,225,000, respectively, the approximate average outstanding balance amounted to \$26,269,000 and \$7,763,000, respectively, and the weighted average interest rates were 5.5% and 7.3%, respectively. Reference is made to Note 5. Unused bank lines of credit aggregating \$101,700,000 and \$82,000,000 at the end of 1976 and 1975, respectively, which can be withdrawn at the banks' option, have been obtained for short-term borrowings. There were no compensating balance arrangements under the lines of credit; however, it is informally understood that if any substantial borrowings are made under the lines of credit, cash balances on deposit may be materially increased. Such borrowings are generally arranged on a demand basis for a period of 90 days at the prime rate then in effect.
- (5) **Common Stock Sale.** On December 14, 1976, the Corporation sold 6,250,000 shares of \$3.50 par value common stock with net proceeds to the Corporation of \$100,818,750. The proceeds from the sale were used to retire the Corporation's then outstanding commercial paper and will provide funds for the construction programs of the operating companies.
- (6) **Supreme Court of Oklahoma Decision.** On October 12, 1976, the Supreme Court of Oklahoma issued an opinion, in response to an original action brought by certain PSO industrial customers, declaring that because the Corporation Commission of the State of Oklahoma had not given adequate notice of the restructuring of PSO's rates in connection with a rate increase approved May 15, 1975, the Oklahoma Commission was without jurisdiction to enter the order restructuring rates. The Court remanded the matter to the Oklahoma Commission for further proceedings after issuance of proper notice. The effect of the Oklahoma Court's holding is to bring into question the lawfulness of the restructured rates. Revenues collected by PSO under the new rate schedules in excess of those that would have been collected under former rate schedules amounted to approximately \$14,900,000 in 1976 and \$11,700,000 in 1975. These revenues produced about 14¢ and 11¢ per share, respectively, of consolidated net income for common stock of the Corporation for 1976 and 1975. The revenues called into question for 1976 and 1975, could exceed the foregoing totals because these totals constitute the net increase received by PSO for these periods under the 1975 rate order, after deducting decreases applicable to some rate reclassifications.
- The Court's opinion specifically noted that the plaintiff customers did not question PSO's need for a rate increase. Nor did the Court itself order any adjustment or refund of revenues collected or express any determination as to the disposition of such revenues. The Oklahoma Commission is vested by statute with the power to determine whether a utility has charged amounts in excess of lawful rates or in excess of what the Oklahoma Commission may in any case subsequently declare to be the legal rate which should have been applied, and to determine the amount of any refund due if there have been excess charges. This statutory provision would appear to permit the Oklahoma Commission to reaffirm, retroactively and without refund, its 1975 order after the proceedings required by the Court. In the event that any refund were ordered, PSO has stated that it would apply to the Oklahoma Commission for additional future rate relief to compensate it for the amount it was required to refund.
- (7) **Operating Subsidiaries.** The information included herein with regard to operating subsidiaries is taken from audited financial statements included in their separate annual reports.
- (8) **Litigation and Regulatory Proceedings.** As more fully explained under the caption "A Compendium of the Securities and Exchange Commission Proceedings and Related Matters," on page 14, Central and South West Corporation and its subsidiary companies are involved in certain regulatory and legal proceedings. These proceedings relate to the Corporation's satisfaction of requirements for electrical integration of its subsidiaries under the Public Utility Holding Company Act of 1935 and its plans for regular operation of all System facilities coordinated on a synchronous interstate basis. The outcome of the litigation and regulatory proceedings is uncertain, but in management's opinion, based upon the information now available, the Corporation should prevail in these proceedings or, if not successful, the outcome would not have a significant adverse effect on the financial statements included herein.
- West Texas Utilities Company (WTU) is involved in a dispute with a fuel oil supplier regarding pricing provisions of a fuel oil purchase contract. In the opinion of WTU's management and in the opinion of its outside legal counsel, the final outcome of this dispute would not have a material adverse effect on WTU.
- (9) **Quarterly Information (Unaudited).** The following information for each of the four quarters of 1976 includes, in the

Corporation's opinion, all adjustments (consisting only of normal recurring adjustments) necessary for a fair presentation of such amounts.

	Quarter Ended			
	March 31 1976	June 30 1976	Sept. 30 1976	Dec. 31 1976
(thousands)				
Electric operating revenues	\$188,931	\$203,415	\$287,683	\$246,097
Operating income	27,409	26,922	52,135	35,819
Net income for common stock	15,341	15,057	38,261	21,551
Earnings per share of common stock	\$.30	\$.29	\$.74	\$.42

Information for quarterly periods is not necessarily indicative of the results that may be experienced for a full year due to seasonal variations in sales, rate increases and other factors.

- (10) **Replacement Cost Data (Unaudited).** In compliance with rules of the Securities and Exchange Commission, the estimated current replacement cost of the Companies' productive capacity (which excludes non-depreciable plant with an original cost of \$50,942,000), the related accumulated depreciation at December 31, 1976, and the provision for depreciation for the year then ended are summarized below. It must be recognized, however, that such data may be imprecise as they are based on estimates and predicated upon many subjective judgments.

	Estimated Replacement Cost	Comparable Original Cost
(thousands)		
Productive capacity	\$4,884,269	\$2,311,263
Less accumulated depreciation	1,334,976	631,202
Net productive capacity	\$3,549,293	\$1,680,061
Provision for depreciation	\$ 157,148	\$ 75,882

The replacement cost of productive capacity was computed by applying certain indices to the original cost of depreciable electric utility plant in service on a functional basis. The Handy-Whitman Index of Public Utility Construction Costs for the South Central Division was used to trend steam production, transmission, distribution and general purpose buildings, and the GNP Implicit Price Deflator Index was used for all other plant.

The accumulated depreciation on a replacement cost basis was determined by calculating the ratio of the accumulated depreciation per books to the actual related original cost and applying this ratio to the estimated replacement cost of productive capacity for each operating company.

Provision for depreciation based on replacement cost was determined by applying the annual book composite rate of depreciation to the average estimated replacement cost of productive capacity for the period for each operating company.

This information should not be interpreted to indicate that the Companies actually have present plans to replace their assets or that actual replacement would take place in the form and manner assumed in developing these estimates. This data does not purport to represent the current values of these assets or the amounts which could be realized if such assets were sold. In addition, this information is not intended to represent amounts which might be applicable to the regulatory rate-making process. Furthermore, as the data is limited to productive assets and related depreciation, it is not meant to provide a basis for computing the inflationary effects on the overall operations and the financial position of the Companies.

AUDITORS' REPORT

To the Shareholders and the Board of Directors of Central and South West Corporation:

We have examined the consolidated balance sheets and statements of preferred stocks and debt of Central and South West Corporation (a Delaware corporation) and subsidiary companies, as of December 31, 1976 and 1975, and the related consolidated statements of income, funds provided for gross additions to electric utility plant and common stock equity for the years then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

As discussed in Note (6) to the consolidated financial statements, electric operating revenues for the years ended December 31, 1976 and 1975 include approximately \$14,900,000 and \$11,700,000, respectively, which are involved in legal proceedings. The outcome of these proceedings cannot be determined at this time.

In our opinion, subject to the effect, if any, on the financial statements of any adjustment that may result from final disposition of the aforementioned legal proceedings, the financial statements referred to above present fairly the financial position of Central and South West Corporation and subsidiary companies as of December 31, 1976 and 1975, and the results of their operations and funds provided for gross additions to electric utility plant for the years then ended, in conformity with generally accepted accounting principles consistently applied during the periods.

Arthur Andersen & Co.

Houston, Texas
February 23, 1977

Central and South West Corporation and Subsidiary Companies

Comparative Statistical and Financial Record

	1976	1975	1974	1973
Sales—Kilowatt-Hours (millions):				
Residential	8,556	8,494	7,832	7,655
Commercial	6,894	6,557	6,025	5,878
Industrial	10,600	9,626	10,490	10,188
Electric utilities	8,837	7,328	7,550	5,985
Other	996	941	903	870
Total	35,883	32,946	32,800	30,576
Electric Operating Revenues (000):				
Residential	\$305,113	\$266,034	\$213,547	\$187,637
Commercial	221,638	185,010	143,674	123,211
Industrial	245,108	181,844	146,922	109,988
Electric utilities	125,962	83,083	70,258	43,688
Other	28,305	24,182	20,648	19,070
Total	\$926,126	\$740,153	\$595,049	\$483,594
Average Number of Customers:				
Residential	995,374	968,443	944,391	920,246
Commercial	137,939	133,786	131,257	128,886
Industrial	19,791	19,338	18,954	18,438
Other	9,408	9,013	8,418	8,146
Total	1,162,512	1,130,580	1,103,020	1,075,716
Residential Sales Averages:				
Kilowatt-hours per customer	8,596	8,771	8,293	8,318
Revenue per customer	\$306.53	\$274.70	\$226.12	\$203.90
Revenue per kilowatt-hour	3.57¢	3.13¢	2.73¢	2.45¢
Total Revenue Per Kilowatt-Hour	2.58¢	2.25¢	1.81¢	1.58¢
Total Rated Generating Capacity (name plate)—kilowatts	9,160,882	8,091,257	7,596,825	6,459,483
Fuel Efficiency Data:				
Average Btu per net kwh	10,229	10,243	10,340	10,464
Cost per million Btu	\$1.181	\$.841	\$.537	\$.318
Cost per kwh generated (mills)	12.05	8.61	5.54	3.32
Condensed Balance Sheet Data				
Total Utility Plant (000):				
Original cost	\$2,665,416	\$2,389,957	\$2,166,304	\$1,944,101
Annual constructed additions	294,443	240,943	235,041	219,426
Accumulated provision for depreciation	633,218	569,277	515,326	464,528
Capitalization (000):				
Long-term debt	\$ 862,438	\$ 816,570	\$ 715,443	\$ 643,485
Preferred stock and premium	155,874	130,787	130,787	85,719
Common stock equity	818,681	688,942	594,304	562,923

1972	1971	1970	1969	1968	1967	1966
7,256	6,321	5,795	5,367	4,537	3,962	3,709
5,517	4,951	4,518	4,230	3,830	3,505	3,234
9,513	8,612	8,105	7,793	7,110	6,252	5,761
7,705	6,450	6,408	3,627	2,575	2,423	2,486
836	781	712	674	601	578	535
30,827	27,115	25,538	21,691	18,653	16,720	15,725
\$170,325	\$149,964	\$138,834	\$130,002	\$113,594	\$101,893	\$ 96,752
110,355	99,262	91,486	86,597	79,848	74,419	69,972
94,653	84,194	79,812	76,773	71,560	65,459	61,688
45,780	37,185	33,999	20,561	16,385	14,827	14,531
17,331	15,717	14,271	13,148	12,003	11,151	10,494
\$438,444	\$386,322	\$358,402	\$327,081	\$293,390	\$267,749	\$253,437
892,929	865,812	841,743	823,535	802,111	782,722	767,701
126,991	123,716	121,665	120,722	119,494	118,998	118,607
18,070	17,777	17,506	17,178	16,724	17,230	16,815
7,850	7,661	7,414	7,126	6,892	6,574	6,286
1,045,840	1,014,966	988,328	968,561	945,221	925,524	909,409
8,127	7,301	6,885	6,517	5,656	5,062	4,831
\$190.75	\$173.21	\$164.94	\$157.86	\$141.62	\$130.18	\$126.03
2.35¢	2.37¢	2.40¢	2.42¢	2.50¢	2.57¢	2.61¢
1.42¢	1.42¢	1.40¢	1.51¢	1.57¢	1.60¢	1.61¢
6,322,483	5,983,283	5,085,330	4,166,600	3,875,750	3,599,000	3,279,700
10,462	10,544	10,715	10,833	10,711	10,835	10,987
\$251	\$226	\$206	\$198	\$197	\$194	\$189
2.62	2.38	2.21	2.14	2.11	2.10	2.07
\$1,742,167	\$1,595,161	\$1,476,396	\$1,354,277	\$1,248,228	\$1,162,609	\$1,094,687
161,266	133,264	135,376	120,522	98,651	80,784	72,526
418,543	381,576	349,102	319,510	293,981	268,835	246,424
\$ 616,314	\$ 572,220	\$ 504,334	\$ 480,695	\$ 422,741	\$ 396,686	\$ 378,524
59,688	59,688	59,688	59,688	59,688	59,688	59,688
479,898	453,706	431,438	373,845	354,970	340,435	324,250

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 Chicago, Illinois 60606

Harris Trust and Savings Bank

Registrar of Common Stock

Harris Trust and Savings Bank, Chicago

Listing of Common Stock

The common stock of Central and South West Corporation is listed on the New York Stock Exchange (ticker symbol-CSR) and on the Midwest Stock Exchange.

Upon request, additional copies of this Report and the 1976 Annual Reports of the four operating subsidiaries will be sent to stockholders or other interested parties. Also available without charge are copies of the Corporation's Financial Statements for the year 1976, a Ten-Year Financial and Statistical Review of the operations of the Central and South West System, and Form U5S for the year 1976, as filed with the Securities and Exchange Commission.

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Central and South West Corporation

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Senator JOHNSTON. Let's hear from Mr. Galt, because he is the only one who hasn't spoken yet.

Mr. GALT. I am Mr. Galt.

Senator JOHNSTON. And you are a lawyer who is going to bring precision into these discussions.

Mr. GALT. I hope we do something.

STATEMENT OF JAY M. GALT, ATTORNEY, MUNICIPAL ELECTRIC SYSTEMS OF OKLAHOMA

Mr. GALT. Mr. Chairman, members of the Senate Subcommittee on Energy Conservation and Regulation. I am Jay M. Galt, an attorney from Oklahoma City, Okla., and representing the Municipal Electric Systems of Oklahoma, which is comprised of 31 municipally owned electric systems.

I also serve as general counsel for the Committee on Power for the Southwest, Inc., headquartered in Tulsa, Okla., formerly known as the Advisory Committee on Power for the Southwest.

The committee assists its members which are located in the States of Missouri, Oklahoma, Texas, Arkansas, Louisiana, and Kansas in their concerted effort to always have available reliable electric power and energy for their needs at the lowest possible price.

The committee's membership consists of 33 municipally owned systems, and 170 distribution and generation and transmission cooperatives. The committee members own and maintain an estimated 532,000 miles of line; provide electric service to an estimated 5 million consumers; sell over 23 billion kilowatt hours of electricity and generate over 8 billion kilowatt hours annually.

While the committee members serve only about 2 percent of this Nation's population, those consumers served produce an estimated \$18 billion of the Nation's agricultural products, and an estimated \$29 billion of the Nation's oil, gas, and other hydrocarbons.

Senator JOHNSTON. Why don't you summarize, and we will read the statement.

Mr. GALT. What I want to say is that we don't believe that section 521 of this bill, which proposes interconnection and wheeling, we will forget about pooling, should be characterized as an effort to break through the electrical iron curtain built by the dictatorial Texas Utilities, which they so jealously guard.

Senator JOHNSTON. All of these pejorative terms don't mean a thing to us, we want to get the facts.

Mr. GALT. Here is your problem. Texas Utilities is interconnected at the Dennison Dam through their subsidiary, Texas Power & Light, with the Southwestern Power Administration. You have two switches there, one operates to the south and one to the north.

The generators of the dam generate electricity, one going south and one going north.

The contract between Southwestern Power Administration and T.P. & L. provides that the Federal Government will never do anything that will subject Texas Power & Light, to interstate commerce. If it does, that contract immediately becomes void.

Southwestern Power Administration sells electricity to an electric co-op, Brazos Electric Power Cooperative in Waco, Tex. Primarily

that electricity is generated at a federally constructed dam called the Whitney Dam. If water levels in that dam are insufficient to permit electrical generation, SPA then has the option of taking power from their Sam Rayburn Dam.

If both dams are low, and if the Lake Texoma water level is low, and they are both in the same watershed, then to supply the electricity needs of Brazos, the Southwestern Power Administration is required to purchase, at an emergency price their electricity from Texas Power & Light, to serve Brazos at a great price to the Federal Government, which ultimately is borne by the customers of SPA over the six States.

If there were interconnections into the State of Texas SPA would have the ability to wheel power over Texas Power & Light lines to Brazos and then, SPA could generate electricity from its other dams, up at Bull Showles, Tenkiller, it's all interconnected. SPA is interconnected everywhere except in the State of Texas.

They could wheel power over their lines to Brazos and other preference customers within the State of Texas. Another example which I cite in my testimony is that we have had severe drought problems in Oklahoma and in the six-State area.

Because of the drought SPA has had to contract to purchase power to supply its contractual demands. They recently entered into, in fact this month, they entered into a contract with Arkansas Power & Light, to purchase 130 megawatts with 300 hours of energy at a price of 40 mils.

Almost simultaneously, Texas Electric Service Co. was offering 25 mil power to those utilities operating within the State of Texas, if SPA were able to purchase from Texas Electric Service Co. the savings, to the U.S. Government, and to the electric ratepayers of the Southwestern Power Administration for that 1 month, are estimated to be \$585,000.

Senator JOHNSTON. What would you have us order, what would you have us write in the statute?

Mr. GALT. I would have you amend the Federal Power Act to give the Federal Power Commission or its successor in being, authority to order interconnection and wheeling of power after a full evidentiary hearing when it is found to be in the public interest.

Senator JOHNSTON. Interconnection means, according to the staff draft¹ we have, to establish physical connection of its transmission facilities with the facilities of any other electric utility. Is that a correct definition?

Mr. GALT. That's what your draft says. If I did not know better I would think it was drafted by Mr. Austin and Mr. Jordan.

Senator JOHNSTON. What's wrong with it?

Mr. GALT. Interconnection without wheeling is like a Senator without a vote, it doesn't do a whole lot of good. We need the ability to interconnect electrical systems and then wheel power over that system to the receiving entity, not the ultimate customer.

We have many generation, transmission cooperatives who generate the power. Out in the distant parts of the country are distribution cooperatives who do nothing but sell the electricity. We need the ability

¹ See Appendix I.

to wheel the power from the generating plant to the distribution cooperative who in turn sells the power to the ultimate consumer.

Now, for a generation transmission cooperative, assume I am wheeling my power over the lines of the Public Service Co. of Oklahoma. We would pay Public Service Co. for the use of their transmission line; if the line had to be increased in size we would bear that cost—

Senator JOHNSTON. Now wait 1 minute. According to H.R. 8444, the House-passed bill, wheeling is defined as transmission of electric energy among electric utilities and qualified cogeneration facilities without transmission to an ultimate consumer.

That means using someone else's transmission lines to go from point A to point C, across from point B, and you are not using their generation facilities, you are not selling or receiving power. Is that correct?

Mr. GALT. That is correct, and the reason that provision is in there—

Senator JOHNSTON. Wait 1 minute, that part is correct. Now, you said a moment ago that the definition provided by our staff could have been written by Mr. Phillips or Mr. Austin or somebody else, and you implied that something was wrong with it.

Mr. GALT. It does not provide for wheeling, it merely provides for interconnection.

Senator JOHNSTON. There are three different concepts, interconnection, wheeling, and pooling. You are a lawyer, now tell me how to define interconnection.

Mr. GALT. Interconnection, in my opinion, just means what we have talked about today, the physical interconnection of facilities.

Senator JOHNSTON. The staff said that, and we are all in agreement that that is correct.

Mr. GALT. But that answers half the problem.

Senator JOHNSTON. It answers the first question, if we can ask one question at a time. Is that definition correct; yes or no?

Mr. GALT. Interconnection of facilities; yes.

Senator JOHNSTON. And the staff draft of wheeling is correct as well, is that correct?

Mr. GALT. I have not seen the staff draft of wheeling. This definition does not provide for wheeling.

Senator JOHNSTON. Wheeling is the transmission of electricity across—transmission of electric energy among electric utilities.

Mr. GALT. That is the definition of wheeling. That is not in my staff draft.

Senator JOHNSTON. Pooling is where you tie them together that electricity flows like water and seeks—

Mr. GALT. Pooling contemplates a central dispatch and an ordering of the generating—of the combining of generating facilities, in central dispatch, where the most efficient unit is used first.

Senator JOHNSTON. That is the central management system.

Mr. GALT. I am not proposing that we need pooling, I am just proposing that we need interconnection and wheeling.

Senator JOHNSTON. With interconnection and wheeling, do you disagree with Mr. Phillips that to keep that circuit connected, that electricity does not flow, that it is used only as the parties—

Mr. GALT. As long as the switch is open and there is any power in the line, let's take a garden hose. As long as you have water going

through the hose and you connect two hoses, you will have water flow, the direction from which the water is coming. Electricity flows the same way.

Yes, there will be a flow of electricity.

Senator JOHNSTON. You are proposing that we have them tied together in such a way that the wires are always together, and the power is always flowing to the point of lowest potential.

Mr. GALT. I think you are being tied up in technicalities, that are better answered by engineers. I am sure that if they—

Senator JOHNSTON. Lawyers have to make the definitions first.

Mr. GALT. We are talking about interconnection and wheeling, and we leave it to the engineers for given situations—

Senator JOHNSTON. I beg your pardon, sir. We have to define as to what is to be ordered. We don't leave the drafting of the law to the engineers. You tell us what it is we are to put in the law, and then we will buck it to the engineers.

Mr. GALT. You can put in the law that the Federal Power Commission or its successor in being may order interconnection, physical connection of facilities, and may order wheeling over utilities transmission lines, or public power transmission lines where it was found to be in a public interest and you have solved the problem.

Senator JOHNSTON. The next question, what is the public interest?

Mr. GALT. What is the public interest? The public interest, in my opinion, is an ability to receive their electric rates at substantially lower cost in the future. Our estimation by our engineers is that if you interconnected ERCOT in the Southwest Power Pool, the savings to the ratepayers in the State of Louisiana and with the other five States that make up the Southwest Power Pool, would be somewhere between \$600 million and \$2 billion between 1975 and 1980.

Senator JOHNSTON. Is the public interest a savings by both A and B if A and B are connected?

Mr. GALT. That is correct.

Senator JOHNSTON. And if there is not a mutuality of savings on electric rates, does that mean public interest is not served?

Mr. GALT. I don't know what you mean by mutuality of savings.

Senator JOHNSTON. It means both of them.

Mr. GALT. Everyone will save by this. Let's talk about New Mexico. There are no transmission lines running east and west through the State of New Mexico. You can ride a horse all the way from Colorado to Mexico, and never pass under a transmission or distribution line. There is an hour's difference in time between Texas and New Mexico—

Senator DOMENICI. What does that have to do with this? [Laughter.]

Mr. GALT. What it has to do with it is that the New Mexico utilities have been prevented from planning east and west because of the refusal of Texas Utilities to interconnect with the rest of the world.

There is no use building a transmission line across the State of New Mexico, east and west, if they can't interconnect within the State of Texas with another transmission line, for reliability purposes.

Mr. AUSTIN. That's not true, Senator. The reason they have not done this, they could have interconnected with Oklahoma at any time they wanted to. The reason they haven't is just like you say, you can

ride a horse from Colorado and not only will you not run into a transmission line, but you will not run into any people.

It is not economical to tie the two together and that's why there are no transmission lines. He's a nice guy but he doesn't know what the hell he's talking about. [Laughter.]

Mr. GALT. I disagree with Mr. Austin.

Mr. AUSTIN. You disagree that you could connect it, they could have connected with Oklahoma any time they wanted to?

Mr. GALT. They had to go through the State of Texas.

Mr. AUSTIN. No, they don't, you don't know your geography, man.

Mr. GALT. Let's not argue about that—

Senator JOHNSTON. This hearing is keeping us awake, I will say that much, but we do want to proceed one at a time.

Mr. GALT. Texas has a peak at 5 o'clock, let's say. They meet their peak. New Mexico then has their peak at 5 o'clock, an hour later. Texas is able to shift power to New Mexico to help them meet their peak demand.

It reverses when it is needed. We talk about—Texas Power & Light has 48 percent reserves, according to a recent rate case they were involved in. Texas Electric Service Co. has 42 percent reserves.

We talk about ERCOT having 32 percent reserves as a whole, and the Southwest Power Pool has 12 percent reserves. Now, I thought we were one big nation, that all shared and shared alike. We are willing to send our natural gas back here to the East to keep the East warm, but you ought to give us some break in letting us have our electricity at as cheap a price as is possible.

Senator JOHNSTON. When you define the public interest, would you define it as a net benefit to each company individually, or would you simply require that the sum total of the benefit be an approximate size?

Mr. GALT. I think it has to be the sum total. I don't know that we get any benefit from sending our gas to the East.

Senator JOHNSTON. A moment ago when I asked you about, asked you the question about mutuality, you would not require mutuality. You would define public interest as the total net benefit, and you might penalize A and hurt A to help B if the sum total—

Mr. GALT. I hate to say that in that general a term. We don't want to do anything that is going to be that detrimental to A to help B. It depends on the magnitude of the hurt.

In other words, we are willing to change our generation from low-cost gas to coal because it's in the national interest. There is no net benefit to the utilities in the State of Oklahoma from doing that, we have plenty of gas.

Senator JOHNSTON. We throw these terms around, public interest, national interest, without their having any—

Mr. GALT. There are other public interests involved. There is the environmental consideration. If you don't allow wheeling power over transmission lines, it means that we have to duplicate that same transmission line, just put it on the other side of the highway, and build it along there, and pay tremendous costs to build it.

Construction costs are just out of sight now.

Senator JOHNSTON. What other interests?

Mr. GALT. I think it is just economically, environmentally sound. I don't know, it might help reliability, and reduce the need for the number of generating plants.

Senator DOMENICI. Let me say to the last witness, so you will know where I come into this hearing, I come into this hearing intuitively thinking that we ought to address the interconnection problem, and that we ought to vest power to require interconnections.

But I am totally amazed that you would continue to use Oklahoma's natural gas as anything comparable, and suggest that we let the Federal Power Commission make these determinations based on public interest.

If anything, Oklahoma, Louisiana, Texas, New Mexico, have been living with the Federal Power Commission that has been making public interest decisions for 30 years that have been very detrimental to Oklahoma and New Mexico.

And I am not about to vote for a statute that has as vague language as the public interest. Those other people have invested hundreds of millions of dollars.

They did not do that just for fun; they have an interest, and they think it is the public interest. What we have to find out is what kind of guidance do we want to give so that both parts of this come out in the public interest, and I do not know how to do that, and that is not what I thought I was going to learn here today.

What are the guidelines we are going to set, and then let them have a hearing, let them have their fights and we will end up finding out whether it was in the public interest with the guidelines that we set which have something of a mutual kind of relationship.

I am not about to let the Federal Power Commission say "It is in your interest" and not take into consideration what the others think are their interest.

Mr. GALT. I am sorry, Senator, if I misled you. I think, I believe it must take into consideration the impact on both systems. I do represent the cooperatives who generate and transmit electricity, and I am not at all implying that anything that is done through this act should be of an undue burden to anybody.

It applies to us, as well as it does to the investor-owned utility. I am just saying that if we want access to their transmission line, we pay for it.

We are not going to use their transmission lines to compete against them. If there are economic savings, and if it does not affect the reliability to any great extent of a system, then let this interconnection and wheeling thing take place.

If it is going to be detrimental, and if it is going to cause Mr. Austin's companies to have a brownout in the State of Texas, then it is obviously not in the interest to do all these interconnection and wheeling things.

Let's just give these people a forum where they can put all of their engineers and let them have a hearing and let somebody make a decision.

That is all I am saying.

Senator DOMENICI. I want to make one more observation, Mr. Chairman, for the record. If I understand what is happening in our Nation on a voluntary basis, interconnections that are interstate in nature occur all the time.

Many companies make these kinds of voluntary arrangements. I would assume they make the voluntary arrangements upon a given shopping list of economic factors which are relevant to both communities of interest.

It seems to me that what we have here is a refusal on the part of one group to do that, and we are being asked to find that there would be an energy savings, some economics if facts were right and they were ordered to interconnect.

We need to find out what are the facts that people take into consideration when they make these voluntary decisions. If we are going to make the first decision that it is in the national interest, then we have to establish those basic guidelines that are similar to the economic decisions being made voluntarily, and then let an impartial board look at the relationships and see if those facts are there.

I am not interested in the sovereign State of Texas fighting with someone else. From my standpoint, this ought to be good for the whole country, or we ought not have it here.

I do not want to be the referee in this fight which has been going on, I assume, since Texas came into the Union.

Mr. JORDAN. Senator, before you came in I made this statement that Houston Lighting & Power Co. and, I think, Texas Utilities, are ready today to make this interconnection, can that type of benefit be shown?

We made enough studies ourselves that we are confident that that benefit is not there. This issue is boiling now in five forums.

It has been before the Nuclear Regulatory Commission, the Federal Power Commission, Texas Public Utilities Commission, U.S. District Court and now it's here. So a forum is not the thing that is lacking.

You take a look at numbers, and they can be very confusing. You have heard the Central & South West People tell you this morning there is something like \$2 billion available in savings for their customers.

I have right here in sworn testimony that took place on September 16, a couple of days ago before the Securities and Exchange Commission hearing, that the consultants who actually made this study did not, in fact, make a study on what would be best for the systems of Central & South West or the customers of those areas, but took a predetermined position supplied by Central & South West upon which to make the study.

If you start on that basis, you can come out with any answer you want to come out with, and that is what we are contending, and that is what now is going to be determined by the Securities and Exchange Commission as to whether there is any merit in this argument at all.

Senator DOMENICI. What does the Securities and Exchange Commission as a forum have to do with ultimately resolving this dispute?

Assume they find these facts of mutuality and the like and benefit and you do not want to interconnect, and the State commission in Texas maintains their present rule.

Are you going to interconnect?

Mr. JORDAN. I think we made the statement here and volunteered that if, in fact, those numbers come out that way and we are convinced that they do, that we will make the interconnection.

Senator DOMENICI. But nobody can tell you you have to.

Mr. JORDAN. No one can tell us we have to at this time; that is correct.

Senator DOMENICI. It does not matter if all five of those forums find the facts, no one can tell you you have to; is that correct?

Mr. JORDAN. That is correct.

Senator DOMENICI. Well, that is why we are here, as I understand it. OK.

Senator JOHNSTON. Mr. Jordan, as I understand part of the philosophical problem of ordering interconnections and pooling, to me they are two different concepts, although there is sort of a gray area involving interconnection and pooling that has not been defined, as I understand part of the philosophical problem, it is this:

Company A, knowing winter is coming, puts away a lot of acorns. That is, it goes and gets lignite or it builds excess capacity early on sensing that the costs are going up or whatever.

It gets a big baseload that it does not now need, sensing that it may have some growth in the future, and want to reserve that growth potential for itself.

Company B did not make such provisions, and it now wants its power. Part of the objection, as I understand it, is that you want to keep that excess capacity for Houston, so that your future needs will be taken care of.

Is that part of the consideration here?

Mr. JORDAN. It may be for Texas Utilities, but it is not for Houston Lighting & Power. The situation is this: We are already interconnected to 30,000 megawatts, and it is entirely possible for sales to be made within that 30,000-megawatt area.

Senator JOHNSTON. My question is not a factor here?

Mr. JORDAN. It is not for us.

Senator JOHNSTON. Is that a factor generally across the country?

Mr. AUSTIN. It is with us.

Mr. PHILLIPS. Companies buy and sell power. If they have excess they should be able to sell it. If they need power they should have a chance to buy it, if it is available.

They cannot demand that anybody give it to them.

Senator JOHNSTON. Mr. Austin, you say that is a factor with you?

Mr. AUSTIN. Why did Mr. Galt keep talking about our excess capacity if he did not want it?

Senator JOHNSTON. Why do you want to keep it? Why don't you want to sell it?

Mr. AUSTIN. We have excess capacity; we don't have excess fuel on a long-range basis. We built this because we do not have gas for the gas-fired plants. Mr. Phillips has testified that we were offering power for sale today.

We are offering power for sale today because we happen to have an excess of gas right now in the intrastate Texas market.

I could philosophically say that the free market system has worked in Texas like it should work in the whole United States, and therefore enough gas has been found that if Congress in its wisdom decided to share its wealth, there is gas available for the East, because Texas customers paid the price to keep the drill rigs running.

Now people want to take it off, and that is the experience the Senator is talking about, about FPC experiences. What I have seen them do to our State with gas, I don't want to see them do with electricity.

Right now we have some power to sell. We think we can sell it intrastate. We made the economic decisions. We made them for years, that it is more economical to interconnect in Texas for the same reason that New Mexico found it was more economical to connect to the West than it was to the East.

It was an economical decision.

Senator JOHNSTON. Let me disabuse my mind of one thing. There is no problem of trying to reserve that excess capacity for yourself for future growth.

Once you interconnect you have not forever lost your excess capacity; you can reclaim it when you put new people on the line. Is that correct?

Mr. AUSTIN. Why does he keep talking about it?

Senator JOHNSTON. Is that correct? Do you understand the question? Let me rephrase it.

Mr. GALT. This legislation does not require him to sell.

Mr. AUSTIN. He answered the question. This legislation, as it is written right now, does not require us to sell anything.

Senator JOHNSTON. Is that not a problem? I had thought it was a problem, that a person with excess does not want to sell it frequently because they are afraid that when they get interconnected they have forever lost that excess power.

Mr. AUSTIN. That is a philosophical problem with us.

Senator JOHNSTON. Once you get interconnected, you would think it sort of belongs to them.

Mr. AUSTIN. It is what the next Congress does, or the next Congress does. You fellows are pretty nice, but if I get interconnected—it is the same thing that Congress is about to do right now.

It is about—I hope it won't—but it is about to take intrastate gas and regulate everything.

Senator JOHNSTON. I understand that argument.

Mr. AUSTIN. If we get interconnected, any Congress at any time can say:

We want energy parity in the United States and there is no reason you should be producing energy with 35 or 40 percent lignite in the State of Texas when they are having to pay \$15 for Arab oil in New York.

Senator JOHNSTON. In your view interconnection does not necessarily involve a free flow of electricity where it seeks the lowest level and flows like water; is that correct?

Mr. AUSTIN. You switched the questions on me. Once you interconnect, electricity will flow like water. But Mr. Galt is right. There is nothing in any legislation right now that can require us to sell any of our product right now.

Senator JOHNSTON. You mean any legislation. You are not talking about this legislation? You are talking about—

Mr. AUSTIN. There is nothing in this legislation that requires us.

Mr. GALT. This legislation does not require Mr. Austin to sell his power, if he does not wish to do so. Nobody can order him to do so. He is speculating as to what might occur, sort of like we never would have needed a second lawyer if we had not gotten the first one.

Mr. AUSTIN. I agree with that statement.

Senator JOHNSTON. Our definition here is not very clear. It says:

In order to establish physical connection of its transmission facilities with the facilities of the other 11 utilities.

If that physical connection means it must always be closed, then power flows; doesn't it?

Mr. PHILLIPS. It only flows when you want it to flow. It is metered. It is a purchase and sale arrangement between companies.

It is not some involuntary phenomenon that happens over the wires.

Mr. AUSTIN. Mr. Phillips is correct on that, Mr. Chairman. If you just interconnect, power does flow back and forth, but all the dispatchers over the United States are busy after midnight every night figuring the inadvertent flow.

If you are in a real contract, it is a contract between one entity and another entity.

Senator JOHNSTON. You have no objection, in effect, to interconnection and wheeling. You just have an objection to what that may mean next year or next week?

Mr. AUSTIN. I have objection to wheeling right now. I would not object to interconnection if somebody else paid it all, and if our customers did not have to subsidize somebody else's customers.

Senator DOMENICI. Don't you wheel right now?

Mr. AUSTIN. We wheel some intrastate.

Senator DOMENICI. That is the difference. You do not want to be forced to wheel interstate, but you need to wheel in your power.

Mr. AUSTIN. The power he is talking about we wheel from Denison Dam to Brazos Electric Co-op. We have a contract now to sell them 10 percent of a nuclear plant, and we will wheel that for them.

Senator JOHNSTON. I do not understand the objection to wheeling.

Mr. AUSTIN. We do not want to have it forced on us.

Senator JOHNSTON. Why?

Mr. AUSTIN. It ought to be an economical situation between two parties.

Senator JOHNSTON. How does it ever cost you that much to wheel and why can't you just—let's say that we gave the Federal Power Commission the power to order wheeling.

I can look at a map, and I can see that it is obviously not very efficient for Southwestern Electric to wheel the power all around its system.

Mr. AUSTIN. They could build generating plants in that system anywhere they wanted to, so they would not wheel all that. Generation can go both ways.

Senator JOHNSTON. Why should they be required to build a generating plant when, by simply coming across the transmission line, they could do it much more cheaply? Even I can see that, and I am not an engineer.

Mr. AUSTIN. I beg your pardon, Mr. Chairman, but we have scattered our generating plants out to save transmission even on our system that is already integrated.

Nobody that I know of, I have referred to the experts, really builds a whole generating system, all of their plants in one place.

They run load studies and load flows and load centers and they put the generating plants where it is closest to the load center instead of doing all this transmission, even if they own the transmission lines.

Senator JOHNSTON. You do not want to be ordered to wheel, but you really have not told me why.

Mr. AUSTIN. We do not want to be ordered to wheel because we are negotiating on an agreement right now. When it is beneficial for the other party and beneficial to us we will wheel.

Leave it up to a business decision; that it all we are asking.

Senator JOHNSTON. I can see where pooling might not be beneficial, but why is it that wheeling is not beneficial? I can understand that it would take the capacity of your lines sometimes, but you can build more lines or require them to come up with their pro rata costs of additional lines.

Mr. AUSTIN. That is all we want.

Senator DOMENICI. Let me ask another question of you and you. Don't you wheel with a company that is here talking in favor of interconnection right now intrastate?

Mr. JORDAN. Are you asking me?

Senator DOMENICI. Yes, sir.

Mr. JORDAN. We do not wheel anything in the normal course of business at all in our company. We have interconnection with these other companies for the purpose of emergency transfer.

Senator DOMENICI. How about your company?

Mr. AUSTIN. We do not wheel with them. As Mr. Jordan said—like Mr. Phillips said, each company has built its own generation, so there is no reason to wheel power from Texas Utilities to Central Power & Light, which is one of Mr. Phillips' companies at the present time.

Senator DOMENICI. Who do you wheel with?

Mr. AUSTIN. The cooperatives.

Senator DOMENICI. And they are totally intrastate?

Mr. AUSTIN. Yes.

Senator DOMENICI. Are any of your decisions not to wheel based on the fact that you do not want to wheel in interstate commerce?

Mr. AUSTIN. The question never came up, because everybody realized we were in intrastate, and preferred to stay that way. We never have had—to my knowledge we have never had a request to wheel somewhere else.

Senator DOMENICI. But the point of it is, even if you did have one, and it was economically sound, you would not wheel because you do not want to become burdened by any interstate entanglements; is that correct?

Mr. AUSTIN. Yes and no. I apologize for that statement. If we can see that it is beneficial to our customers, we will interconnect.

All that we have seen so far is beneficial to somebody else's customers, but it is our stuff going out. It is our cheap fuel going out. It is our capacity that is going out.

And you know as well as I do that the consumer pays for everything.

Any capacity we've got has been in our rate base, and we have earned a return on it that our customers have paid for.

Senator DOMENICI. Mr. Chairman, you asked me if I understood the opposition to wheeling. I think that there is no opposition to wheeling.

Wheeling is done in the ordinary course of business by most major utilities. The opposition is to couple wheeling with interconnect, and place it under the jurisdiction of the Federal Power Commission be-

cause there is a fear that at the first go-round it will be on the basis of economic decisions not voluntary decisions.

But the concern is that down the line some further public interest would turn a whole region into, not only an interconnect, but a wheeling that would be mandated by either Congress or the Federal Power Commission.

Senator JOHNSTON. That is what I thought. In effect, the answer is that there is no objection to wheeling. It is what wheeling might entail; is that correct, Mr. Jordan?

Mr. JORDAN. There is none on my part, but there may be some other utilities around the country. I think EEI will testify for some other part of the country that you might be interested in hearing.

Senator JOHNSTON. Let us see if we can strip this bill down and say that interconnection means the physical connection of transmission facilities with facilities of another electric utility, and wheeling means transmission across the facilities of someone else, and it did not involve pooling.

It did not involve the jurisdiction of the Federal Power Commission and that the FPC would have to determine that it was a net benefit and in the public interest and you would be compensated for the use of your lines.

You have no objection to that kind of law; would you?

Mr. JORDAN. If it were done in such a way that the reliability would remain strong and there would be total compensation and that there was a clear net benefit to the customers of Houston Lighting & Power Co., I am ready.

Senator JOHNSTON. How would it hurt the reliability to have the kind of law that I described?

Mr. JORDAN. It would depend on what facilities were installed. If we went back—I think you've got your answer on the 25 percent, 75 percent testimony provided earlier. If you go back and make this investment in the system, you can shore them up where the individual customer in a service area probably would not know the difference.

There would be some load probability studies that would show over a period of time that there is something like the statistical example of property in the 100-year flood plain, and over a period of time there would be the likelihood of more outages, but the individual customer could not tell the difference if the transmission system were designed properly.

Senator JOHNSTON. How does wheeling affect reliability?

Mr. JORDAN. I was talking about total construction programs and not wheeling individually. If your facility is strong enough to handle it, then you can physically do it.

And reliability will not be affected.

Senator JOHNSTON. Wheeling should not basically affect reliability. In other words, you use one of your lines to wheel over and you have got to have a capacity within that line.

And if you do not and the FPC orders the wheeling, it would order the other fellow to pay for it. So if you build that line big enough it should not affect the reliability at all; should it?

Mr. JORDAN. As long as the lines are big enough, you will be able to handle it.

Senator JOHNSTON. Interconnection also is a physical connection, but as I understand your testimony here, the load managers can manage that connection in such a way that the net flow of power is zero on a 24-hour basis, and there would be small amounts of power that would go back and forth which could be basically managed.

Physical interconnection itself involves no pooling, and, ergo, should involve no reliability problems.

Mr. JORDAN. The reliability of problems involved have to constitute significant attention given to the construction program that would offset the larger pool you are talking about.

If you design it to satisfy those additional risks, then it can be done, and it is just a matter of the electrical design and the money you invest in the system.

Senator JOHNSTON. I do not understand why it involves all these systematic changes, if your managers of the power are going to manage that so the net flow of power is zero, except in times of emergency.

Mr. JORDAN. If the facilities are big enough to carry that and are designed properly, it should work.

Senator JOHNSTON. So it will not affect reliability. It is only pooling that affects reliability.

Mr. JORDAN. Wheeling does affect reliability if the capital is not invested to offset its effect. It is a matter of dollars invested in the system.

Senator JOHNSTON. If you pool them?

Mr. JORDAN. Yes, either way.

Mr. AUSTIN. Mr. Chairman, wheeling can affect your reliability. If you have a transmission line there floating, and no power flowing either way, but it is there, and if one unit trips off somewhere, and one unit trips off somewhere else, that is reliability.

These do this all the time in intrastate in Texas and lights hardly flicker. But if someone else is wheeling power over that line and then your unit trips off, you will be liable not to have enough capacity in that line to not jeopardize the reliability of the system.

I do not like wheeling anywhere you take it, except where you have done it, where two companies get together and agree on a wheeling contract, just like we are doing right now in the State of Texas, but don't mandate somebody else's.

Defining the public interest, the FPC can define the public interest so many ways—I have had all the public interest I can stand.

If you want interconnection, leave that; but leave off wheeling.

Senator JOHNSTON. The factors of the public interest are economic, and economic is a simple matter; isn't it?

Mr. AUSTIN. Not sometimes, because they are assigned—you can take an engineer and he will assign a certain factor to this, a certain factor to that.

Senator JOHNSTON. I understand. It is a complicated process, but it is easy to see. You can come down to numbers, and the FPC can require an exchange of dollars to offset the economic benefit or adverse effects; can't it, on economics?

Mr. AUSTIN. Yes.

Senator JOHNSTON. Then we have reliability that is part of the public interest here. What else do we have?

Mr. JORDAN. Those are the two big issues, as far as we are concerned. Reliability and economics.

Mr. GALT. You have environmental considerations.

Senator JOHNSTON. Let me respond to that question. I am very concerned about the environment, but I do not see how we can get into environmental considerations without planning the national grid and, in effect, siting for all companies where the plants will be and that is something that concerns me.

Mr. GALT. I think we would all rather not have the environmentalists be able to come in and tell us all this, but I say there is an environmental consideration in this legislation.

Senator JOHNSTON. Can we describe that environmental consideration without having national planning of our electric utilities?

Mr. GALT. Yes, sir. You can say it avoids the duplication of existing transmission lines and avoids the waste of natural resources.

Senator JOHNSTON. Duplication, that is an economic. What you are talking about is siting of electric powerplants and building extra capacity—I understand. You are correct.

Siting lines can be an environmental concern.

Mr. GALT. Let me say if we can build a generation plant in the State of Oklahoma, a coal-fired plant, transmit electricity to the State of Texas, we cut the transportation distance of coal from Wyoming by 500 miles.

That might be environmentally suitable, and it would also be economically suitable. There may be some engineering considerations why that would not be done, because of the distance.

But that opens up a myriad of planning possibilities.

Senator DOMENICI. Mr. Chairman, I think on the environmental issues, rather than talk about what we would want and what we would not want, we ought to make sure that the staff advises us as to what environmental laws outside of this one would apply in any event.

The major construction of new powerplants is subject to environmental scrutiny outside of what we are doing here, and there is no use in muddying up the water or even trying to escape that or try to build in any special treatment.

The location of plants that might result as an aftermath of a decision of this kind is dependent on the Clean Air Act, and a lot of other laws.

They would remain in effect, and these people are used to coping with them. Let me ask Mr. Jordan a question.

Senator JOHNSTON. Excuse me. Are you saying you think we ought to leave the environmental considerations alone and deal with the reliability and economic problem?

Senator DOMENICI. Correct. At this point I am not sure that those are the only two criteria, but I am prepared to say, "Leave the environmental considerations to existing environmental law and in no way to try to change that in this act."

Mr. Jordan, what is or what are the issues in the five arenas where this matter is being litigated or heard? Can you summarize?

If the SEC is going to make a decision, as you told us, what are they going to use as the standard that they are making a decision about?

In three or four sentences, what is the cause?

Mr. JORDAN. Because the SEC determines compliance with the Holding Company Act, and that is why it is in that forum. They are taking a look at it, to see whether or not it would be in the public interest to make the interconnections, as had been requested by Central & South West or not to make those interconnections, as requested by Central & South West.

The issues are clear enough, it is a question of economics and a question of reliability. That testimony before the SEC was recessed this morning because of this hearing, and will convene at the end today and will go on for some days.

Senator DOMENICI. Mr. Jordan, the basic issues are economics and reliability as the chairman indicated; is that correct?

Mr. JORDAN. That is correct.

Mr. PHILLIPS. Senator, we are the people who have a case before the Securities and Exchange Commission. The question there is, is the proposed mode of operation that Central & South West suggests for the future and which has been designed by Power Technology, Inc. and Stone & Webster Corp., is it in compliance with the Public Utility Act of 1935 and is it a feasible plan, a workable plan?

That is what is being tested up there.

Mr. JORDAN. He made a mistake, Senator, by saying it was designed by his two consultants. That is absolutely not correct.

Senator DOMENICI. Mr. Chairman, let me say this: I am not interested in that litigation. I was wondering if it furnished a clue to the kind of guidelines we ought to be building into this statute.

What they are going to decide on, is there some guideline in that case we could use in our public interest definition, or will we do that on our own.

Mr. GALT. Senator, I am one of the attorneys who represented the plaintiff who started the whole thing, and I do not think that that is going to help you.

Senator JOHNSTON. Gentlemen, I said we would have you on for 15 minutes each, and you have gone considerably over that, but you will be glad to learn that the 10 o'clock hearing here was canceled, so we can proceed on.

Our friends from Kentucky were worried about not getting on. We have more adequate time to deal with it. We have not exhausted all our questions of you, but we do need time for these other witnesses.

If you gentlemen would stay for the rest of the hearing, in case there is a question we can ask you later on, we would appreciate it.

Thank you very much.

[The prepared statement of Mr. Galt follows:]

TESTIMONY SUBMITTED BY
JAY M. GALT
TO THE SUBCOMMITTEE ON ENERGY CONSERVATION AND REGULATION
OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

September 20, 1977

Mr. Chairman, Members of the Senate Subcommittee on Energy Conservation and Regulation, I am Jay M. Galt, an attorney from Oklahoma City, Oklahoma and am representing the Municipal Electric Systems of Oklahoma which is comprised of 31 municipally-owned electric systems. I also serve as General Counsel for the Committee on Power for the Southwest, Inc., headquartered in Tulsa, Oklahoma, formerly known as the Advisory Committee on Power for the Southwest. The Committee assists its members which are located in the States of Missouri, Oklahoma, Texas, Arkansas, Louisiana and Kansas in their concerted effort to always have available reliable electric power and energy for their needs at the lowest possible price. The Committee's membership consists of 33 municipally-owned systems, and 170 distribution and generation and transmission cooperatives. The Committee members own and maintain an estimated 532,000 miles of line; provide electric service to an estimated 5 million consumers; sell over 23 billion kilowatt hours of electricity and generate over 8 billion kilowatt hours annually.¹ While the Committee members serve only about 2% of this nation's population, those consumers served produce an estimated \$18 billion of the nation's agricultural products, and an estimated \$29 billion of the nation's oil, gas and other hydrocarbons.²

¹ REA Bulletin 1-1, 1975.

² Preliminary 1976 figures, U.S. Bureau of Mine supplied by the U.S. Geological Survey, Norman, Oklahoma.

We do not believe that Section 521 of Senate Bill 1469 which proposes interconnection, wheeling and pooling should be characterized as an effort to break through the electrical iron curtain, built and so jealously guarded by the dictatorial Texas utilities, but rather this section addresses the national energy crisis of today, which if not squarely faced by you can result in economic devastation.

The issue is simple:

Are these millions of people who are the member-owners of the systems, that I am representing here today, who produce to a large extent the basic agricultural products, and the bulk of the oil and gas upon which this nation depends, entitled to the electrical energy necessary for them to grow their crops and produce the oil and gas, at the lowest possible price? We believe that they are.

If they are not entitled to receive the lowest cost electricity possible, then farms and ranches will be abandoned; the production of oil and gas will decline and economic disaster can ensue, and the nation could experience an energy crisis like the East faced this past winter.

The passage of this proposed amendment to the Federal Power Act contained in Section 521, which would give the Federal Energy Regulatory Commission authority to order interconnection, wheeling and pooling of electricity, after a full evidentiary hearing, when found to be in the public interest, is absolutely necessary to insure that the consumer-owned and investor-owned electric systems doing business within the six states can assure their owners and customers of an abundant supply of elec-

tricity at the lowest cost possible.

The interconnection and wheeling provisions will permit one electric generating entity, whether it be consumer-owned or investor-owned, to use the transmission facilities of the other if capacity is available for the purpose of delivering electric power and energy to its wholesale members or customers at a distant point with the utility owning the transmission facilities being fairly compensated for the use of those facilities. The capability to interconnect and wheel is both environmentally and economically sound. It can eliminate or defer the expenditure of billions of dollars for new generating plants, new transmission lines and the securing of land right-of-way for their use, which costs, if incurred, are paid for by the electric rate payer through higher and higher electric rates.

The savings which can be realized through interconnection and wheeling are exemplified by one study made by the Federal Power Commission which examined the benefits of interconnection coordination of 93 separate electric generating systems in Kansas and Western and Southern Missouri. The study estimated savings of 1.92 billion dollars between 1980-1990 to the utilities which would ultimately be realized by their ratepayers. Whether there was a possible national benefit in addition to those savings was not considered by the Federal Power Commission in their analysis.

A recent report made by the United States General Accounting Office entitled Problems in Planning and Constructing

Transmission Lines Which Interconnect Utilities dated June 9, 1977, stated that the Federal Power Commission made 35 such studies on interconnection coordination which showed billions of dollars of savings to the public, but no savings have been realized because the Federal Power Act does not give adequate authority to order interconnection, wheeling and pooling.

I recently learned that the Southwestern Power Administration, a Bureau of the Department of Interior, which sells electricity to many of the members of the organizations that I represent, has, this month, contracted to purchase from Arkansas Power & Light 130 megawatts with 300 hours of energy to meet their contract demands, if water levels in the dams from which they normally produce their electricity to meet their customers' needs are not at sufficient levels to permit generation, at a price of 40 mills. At the same time, I have also learned that Texas Electric Service Company has offered 300 megawatts of firm power priced at 25 mills for sale to utilities that are operated only within the State of Texas. The Southwestern Power Administration, although interconnected at the Denison Dam on Lake Texoma with Texas Power and Light, which, in turn, is interconnected with Texas Electric Service Company, is prohibited from purchasing that 25 millpower because of the arbitrary decision of the Texas Utilities Companies not to operate in interstate commerce.

If the Southwest Power Administration could purchase this power from Texas, the savings to the Government would be \$585,000 for just one month.

Further, a May 17, 1977 letter to the Texas Public Utility Commission from Norman R. Lee, President of Gulf States Utilities Company, whose utility operates in Southeast Texas and South Central Louisiana, estimates that his company could save approximately \$11 million if interconnections within Texas were possible between his company and the utilities operating within the State of Texas in an intrastate mode.

A 1972 study made by the Federal Power Commission on the question of interconnecting ERCOT and the Southwest Power Pool revealed that there would be an estimated savings to the electric consumer between the years 1975-1980 in the six-state area of \$200 million dollars. An update of that report by our engineers, updating only the fixed cost data used by the Federal Power Commission to 1974 levels, resulted in an estimation of the savings being between \$600 million and 2 billion dollars during the same period.

It is further interesting to note that as you look West from the State of Texas, there are no East-West transmission lines running through the State of New Mexico, even though there

is an hour's difference and the time diversity between the two states should enable utilities who were operating interconnected and coordinated to save hundreds of thousands of dollars, simply because of the time diversification differences and differences in system peaks. It was not until recently that I realized that one could ride a horse through the State of New Mexico from the Colorado line to the Mexican border, and never cross under either a distribution or transmission line. I submit to you that one of the reasons why transmission lines have never been built on an East-West axis is because of the fact that the Texas Companies have refused to operate in an interstate mode of operation.

It is time for legislation to be passed which can benefit the electric ratepaying consumer rather than evading the issue, at the behest of the special interest groups representing some of the investor-owned utilities, who claim that they can accomplish the same results through private negotiation, but who, for the most part, have totally failed and refused to do so for almost 40 years.

This proposed legislation does not force any utility to interconnect, wheel or pool. It merely provides a forum wherein the issue can be considered, and where, after a full hearing and consideration, it can be ordered when it is feasible and found to be in the public interest. In other words, a forum is established wherein justice and fair play may be permitted

on this question and, after all, what is more fundamental in our American culture than the notion that justice and fair play should prevail in any controversy or dispute.

If anyone of the 35 studies, referred to above, which were made by the Federal Power Commission, is correct and substantial savings to the ratepaying public are available to them but are not being realized but for the lack of interconnection, wheeling and pooling, this, alone, justifies the passage of this Amendment.

I submit to you that each of you owe to your constituents, those who place their faith in you, the obligation to permit their electric utility to sell its electricity at a price your constituents can afford rather than at a price they cannot pay which can lead to national economic disaster, or in the alternative, Federal subsidization of the ratepayer.

The members of the Committee on Power for the Southwest, Inc. and Municipal Electric Systems of Oklahoma are dedicated to the principle that their member-consumers should receive their electric service at the lowest possible cost, and we firmly believe that interconnection, wheeling and pooling can result in future savings to our consumers, and we therefore fully support the provisions of Section 521. On behalf of the Committee on Power for the Southwest, Inc. and Municipal Electric Systems of Oklahoma, I want to thank you for the opportunity to make these comments this morning.

Senator JOHNSTON. At this time, David J. Bardin, Deputy Administrator of the Federal Energy Administration, who is unaccustomed to our standard hour of hearings, at such an early time.

STATEMENT OF HON. DAVID J. BARDIN, DEPUTY ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION; ACCOMPANIED BY ROBERT NORDHAUS, ASSISTANT ADMINISTRATOR, FEA; WILLIAM LINDSAY, ACTING CHIEF, BUREAU OF POWER, FEDERAL POWER COMMISSION

Mr. BARDIN. Mr. Chairman, I have benefited from a very interesting discussion and I am grateful for that. I am accompanied by Robert Nordhaus, Assistant Administrator for the Federal Energy Administration, and Mr. William Lindsay, Acting Chief of the Bureau of Power of the Federal Power Commission, who is here by designation of Chairman Curtis to answer any technical questions that may come up on the Federal Power Commission jurisdiction.

The discussion thus far, however, has missed one ingredient—a statement of the law in effect today.

Rather than read my prepared statement, I would like to focus on a few background issues. We have on the statute books today part 2 of the Federal Power Act, enacted by Congress in 1935, under the leadership of Sam Rayburn. This legislation was part of a major reform of public utility regulation, and provided for the first time for Federal participation in public utility regulation.

Under that act, Congress directed two relevant actions by the Federal Power Commission. One was purely voluntary, to foster the voluntary interconnection and coordination among bulk power facilities of utilities, that is to say, generation and transmission facilities. This is to be found in section 202(a) of the Federal Power Act.

Second, by enacting section 202(b) of the Federal Power Act Congress conferred certain mandatory powers on the Federal Power Commission. I am going to focus on these provisions because they have not yet been discussed and because they apply to most of the investor-owned utilities in the country. Today we have been hearing about the exceptional case, and not the typical case.

Let me note at the outset that the term “interconnection” is, indeed, a term about physical facilities. The statutory term “coordination” includes the planning and commercial arrangements among utilities which are generally characterized in the industry as pooling arrangements.

Senator JOHNSTON. Is interconnection a word of art?

Mr. BARDIN. Interconnection is a word of art, and it is usually used to refer to the physical facilities that tie together the systems of two corporate bodies, rather than the similar transmission facilities within the service area of a single corporation.

Senator JOHNSTON. Interconnection usually does not mean pooling or flow of electricity, but more or less a standby line?

Mr. BARDIN. No, Mr. Chairman. In practice interconnection does not mean a standby line. With very few exceptions, where the switch is open, interconnections are closed switch connections. This is, a tie among the generators exists, so that the generators continue in synchronism throughout the whole interconnected grid.

Moreover, you do not have interconnection in practice without some additional arrangements. The key is to look at section 202(b) which is the section of the existing law that gives the FPC the authority to order interconnections under certain circumstances.

This power extends beyond granting the FPC authority—as defined to include investor-owned utilities engaged in interstate commerce—to order a public utility to establish physical connection of its transmission facilities with the facilities of one or more persons engaged in the transmission or sale of electricity. The law authorizes the FPC to order the public utility to sell energy to or exchange energy with such persons. That is the language in the existing law today.

Any investor-owned utility of Louisiana or New Mexico or Ohio is subject to that law today.

Senator JOHNSTON. If we required Houston Lighting & Power to interconnect, and carefully defined that, that would bring them under the Federal Power Commission and, in turn, under those other powers of pooling and exchange, et cetera?

Mr. BARDIN. That is correct, Mr. Chairman.

Senator JOHNSTON. So if we wanted only to order the interconnection and wheeling, we would have to specifically except that jurisdiction from the bill; is that correct?

Mr. BARDIN. That is correct, and if you did, as is attempted to be done by the draft subsection g, subsection 4, proposed to be added to section 202,¹ you would, frankly, get into a ludicrous situation.

Let me illustrate that. If this draft bill were the law today and the Federal Power Commission held the proceedings called for under this draft bill and concluded that an interconnection should be ordered between Houston and Louisiana and the necessary physical linkage was established, then any wheeling or sale of power transmitted from Louisiana to Houston would be subject to FPC regulation.

But, Houston Lighting & Power, the fourth largest utility in the entire country, would be exempted by proposed subsection 4 from regulations on a sale of power back to Louisiana.

Let me illustrate this point with a chart which is included in the testimony. The way the Federal Power Act works today, a utility that sells electric energy in interstate commerce for resale, or transmits electric energy, is subject to FPC regulatory jurisdiction over account books, rates, wholesale rates, and transmission rates.

All the investor-owned utilities in Louisiana, Arkansas, and Oklahoma are involved in an interstate situation, as previously described, which involves them in interstate commerce.

The utilities in Texas are involved in an intrastate pool. I will assume, without knowing, that there is no relevant interstate commerce past or present involved in that pool. So that it is truly an intrastate arrangement. If a tie line is built and paid for and people want to take advantage of it for short-term or long-term commercial transactions, when the sale goes from Louisiana to Houston, it will be a sale in interstate commerce and be regulated.

If it is wheeling, it will be a transmission service in interstate commerce, and FPC will regulate it and protect the consumers in Texas.

On the other hand, if that same physical facility is used for an identical type commercial transaction involving service by Houston Light-

¹ See Appendix I.

ing & Power to utilities in Louisiana, under subsection 4 of the draft proposed, there would be no regulation by the FPC, and no protection for the consumers in Louisiana.

Mr. Chairman, quite frankly, that just isn't fair.

Senator JOHNSTON. The draft also says that "terms and conditions of agreements among the facilities affected by an order issued under this subsection shall be determined by negotiation of said utilities subject to approval by the Commission." If they do not agree the Commission may prescribe the terms and conditions.

Are you saying that provision is inconsistent with four, which brings them out from under the jurisdiction?

Mr. BARDIN. I think that subsection 2 is inconsistent with subsection 4. I found subsection 2 provision to be encouraging. I found subsection 4 to be unfair. I suggest to you, Mr. Chairman, that it is a contradiction, and you cannot have it both ways.

I would think that the Congress of the United States would clearly want to have it the first way, namely to provide for an attempt at negotiation. If an arrangement cannot be arrived at by negotiation, then give the authority to a Federal regulatory agency to make the final decision on what is fair after a hearing under appropriate standards.

Senator JOHNSTON. I am going to ask you about those standards in a moment. But right now, of all investor-owned utilities a greater portion are subject to FPC jurisdiction.

Mr. BARDIN. That is correct. Virtually every investor-owned utility is subject to that jurisdiction.

Senator JOHNSTON. You have the power to order the interconnections and exchanges or sales of power: is that correct?

Mr. BALDWIN. That is correct. There are limitations to this authority which ought to be noted. The FPC may exercise the power to order interconnects and exchanges only on complaint of a State commission or any utility.

The FPC does not have authority to act on its own motion to accelerate the pace of interconnections. Under the administration bill, the Federal Power Commission would have the authority to act on its own motion to require, for example, an extra interconnection to be built to tie in, for example, Consolidated Edison and New Jersey.

Senator JOHNSTON. Under the present law you cannot on your own motion order that interconnection?

Mr. BARDIN. That is correct.

Senator JOHNSTON. It is only on petition of one of the parties.

Mr. BARDIN. But where the petition is filed, or where the application is filed by a State commission or a would-be interconnecting utility, the FPC has broad jurisdiction.

Senator JOHNSTON. And you want to have the power on your own motion; is that correct?

Mr. BARDIN. We believe that the Federal Power Commission ought to be assigned that responsibility on its own motion.

Senator JOHNSTON. If you had the power to do that, would you not necessarily get into the whole question of siting and financing places of construction, all those panoply of decisions?

Wouldn't we have, in effect, total Federal regulation of that? Whether that is good or bad, wouldn't that follow?

Mr. BARDIN. No. Let us distinguish between generation and transmission. The existing Federal Power Act clearly denies to the Federal Power Commission responsibility to require increases in generating capacity. Under the administration bill, that limitation would remain law. In the case of transmission facilities, if an interconnection is ordered under the existing section 202(b) or President Carter's bill or the staff alternative draft, it is quite conceivable that some siting question would be raised.

And, more likely, a general environmental question will be raised under the National Environmental Policy Act. The Federal Power Commission, under existing law, or under any proposed provisions would have to confront these questions.

Senator JOHNSTON. If, for example, you order the Houston Lighting & Power Co. to interconnect, with their 32 percent extra capacity, and you order them to sell that capacity to Central & South West under certain terms and conditions, and it is, in effect, involving an irrevocable sale, you are, in effect, making the decision as to where the next generating plant will be built.

Mr. BARDIN. There is a misapprehension here. One way of looking at the problem is the irrevocable sale concept. However, elective utilities do not do, interconnection and pooling service business through irrevocable sales. They do have term sales, such as 3- or 5-year agreements.

The exception is when two or more utilities jointly build a powerplant and thus commit themselves for the life of the plant as to capital costs and operating costs.

There is no authority here over the powerplant.

Senator JOHNSTON. But listen to what I am suggesting to you, and check me if it is correct. We will talk about whether it is good or bad later.

By making that decision of the terms and conditions under which Houston shall sell to Central & South West, you take upon yourself the power to determine where the next plant will be built and, in turn, how it will be financed.

Mr. BARDIN. No, that is not right. Thank you for coming back to this question because there is a misconception here. Under the existing Federal Power Act, and under President Carter's bill, the Federal Power Commission may not impair a utility's ability to serve its customers.

That prevents the Commission—

Senator JOHNSTON. Does that include future customers?

Mr. BARDIN. Yes, it includes the customers in the utility's service area. The basis of a utility's responsibility typically is a service area, most often a monopolistic service area.

Utilities, unlike most businesses in the world, have a responsibility to meet the needs of whoever may some day be in that service area.

That is the commitment they have undertaken.

Senator JOHNSTON. Let me see if I have this straight. In effect, you can never order Houston to sell power to Central and South West if Houston needs that power itself?

Mr. BARDIN. I believe that is correct, Mr. Chairman. Houston has first call—

Mr. AUSTIN. I do not want to commit myself on that statement.

Mr. JORDAN. I don't either.

Senator DOMENICI. I think the statute says that the words are to sell or exchange energy when to do so would impair its ability to render adequate services to its customers, "it" being Houston Power in your question. They cannot order it when that is the case, when to do so would impair its ability to render adequate service to its customer.

Senator JOHNSTON. That would imply existing customers, as opposed to future customers.

Mr. BARDIN. It clearly includes present and future customers. The whole service area concept, the whole public utility concept evolved from Anglo-Saxon law, going back to Elizabethan times, clearly means the service area customers, whoever chances to be a customer tomorrow or the next day.

May I take this a step further?

Senator JOHNSTON. The administration bill also says "unreasonably impair." Our draft says "impair." You would want that to be "unreasonably"?

Mr. BARDIN. I regard that as a procedural rather than a substantive difference. It ties in with the fact that the administration bill allows action on the Commission's own motion. There was some concern that the right of the utility to seek judicial review of what the Commission decided might be open to question if the word "unreasonably" was not included.

It is not a critical word from the point of view of substantive standards. The question is, to adhere to substantive standards now in the Federal Power Act, which just says "impair."

Senator DOMENICI. Would you go back, Mr. Bardin, to this chart and tell—I understand your criticism of the draft before us, but tell me what kind of aberration or unfairness the fact that the arrow does not run both ways regulatorywise could cause.

Are you saying the Texas Commission could set unduly high rates for the arrow flowing to Louisiana?

Mr. BARDIN. The Texas commission cannot regulate those rates. The background to the 1935 statute was the Supreme Court decision that this kind of interstate rate is beyond the power of the States to regulate.

The question is whether the FPC will regulate or nobody will regulate. Let me go through a couple of examples.

Senator JOHNSTON. Before you get into the examples, let me ask you—

Mr. BARDIN. We are thinking of sales as ordinary merchandising sales.

Senator JOHNSTON. Let me ask you if this changed suggestion by the staff would solve the problem? It would change four to read, "Except as provided in two."

Two is where you have by negotiation subject to approval of the Commission.

Mr. BARDIN. Then what on earth are we trying to exempt Houston Lighting & Power from? Mr. Chairman, back in the 1960's utilities in Michigan, Florida and Texas were advocating legislation almost identical with the kind of language that you now have in proposed subsection 4.

That legislation considered by the Committee on Commerce in those days. The then-Chairman of the Federal Power Commission was Joseph Swidler.

I remember him testifying to his astonishment that American corporations should be so afraid of their own Government that they were advocating this kind of legislation.

If FPC regulation is so onerous or intolerable that it should never be imposed on Houston Lighting & Power, the fourth largest utility in this country in terms of kilowatt hour sales, no matter what, then Mr. Chairman, this Congress ought to review the wisdom of the 1935 decisions as they apply in Detroit, in Shreveport, as they apply in New Mexico, Ohio, California or anywhere else.

I cannot imagine any good argument whatsoever for subsection 4.

Senator JOHNSTON. You see, we do not give FPC right now the power on its own motion to do these things. That is only with the competing utilities themselves, or, according to you at least, but you want to expand that now.

Mr. BARDIN. That is correct.

Senator JOHNSTON. Well—

Mr. BARDIN. There is no question in my mind, Mr. Chairman. Back in 1935 when Sam Rayburn propounded the act, the working assumption was that we would get to a point through voluntary coordination of having, with very little more federal impetus, a national grid.

Senator JOHNSTON. What do we mean by "national grid" by the way?

Mr. BARDIN. The term has been used in two senses. There are some people who have recommended to the Congress a formal master plan, master construction—

Senator JOHNSTON. It is a national pool, in effect?

Mr. BARDIN. We are talking about physical facilities now. I think we ought to take a few minutes to talk about pooling.

I do have some thoughts to share on the question. But a national grid could be something planned out by the Federal Government, or it could be what evolves gradually as it has been doing in the East and the West, and has been described to you generally.

The progressive interconnection of utilities that started about 50 years ago in Pennsylvania and New Jersey and which now includes this area of this country and has progressively spread out.

Senator JOHNSTON. A national grid obviously means that it is all interconnected, and it obviously involves some degree of planning and coordination.

Mr. BARDIN. The trick on pooling is that pooling has to do with planning and commercial arrangements. But pooling arrangements can be of many different forms.

For example, a pooling arrangement may involve just planning the next powerplants. Some utilities do that together. It is an intercorporate arrangement.

Under President Carter's bill the key term is not pooling-but-pooling services—services such as emergency power or backup arrangements. If I need help from you, and if you can lend assistance, you will help under agreed upon terms. Also with regard to maintenance services, when my powerplant No. 3 is down for routine maintenance,

I have an agreement with you under which I can buy backup power from you.

There are also block sales of power on an hourly, monthly, or yearly basis, which are more like ordinary commercial transactions.

Let me get back to Senator Domenici's question about the chart. The clearest case is if we have an exchange agreement that has to do with some kind of diversity, for example if your peak is at a different time from my peak.

It may be a difference in hours time of year, or time of week. We can agree to swap power back and forth.

Maybe there have to be some commercial payments, because there is greater cost for you and greater cost for me. We sign a contract, if we can work it out, or, under this bill's subsection 2 alone, we enter into some kind of arrangement ordered by the FPC after the hearing.

If you really say that this side of the transaction is not subject to the Power Act and that side is, it means that anything that Louisiana pays Texas is unregulated.

Senator JOHNSTON. We do not mean to say that. We can change that. I would suggest to you, it is not clear from the draft that if the change was to read, "Except as provided in two," that would clear it up.

And then your question is, does that then exempt Houston Lighting & Power from—

Mr. BARDIN. Let me give you an example of an ambiguity. Under the Federal Power Act, jurisdictional utilities have to obey a uniform system of accounts have.

If they are exempt from that, what is the basis for rate regulation? All FPC rate regulation is based on compliance with a uniform system of accounts.

It is analogous to one of issues that prompted the 1935 regulations, ordering standardized bookkeeping for utilities—there are very few utilities that have not been subjected to FPC audits.

You happen to have had two of the largest represented on the panel before. If FPC rate regulation is going to attach to this transaction, then the Congress would want to be sure that accounting and audit regulation attached to the transaction.

Senator JOHNSTON. Do you need all that to cover that single transaction, or are you just saying it would be a good thing, even absent this interconnection, to have it under FPC jurisdiction?

Mr. BARDIN. If anyone would think that the transaction would stop with building a powerline, then the answer is "No," you do not need accounting jurisdiction.

But intelligent businessmen would take advantage of the powerline to engage in commercial transmission over it, then the answer is "Yes," you do need jurisdiction.

Senator JOHNSTON. Do you know why Houston Lighting & Power resists so mightily this change?

Mr. BARDIN. I hear scuttlebutt in the industry, but I do not read people's minds. I assume this is a strongly-held philosophy—let me put it this way.

Walker Sissler, who was one of the superstars of this industry, was for many years head of the Detroit Edison Co., and a very outstanding leader of the industry.

He felt strongly that his company should not be subject to FPC regulation. He succeeded in getting an amendment to the Federal Power Act back in the forties or fifties, so that even though he was interconnected to New York through Canada, Detroit Edison would not be jurisdictional.

Then, when questions arose as to whether that amendment was effective to do what was intended by its sponsor, he became one of the strong proponents of the legislation that I referred to which was proposed during Chairman Swidler's time.

He just did not like to be bothered with the Feds.

Senator JOHNSTON. Are you saying that you think it is because of Federal Power Commission jurisdiction and not because of these inability to agree on the cost of the backup system, et cetera?

Mr. BARDIN. There is no question in my mind, from seeing what happened in Michigan and Florida, and actually the participation of Texas Utilities in the past, that there is a strongly felt opinion on the part of utility management that they much prefer not to be regulated by the Federal Power Commission.

In the case of the Texas Utilities, you may have had other issues, because just recently has there been statewide legislation.

That has been a perennial issue in the legislature. The history of the country is that everything started with municipal regulation, and only in the time of Samuel Insull of Commonwealth Edison did he get Wisconsin and Illinois to pioneer the concept of State—

Senator JOHNSTON. Why do people resist FPC jurisdiction on electric rates? I can tell you in natural gas; that is easy. But why, on electric rates? Because they do not want to keep their books right?

They are trying to hide something? What are you saying?

Mr. BARDIN. I am not saying, and I am being careful not to speculate, but I did want to finish this. Mr. Sissler finally studied the whole question closely with American Electric Power Co., which was then under Don Cook's leadership.

They finally decided this was a lot of nonsense, and they were going to bury that hatchet. They buried that hatchet and they have survived and thrived ever since.

The same thing has happened in Florida, where Florida Power & Light at one time felt very strongly against FPC regulation. Today it is weakly interconnected with Georgia and the rest of the country.

There probably should be a much stronger interconnection and that is probably an example of the situation where it would be a good thing for the FPC to act on its own motion after proper procedures.

Senator JOHNSTON. Your answer is you do not know why people resist FPC jurisdiction; is that right? If you do know why, please state.

Mr. BARDIN. I have never asked it, point blank, and I have never investigated it point blank. My own opinion would be in the nature of surmises.

Senator JOHNSTON. We do not have involved here some costs, where they would like to sell for more and FPC says, "No, you have to have a cost of service" as opposed to something like that?

Mr. BARDIN. Maybe. Houston Lighting & Power has relatively high cost rates, and has always had a relatively high rate of return actually earned, as compared with many other utilities.

Until recently they have been under a different system of regulation, that is, municipal government review. Obviously, you have a gentleman in the room who could tell you much better than I to what extent that influences their philosophy or Mr. Austin's own philosophy on regulation.

Let me put it this way: I heard Mr. Austin tell you time and again that he has nothing against wheeling, but he did not like to be regulated.

Any businessman prefers not to be regulated. I have been regulated by various Federal agencies as a State official, and sometimes I got my permit and sometimes I didn't.

But I preferred not to have to ask. On the other hand, to have a public utility chief executive in 1977 tell you that it is better to do it on a business transaction basis with no oversight seems to me simply incredible.

Public utilities are monopolies. The Texas company that Mr. Austin heads is a monopoly. It is a classical monopoly.

Utilities have been described by Mr. Justice Frankfurter in the *Rochester* telephone case as the kind of business normally done by Government. However, in our country we have had the genius to invent a way to do it through investor-owned companies. But they ought to be regulated investor-owned companies, and ought to be regulated by an appropriate entity.

If it is interstate commerce, it ought to be regulated by the Federal Power Commission.

Senator JOHNSTON. Don't you like this approach we have here in paragraph 2 where you first require them to negotiate and then the Commission, subject to approval by the Commission, and provided that if you do not reach agreement the Commission may prescribe the terms and conditions of the arrangement?

Mr. BARDIN. Yes, I think the idea of starting with negotiation and, hopefully, being in a position where the Commission simply would review something filed with it as a rate schedule, rather than having to impose its will initially would be extremely desirable.

Senator JOHNSTON. Let us move on to the factors we were speaking about a moment ago. Senator Domenici and I, I think it is fair to say, are of the mind that the two factors ought to be economic and reliability.

The questions beyond that are, economic. Is interconnection susceptible of an exchange of dollars to the extent that it is not otherwise an economic boon to both?

On reliability, how do we define "reliability," and what should the standard be? Will you speak to those?

Senator DOMENICI. Mr. Chairman, may I ask a preliminary question to that? Mr. Bardin, I think we have been filled with facts about these particular utilities in the State of Texas, and its present posture in protecting intrastate jurisdiction.

Would you tell me, generally, if we change the law as recommended by the President, that would obviously enlarge the Federal Power Commission's jurisdiction, change that relationship from voluntary requests to direct involvement and intervention. In a general way how much of the utility business in the country, aside from this Texas issue here, would the Federal Power Commission expand to?

Is most of it already under the Federal Power Commission, or are we talking about 50 percent?

Mr. BARDIN. Which question should I answer first?

Senator JOHNSTON. His.

Mr. BARDIN. The expansions would be as follows: The first expansion is one already noted. The order could be addressed to an intrastate utility, and that is basically the Texas situation.

Second, the order could be addressed to a municipally owned or REA co-op GNT utility. These non-investor-owned utilities are now exempt from the interconnections and wheeling provisions of the act.

Three, the Commission would be authorized to act on behalf of a cogenerator, that is, an industry that owns a facility that both generates electricity and then uses that residue steam for processed heat, and in this way achieves energy and pecuniary economies.

The industrial cogenerator is not now eligible for assistance under 202(b).

Senator JOHNSTON. Assistance under 202(b)?

Mr. BARDIN. Under 202(b) of existing law the Commission can order an interconnection only to an investor-owned entity engaged in the transmission or sale of electricity interstate.

It cannot order an interconnection to a utility engaged in generation but not sale of electricity. So those are three expansions over and above the Texas situation.

Moreover, under the President's bill, and after much of our discussion today, there would be what I would consider a clarification of the jurisdiction with regard to wheeling.

The President's bill would make clear that FPC could order wheeling. Today under the Ottertail legislation, there is strong dictum to the effect that the FPC may not order the kind of point-to-point wheeling that Senator Johnston described earlier, from point A to point C, via line B.

In my own personal judgment the FPC under 202(b) can today order other kinds of transmission services, like transmitting power through the grid of a utility through displacement.

But the President's bill would clarify that last point and also extend the jurisdiction to authorize the FPC, subject to the prescribed procedures and standards, to order point-to-point wheeling.

Senator JOHNSTON. You say that they can now order it by displacement?

Mr. BARDIN. I believe so. The language about sale or exchange—let me take the situation—

Senator JOHNSTON. You put it in over here and, in effect you sell over to this edge and you buy over to this edge of another person's lines without the same electricity necessarily flowing all the way through; is that correct?

I recognize you cannot identify the same little unit of electrical energy.

Mr. BARDIN. Electric energy travels at the speed of light. It cannot be identified. When you have one transmission line along open spaces, as we do in some of the western Rocky Mountain areas, you run into point-to-point wheeling.

But in the Louisiana grid situation where you put it in at one end and take it out somewhere else, you plan for that.

You have to meter for that.

Senator JOHNSTON. Do you think you can order that now?

Mr. BARDIN. In my opinion it can be ordered, but the FPC has not ordered it. There is clear FPC jurisdiction when there is an agreement between two or more utilities of this sort or any other pooling service, actions must be filed with the FPC under section 205 and the transaction is subject to FPC review and revision after hearings which consider standards of reasonableness and nondiscrimination.

So the agreement is voluntarily reached. In the case of the staff draft, the agreement reached voluntarily or after Commission review under subsection 2, would be subject to continuing FPC jurisdiction under section 205, unless a question were raised by the proposed subsection 4, which I hope the subcommittee will delete.

Senator JOHNSTON. Let us go to the question of factors.

Mr. BARDIN. Let me illustrate the answer to your question, Mr. Chairman, with the leading case that the FPC has decided under existing law.

That is the case of the *City of Gainesville, Florida v. Florida Power Company*. There, Florida Power Co., was admittedly an interstate interconnected electric utility.

The city of Gainesville generated power on its own, but was not interconnected with any other utilities. Gainesville filed an application under section 202(b).

Florida Power claimed, one, that there would be no economic benefits to Florida Power from the interconnection, and for that reason alone it should not be required to interconnect.

Two, it would impose reliability detriments, use up some of their transmission grid capacity of themselves and other members of the pool with which they voluntarily participated.

Three, and as a fall-back provision that there should be certain payments made to Florida Power to reimburse it if the interconnection was ordered.

Gainesville, on the other hand, contended that there would be benefits, not only to the city of Gainesville, but also to the Florida Power Corp., and that it was willing to pay the cost of the transmission line linking the two utilities. Gainesville also denied the other allegations about reliability and internal costs to the Florida Power Corp. system.

The Federal Power Commission held a full hearing on the question and delved into it at great length. This is a case the Commission studied very closely. As I recall, it was a unanimous decision by a Commission which had often vigorous dissenters on other issues.

The holdings were as follows: First, there were some benefits to Florida Power, as well as to Gainesville, even if the benefits to Gainesville were greater. That point went all the way up and was affirmed by the Supreme Court.

Two, and more importantly, even if there were no benefits to Florida Power Corp., as long as there were overall net economic benefits exceeding costs, and reimbursement to the utility which did not receive benefits, but sustained costs, the FPC would go ahead and order the interconnection.

Senator JOHNSTON. On economics, you were saying, in effect, that on economics you can always offset the net detriment or net benefit with exchanges of dollars between the two, and that is not particularly difficult.

It is complicated, but not difficult.

Mr. BARDIN. That is correct, and I would also say the same on reliability.

You discussed the possible effects or demands on the transmission system of the participating utility. Conceptually, such problems could arise, and it might be a point for reimbursement.

It was a point specifically recognized by the FPC in the *Gainesville* decision.

Senator JOHNSTON. How about us putting in a clause that says, "Must be of overall economic benefit to the most number of people and any economic detriment to one of the companies must be offset by payments," and, for reliability, that "it may not impair the reliability of either system unless such reliability can be repaired by payment of dollars and, in turn, construction of other facilities."

Would that be a proper standard?

Mr. BARDIN. If you were to use the language now in 202(b) and refer to the *Gainesville* case in your committee report, you would end up very close to that.

Yet, if you ask me whether I would recommend that you write it into the statute I would say no. I am very much troubled that you will not have sufficient flexibility to allow the FPC or its successor Commission to look at the facts and resolve the merits of a particular case.

For example, cost benefit. In theory, I suppose, it is the national cost benefit. In practice it is usually the cost benefit of the service area of the two, three, four or five utilities participating, or a portion of those service areas.

You cannot answer that simply. Houston Lighting & Power has a tremendous number of customers and sells an awful lot of power and has a small service area.

Another utility, Pacific Gas & Electric, sells almost as much electricity over a vast service area.

Senator JOHNSTON. This looks to me like a classic situation, where you should not take something from someone without reimbursing them.

Mr. BARDIN. No problem with the concept of reimbursement, Mr. Chairman, and no problem with the concept of cost benefit. But if you try to say in statute law that net benefits must be positive for a class of people and have to define who they are, you are going to end up with a pretty rigid statute.

Similarly, on the reliability question, somebody will argue that if you put it into statute law—if we actually have a 32-percent reserve margin at this time, and I do not know that we do—that we can contend that that is needed for our reliability, then you have to prove that 31½ percent is not good enough.

Senator JOHNSTON. We ought to define "reliability" here then, shouldn't we?

Mr. BARDIN. Frankly, Mr. Chairman, I do not think you can. I think you are talking about the kind of technical issue that the Congress has created Federal Power Commissions to develop expertise about.

I do not think you can define it in a statute, nor do you need to. It is not as if we were devising a brand new law out of whole cloth.

We have the concept of reliability thoroughly explored within the industry by the FPC and the First National Power Survey and the Second National Power Survey, by the Presidents and how they exercise their authority under section 202 (b).

Senator JOHNSTON. I beg to disagree. We are creating a new law here, and you are asking for vast new powers that you never had before. FPC asked for this power to do it on its own, and we want to know under what terms and conditions that power will be exercised.

I, personally, do not have total and complete faith in the ability of FPC always to make the right decision, or to put it another way, always to agree with me on what I would have done, had I been there.

Mr. BARDIN. I would have put it the first way, Mr. Chairman. If you wanted to write into statute law, committee report or anything else the concept of reliability, I would do it in terms of a finding that the Commission had to make, that the order it issued was not unreasonable, and would not impair the reliability of service.

Remember, reliability is not now a term of art. It may be. In the House-passed version of the Utility Act, the FPC would have responsibility for reliability standards and you would have something to tie into.

Senator JOHNSTON. Maybe we ought to define "reliability." I wish you would give it a run. Get Bob Nordhaus there; he is a good lawyer.

Then we could say, "Not impair reliability or unreasonably impair it," depending on how we define it.

Mr. BARDIN. You have to understand, there has been a ritual that has developed in the last few years as to how much reliability the national economy should pay for, and how deeply you want to get into that seems questionable to me, but we will certainly try our hand at providing you and the staff with language that you might want to consider for this purpose.

Senator JOHNSTON. One of the purposes of this act is to encourage overall conservation in electric and gas utility systems. That is one of the factors of the public interest.

Is that correct?

Mr. BARDIN. Yes, sir.

Senator JOHNSTON. We are really dealing here with conservation of fuel; aren't we? In other words, it would cause less fuel to go directly across here, rather than all the way around.

Mr. BARDIN. Fuel and capital, and they were both recognized in the bill you marked up yesterday. This is an industry which over the next 10 years might require almost one-third of \$1 trillion for capital needs.

Over 15 percent of our Nation's capital requirement. This is the most capital consuming, capital intensive industry in the country.

Anything we can do to make the capital consumption more efficient would be a great help.

Senator JOHNSTON. That is here under "D," "encourage the optimization of the use of facilities and resources by electric and gas facilities."

Optimization, I believe, deals with capital; doesn't it?

Mr. BARDIN. I agree with you.

Senator JOHNSTON. What will it mean in this context? Encourage equitable rates to consumers. Is that because you conserve fuel and optimize efficiency, you therefore get lower rates; is that what that means?

Mr. BARDIN. You tend to get lower rates. This is one of your few opportunities in this session of Congress to do something to restrain the progressive increase in utility rates.

Senator JOHNSTON. I will tell you where the "C" came from. We put that "C" on a motion of Senator Church, I think, who wanted to include that as one of the grounds for intervention.

Does it have any part with respect to interconnection of wheeling and pooling?

Mr. BARDIN. I do not have the language in front of me, Senator. May I impose on you to read it again?

Senator JOHNSTON. It says:

The purposes of this act are A, B and C, to encourage equitable rates to consumers of natural gas and electrical energy.

Mr. BARDIN. I would say that is entirely consistent with the concepts of the existing Federal Power Act, the just and reasonable standard and the nondiscriminatory standard, which would apply to any agreement that Mr. Austin or Mr. Phillips or X and Y somewhere else in the country would come up with and file as a rate schedule under section 205.

Senator Church may have had some other issues in mind also.

Senator JOHNSTON. What he had in mind in this respect is the power to intervene, where the FPC can intervene and make its case. I just do not want to include something mischievously here, and I think it might be mischievous to our purposes on interconnection.

It would imply—when you say in this draft here that the Commission may, on its own motion, et cetera, in order to carry out—appropriate in the public interest—and to carry out the purposes of section 1.

This is section 1 over here, and that says the purposes are conservation, optimization of efficiency, and equitable rates.

Mr. BARDIN. I want to recommend, given your concern, Mr. Chairman, that you may well want to drop the reference to section 1 of the Public Utility Regulatory Policy Act and instead have this subsection be self-contained.

Since this proposed legislation is in addition to the Federal Power Act, I would hope that wherever possible you will write standards that already exist in the Federal Power Act and are interpreted by the courts and understood by the utility fraternity.

Senator Johnston. Let me interrupt and say what our objection may be. On "C," where you say "encourage equitable rates" that would imply that you could order an interconnection where one utility has low rates, because they have a good price on fuel and another one has high rates. In order to make it equitable, that is, equal, you could order the interconnection.

That is not what we had in mind here; is it?

Mr. BARDIN. That certainly is a great opportunity to interconnect, and one of the principal reasons for interconnections and pooling arrangements. Let me give you an example.

One utility has a high-cost fuel situation and another utility a low cost. They sign an agreement between the two to use the low-cost fuel supply as their baseload as long as possible, and split the savings that way.

This is a common way of doing business. The utility that has a low-cost supply makes some money out of it on behalf of its customers, and the utility having a higher cost of supply also saves.

That happens all over the country, and is a good way of doing things. With the fuel shortage that has only recently begun to plague us, some of these pools are taking a look at another factor, availability of fuel.

Senator JOHNSTON. The State of Washington has very cheap hydropower. Are you suggesting you ought to be able to tie Washington into Oregon or pick a State that does not have cheap hydropower and more or less equalize their rates?

Mr. BARDIN. No. We are not suggesting that this authority would or should confer upon the Commission the power to force the State of Washington to export that power.

I think you have to remember the standard of adequacy of service to customers, which is the point Senator Domenici made, and the basic concept of what is in the public interest.

If, on a short-term basis, these utilities want to swap as Washington does with California, while they do not need the power, then the interconnection gives them the facility for doing it.

But the answer to your question is no. We do not want and do not have under any of these bills or under existing law the authority to require them.

Senator JOHNSTON. I would suggest, and, Peter, check me on this, that in any draft we ought to strike "C" as a basis on which they can order an interconnection or definition of the public interest.

Then, in order to have the interconnection, you can do it to conserve energy, to optimize the efficiency. Those would be the affirmative factors you have to find and the negative factors would be that you cannot impair reliability and it must be in the economic interest—well, we will have to define what that means to most people or for most systems.

We have to sharpen that.

Mr. BARDIN. I think you have to use a term like "overall benefits exceed costs."

Senator JOHNSTON. Something like that.

Mr. BARDIN. That actually is the standard of public interest as construed by the FPC and run through the gauntlet.

I do not think that is too difficult to deal with.

Senator JOHNSTON. I can see that.

Senator DOMENICI. Mr. Chairman, I agree wholeheartedly with dropping the third section of the preamble. As you recall, the President's package did not have that third part of our preamble, and did not have that in the energy conservation part of this package when we were talking about perhaps some kind of intervention in State rate-making.

It would seem, therefore, to me, that since they did not want it, they understood there may be some very serious problems, and what is equity to one group may not be equity to another.

It is better to follow Mr. Bardin's suggestion. If we are going to modify the Federal jurisdiction in this area, that we ought to make it a separate package and track it with the Federal Power Commission authority that they now have on a voluntary basis.

I really do not believe that the preamble to the overall bill is relevant to the interconnection, pooling and wheeling sections. I agree with you.

May I ask Mr. Nordhaus one question? I need to get something cleared in my mind. I am reading section B of the existing act.

It says—this is what we have now—“Whenever the Federal Power Commission on the application of any State commission or person engaged in the transmission or sale of electrical energy, and after notice to each State commission and public utility affected finds such action necessary or appropriate in the public interest, it may by order direct public utility—,” et cetera.

Now, where is the language that exempts intra or municipally owned and operated, REA cogeneration?

Mr. BARDIN. That emerges the definition of “public utility” that appears in section 201 (b), (e), and (f). Under (b) the provisions apply to transmission and sale in interstate commerce.

Under subsection (e), the term “public utility” means “any person who owns or operates utilities subject to the jurisdiction of the Commission.”

That will exclude the intrastate utility, all of whose facilities or none of whose facilities are used for interstate commerce. Under (f) no provision will apply to the United States, a State or any political subdivision of a State. Under that exception, REA co-ops as well as municipally owned plants and systems owned by State authorities and TVA and Bonneville are all exempt, which also goes to one of the questions that Chairman Johnston raised about the States of Washington and Oregon, since Bonneville is involved.

Senator DOMENICI. Even with those definitions, the present involvement of the Federal Power Commission is upon request, filing an application; is that not correct?

Mr. BARDIN. That is correct.

Senator DOMENICI. Why do we have to go all the way in the other direction? It is voluntary now, but certain things are exempt.

Why can't it remain voluntary? That is, upon application, and include no more.

Mr. BARDIN. Our judgment is that it would be better to allow the Commission to act on its own motion, on a motion from outside the electric utility community.

This is needed to overcome a kind of clubbiness in the fraternity. It is quite conceivable that in Texas, for example, there are some people quite willing to interconnect and be part of the interstate system with all the responsibilities of public utility status. I do not know who plays which role.

That has certainly been true of the public utility industry and State commissions in the past. In our judgment there are situations where the Federal Government ought to be empowered to rule on its own motion.

There is a national interest in the construction of some of these lines. Let us just illustrate that with the Con Edison power failure.

One of the limiting factors on Con Edison was a delay on building those transmission lines to the New Jersey side of the Hudson River and to the PGM pool.

There is nobody in that situation who is ready to make the application to the FPC to hold a hearing and make a determination of whether it has to be done right away. I would suspect you would find the same situation with Florida and Georgia.

I want to be careful. I am not prejudging either situation. But there is a very serious doubt, based on all the reports from the Con Ed disaster, which was a disaster with national significance, in my judgment, and not just intrastate significance.

Senator JOHNSTON. The problem with Con Ed did not have anything to do with FPC. It really had a great deal to do with the environmental laws that prevented the building of the powerplants in places where they would have liked to have had them.

That is what the President of Con Ed said, and he has, of course, a point of view.

Mr. BARDIN. He is a very able man, and has many significant and farsighted points of view. I do not know what to say with that kind of contention. Who is going to allow them to build a powerplant in downtown Manhattan?

They have some old ones, which are on the way out. What can we do about that? We are stuck with that kind of situation. They have a very difficult system to manage because of that, and plus the fact that all the lines have to be underground.

Senator JOHNSTON. I did not mean to digress off of that. Peter was on a good point here on what is the practical significance of the words "on its own motion."

I confess I do not quite understand that either, and how can you have a national interest to give somebody something they do not want and do not perceive to be in their best interest?

Mr. BARDIN. This is a national interest in "shoring up," which is the term that Mr. Jordan happily used, the transmission capacity overall. For electricity to travel safely at the speed of light all around, tying these powerful generators together, you need substantial transmission capacity.

The experience of this country's industry has been that we have tended to lag in too many places on building for more transmission.

The most difficult point in making that decision is on the interconnection between two utilities, even between two utilities such as the ones I illustrated which are interconnected but not as heavily and strongly interconnected as they might be.

There is a clear national interest, particularly if we want to preserve the pluralism of this industry and the multiplicity of ownerships.

We have 50 really large electric utilities in this country, and 200 substantial ones and 3,000 all together. There is a national interest, short of building the grid ourselves as a Federal project, to be able to move in there and say something's got to be done. At least we can hold a hearing to decide whether to order that something be done.

Senator DOMENICI. Mr. Chairman, I appreciate your letting me interrupt your questions. I must go to the floor in 5 minutes, and I would like to clarify two points, if I could.

Senator JOHNSTON. Please.

Senator DOMENICI. I think you have the statute I am reading. It says, "Whenever the Commission, upon application of any State com-

mission or of any person engaged in the transmission or sale of electric energy." Let us just stop at that for 1 minute. What limits Federal Power Commission jurisdiction as provided in this law, if the Central & South West Co. out of Louisiana were to apply to the Federal Power Commission?

Are they not a person engaged in the transmission or sale of electricity?

Mr. BARDIN. They are. But the order may be directed only against the public utility. If Houston Lighting & Power were coming in, or the city of Austin, Tex. were coming in and saying, "Order that utility in Louisiana to interconnect with us," the FPC would have jurisdiction.

But if the utility in Louisiana, Arkansas, and Oklahoma comes in, the public utility, and says, "Order that intrastate utility to interconnect with us," there is no jurisdiction.

That is the defect that these people at the table were talking about.

Senator DOMENICI. Following the normal sequence of the evolution of regulatory power in the United States, it would seem that this is a cautious act, and it would seem that we are going from a cautious act all the way to the Federal Government being the one who makes a decision on its own whether to get involved.

It seems like there is a middle ground.

Mr. BARDIN. It has taken us 42 years to get to the point where we can consider it.

Senator DOMENICI. I understand that, and I have my own views on why people do not want to come under the Federal Power Commission.

But since you did not want to answer it on behalf of others I said "OK" to you. I can tell you why they do not. There is an awful lot of skepticism about your Federal Government today that was not there 20 years ago.

If we keep on like we are, it will be worse in 10 years. So these 42 years do not mean very much, Mr. Bardin.

Senator JOHNSTON. Skepticism is not the word.

Senator DOMENICI. It is worse. "Skepticism" is very generous.

Mr. BARDIN. In this case, 99 percent of investor-owned utilities in this country are living with that Federal jurisdiction. That is the difference.

Senator DOMENICI. Why couldn't we, if we are going to expand your jurisdiction, why couldn't we at least have some protection against your nosing around the country trying to find out where you ought to do it?

And at least have some institution or entity or commission or one or two utility companies that are arguing ask you to. That would be the next evolutionary step. The Louisiana company, in this instance, would ask you to, because they cannot resolve the dispute.

At least you start with somebody saying, "There is an interconnect need here, and somebody, in our opinion, is arbitrarily refusing to be involved."

I am not sure that we are not giving you all the jurisdiction you would have otherwise, but at least to me you will not be running around trying to solve New Jersey and New York's problem if somebody there with a genuine interest does not ask you to.

Mr. BARDIN. Keep in mind that under the President's proposal, it is not I who may make these decisions. I may be the regulatory administrator, but in this case it would not be the regulatory administrator who makes the decision.

It would be a five-member regulatory commission, with checks and balances in that process. We actually have built into the administration bill just the kind of caution that you are suggesting.

It is not a one-man decision. It is analogous to the procedures by which the Federal Trade Commission can institute a major decision that five commissioners there have to decide on.

You can consider alternatives, but the question is, What institution would you turn to?

Senator DOMENICI. Let me say what I like about it. If I am going to expand the jurisdiction, if I am going to agree to that and vote for it, I want to do everything in the law that will cause the parties, including the Commission in the State of Texas, to let them make this agreement themselves.

Obviously, if they are exempt from jurisdiction they can be smug. But if Central & South West says, "We want to sit down and negotiate about this as businessman" and, "Look here, if you do not want to do it, we are at least going to ask the Federal Power Commission to intervene and see what they can do about it, I would suspect that you are going to get a lot more business transactions of a voluntary type that would not otherwise occur.

You may force it by intervening *ab initio* under your theory. But I think the practice of making the incentive for them to get together first before you get involved would be fostered in the business community if that statute clearly said that the party that cannot get this agreement—

Mr. BARDIN. It is a good idea, Senator, and we will be sensitive to that approach. I want to offer two cautions. One, I have seen some of these voluntary texts that I personally initiated and they have not gotten off the ground yet.

I think there has to be a power, ultimately, to make a national decision. I think it is vital that we keep in mind that for the whole United States of America, we are now to a point where there is no voluntary group of utilities or power pool organized for reliability that really represents the true dimensions of opportunity.

Last winter, when we had the fuel crisis, we were generating power in New Jersey and Pennsylvania and shipping it out to Ohio, which is in an entirely different power pool, an entirely different complex of utilities.

The decisionmaking vision has got to go much farther. The people at this table may be the right people for many purposes, industrial, political, commercial and others. But for some of these decisions, particularly in those areas of the country going from Minnesota to Massachusetts, the District of Columbia to South Carolina, you are going to have to make sure that the forum for discussion is virtually national in scope.

Senator DOMENICI. Let me say, Mr. Chairman, I do not know that I have made myself clear, and certainly by limiting my focus to this particular *modus operandi* as to how we get the Federal Government involved, I do not want to leave the impression that I am satisfied

with all the rest, but I do not think you understood what I said, Mr. Bardin.

Let me put it in the perspective of the fight that the Senator from Louisiana and I have been listening to this morning, between intrastate Texas Utilities and an interstate holding company.

Let me assure you that from this Senator's standpoint, if that group of people out there arguing thought that in about 9 months, gentlemen, the Federal Power Commission—the Congress is going to give the Federal Power Commission the authority to come in here and resolve this dispute in the national interest, I surmise that they would be talking over there in Houston and Shreveport a little different than they are now.

All I am saying is that maybe the new jurisdiction ought to be predicated upon any of those parties in interest asking for the jurisdiction.

I am not suggesting that you could only get involved if 3 years from now they did not solve their problems. I am just saying give any one of those disputing parties the leverage of saying that we think we are right, sitting around a table, and let's make our business deal as they have been made around this country in the mutual interest of our customers, and let me remind you, if we do not make this businesslike arrangement, we are going to have to ask the Federal Power Commission to come in and take a look as to whether they will order us to.

It is not any great protection, but you would not be out there initiating it. Have a real party in interest, including a State commission if you want to define them as such be party to make the request.

I think you would resolve many of the disputes without you getting involved if you had that; it was just my hunch.

Senator JOHNSTON. If the Senator will yield, I think that is the appropriate way for us to proceed at this time. I think we need to study the suggestion which you make, which entails national planning and national grid.

I think there are some very good arguments in favor of that, but I think that question ought to wait fuller hearings, probably next January, when we ought to consider the full implications of it.

I would think the Senator is correct, that for the time being we ought to just strike on this draft "wherever the Commission on its own motion" and just put—strike that, and then it will read, "Upon application of a State commission or of any electric utility," et cetera.

So it will be clear that FPC jurisdiction is not expanded to take this action on its own or should at this time. We will come back and study that question later. Another point the Senator—

Senator DOMENICI. I am making that point, but I think you would have to clarify the definitions in the earlier part of the act as to what a public utility is.

If you wanted to include municipalities, REA's and intrastate and not subject only totally interstate parties to the action, you could provide jurisdiction, when any one of the applicants is a public utility as defined.

We have not solved the problem of how do we define what they can force them to do. We have only taken the first part of who initiates the action.

I still have grave doubts as to how you define the matter under that as to the authority to compel and do other things.

I do believe that the normal development of regulatory law would have it go in the sequence that I have suggested. That we go from the purely voluntary, where certain limited groups can apply, to a broader definition of those who can apply, and that is what I am suggesting, before you get over to the Federal Government doing the forcing, which would be the third stage in the evolution as I see it, whether there is 42 years in between or not.

Senator JOHNSTON. Once they do apply and have the order made, then first they try to agree, and that agreement is approved or the judgment of the FPC is substituted for that failure to agree.

Or if they disapprove, substitute for the disapproved agreement. To that extent they are subject to FPC jurisdiction, but not beyond that exchange. Is that what the Senator is suggesting?

Senator DOMENICI. Yes.

Senator JOHNSTON. You are suggesting that they not be, by this interconnection, pooling or wheeling agreement alone, subject to the accounting provisions or the intrastate sales, regulation of intrastate sales; is that what the Senator is saying?

Senator DOMENICI. I do not know about that last part. I do not quite understand everything under that part that I have just discussed with you.

I do not know how broadly jurisdiction ought to be on the expanded applicant list. We have expanded those who come under jurisdiction.

Beyond that, I do not know how broad the jurisdiction of the Federal Power Commission ought to be, and I cannot make that decision today.

I will try my best to work with the Senator. What is the schedule you have in mind, Mr. Chairman?

Senator JOHNSTON. Bring this up on the floor.

Senator DOMENICI. When?

Senator JOHNSTON. As soon as natural gas is voted.

Senator DOMENICI. So we have to report it out of the full committee this week?

Senator JOHNSTON. I do not think we have time to report it out of the full committee. I was going to vote directly on the floor.

Mr. BARDIN. We will be happy to work with you, Mr. Chairman, and Senator Domenici and the staff, in assisting in any way in the language.

Senator JOHNSTON. I do hope we get some language here that is basically suitable to the committee. I just do not think we have time to go through a markup in this committee, and go through the very painful process that we have gone through this morning, just in trying to define what interconnection and wheeling are.

I think we understand that a little better now, but when you have got to go to a committee and ask those questions with 10 people there, you just do not have time to accomplish it.

Mr. BARDIN. We will be happy to work with you, Mr. Chairman, and so-called intrastate sales situation. In that example you are talking about wheeling from Louisiana to Texas, and another wheeling service down further in Texas.

The whole thing ends up like your situation in Oklahoma or just like the situation in California. I do not think you will have a workable piece of legislation administratively for the Federal Power Commission.

Senator JOHNSTON. We will consider that. We have some other witnesses that we will ask about that question.

Senator DOMENICI. Mr. Chairman, I want to say I do not really know how relevant it is as to how I feel about the approach.

We generally try to work together, you and I at least, and I think most members of the committee. I really do not feel comfortable in terms of knowing what we are doing.

If you are going to introduce an amendment to the bill that we reported out yesterday, I would work with you and certainly have my staff do that.

Senator JOHNSTON. I would very much want to do that, because in this kind of an amendment I do not think we can go all the way, and I do not think we can solve all the questions.

It seems to me very clear that there are some things we ought to do. There is doubt about whether we ought to order the accounting and that sort of thing, but it seems to me at this point in the hearing that we ought to invest the FPC with some jurisdiction to order the interconnection and wheeling on motion of one party with the public interest defined as we have stated and not go beyond those points.

Senator DOMENICI. On that score, could I ask Mr. Bardin one further question? Mr. Bardin, when you explain what you say to be an unfair consequence when you have your arrow running this way, prices regulated by Federal Power Commission or its successor, and the intrastate running that way, prices not regulated, you then proceeded to talk about the fact that they may be running an accounting system that is completely different than the system that has been accepted nationally by virtue of the Federal Power Commission's basic requirements.

Aside from that as a management and bookkeeping instrument, what are the equities you see resulting from that in terms in impact on consumers or utility companies?

Are you suggesting prices could be inordinately high as they flow that way? I am not interested in bookkeeping. Who is hurt, and how can they be hurt?

Mr. BARDIN. The people in New Mexico might be very interested in making sure that the books are accurate, so the rates based on those books reflect the costs actually incurred.

This is an industry whose rates are regulated on a cost of service basis. This is a question of rates and prices.

You could just see a completely unequitable situation of the consumer on one side who pays more than the consumer on the other side.

Senator DOMENICI. Using the example of these people who have been fighting down there and have been in battle for a number of years, what if that holding company from Louisiana wants an interconnection agreement and is not challenging the veracity, authenticity, reasonableness of that rate structure over there?

Does it become your business to check it anyway?

Mr. BARDIN. I think it is the Congress business to have its agent, the Federal Power Commission, to do that; yes.

I am certainly not here on behalf of the holding company. I am here trying to argue for a rational progression in the development of Federal law.

Senator DOMENICI. I never heard any of those witnesses or lawyers representing the cause they are involved in say that as part of this overall forced transaction that they would like to challenge the rate-making, bookkeeping or anything else of the intrastate system.

I would assume that they are the best ones to judge whether the Louisiana customers are going to get shortchanged or not.

They are parties to the transaction.

Mr. BARDIN. Let me ask Mr. Nordhaus to address that question.

Mr. NORDHAUS. It seems to me that the concern here is not whether it is a good idea to regulate the heretofore unregulated companies in Texas, but whether regulation or some portion of the regulation under the Federal Power Act is necessary in order to insure that the rates for the sale of power from Texas to New Mexico or Louisiana are fair.

What David is pointing out is that you do need some of the apparatus of the Federal Power Act in order to assure not only the wholesale customer who is in New Mexico and buying the power from Texas, but also the retail customers of that wholesale customer, that they are receiving power from Texas at a rate which is just and reasonable under the Federal Power Act.

Senator JOHNSTON. Let me interrupt there, if I may. The power to order the wheeling and set the terms and conditions, doesn't that give you all you need at the FPC?

Can't you set the accounting terms and make a——

Mr. BARDIN. Are you assuming continuing jurisdiction, Mr. Chairman?

Senator JOHNSTON. For wheeling; yes.

Mr. BARDIN. History shows that after a few years going one way, you find somebody making a change in the status quo. If I am interconnected with you and I do not want to serve you anymore, one solution for me is to jack up my rates.

Not necessarily for selling power, but, say, for backup service. I triple my rate and then you will not buy from me anymore, because it is too high.

Senator JOHNSTON. That can all be part of the agreement, the FPC has the power to approve the agreement or disapprove it, and set its own agreement.

Mr. BARDIN. Against what standard does the FPC approve or disapprove? The FPC standards are cost standards. It wants to know what are your costs and what are mine.

If costs are imposed upon you or upon me, then they say, "Yes, we will pay for it."

Senator JOHNSTON. Why can't they say, "We approve the cost of x cents per kilowatt hour as determined by the uniform accounting procedures in use by the FPC?"

Mr. BARDIN. If the books are maintained by that system and audited against it, that is fine; that is what I am arguing for.

Mr. BARDIN. What we will find in that case is that Mr. Austin and Mr. Jordan make the argument that they've invested in some work in Texas that is backing up the interconnection, and that should be charged for.

Moreover, they have to shore up that interconnection and incur more investments. Both FPC, if it has to rule on this question, and I think the utility outside the State want to make sure that these costs were

really incurred, that they were audited and assembled and connected in accordance with established principles.

Senator JOHNSTON. I think that would be implicit in the power to audit.

Mr. BARDIN. That's what the FPC accounting regulation is all about. It is not about retail rate regulation, it's not about any other issue.

Senator JOHNSTON. I tell you what. We are taking a great deal of time here with you, Mr. Bardin, and your testimony, as usual, has been very good.

We know you will help us with drafting and further consultation on this. But we have a gentleman in the audience who is a witness, and he happens to be from Louisiana, and I should have put him on first.

[The prepared statement of Mr. Bardin follows:]

STATEMENT OF HON. DAVID J. BARDIN, DEPUTY ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION

Mr. Chairman, section 521 of S. 1469, Interconnection and Wheeling, to which these hearings are limited today, is specifically addressed to improving the energy and economic efficiency of bulk power supply, that is, the generation and transmission of electricity. Such improvements in bulk power supply efficiency offer a rare opportunity to restrain the steady increase of electric utility rates.

CAPITAL AND ENERGY REQUIREMENTS

The electric utility industry is the most capital intensive industry in the United States. FEA has estimated that the industry will require roughly 300 billion dollars in new capital investments in the 1975-1984 period, which is approximately 15 percent of all capital investments made during this period. In 1976, the industry consumed 29 percent of primary energy supplies, including 16 percent of the natural gas and 10 percent of the petroleum used in that year.

INTERCONNECTION, POOLING, WHEELING

The wheeling and interconnection provisions which President Carter has proposed would improve efficiency in fuel and capacity utilization in the generation of electricity. Greater energy and economic efficiency in the electric utility sector can be achieved by extending to the Federal Energy Regulatory Commission, the successor to the Federal Power Commission, the power to order interconnection, wheeling and pooling. Almost fifty years ago, in 1927, three companies in Pennsylvania and New Jersey formed a pool which has since grown to be the largest power pool in the country—the Pennsylvania, New Jersey and Maryland Interconnection (PJM), which includes the District of Columbia and Delaware. Their model has been emulated in several utility service areas, with over a third of our nation's generating capacity. Interconnection, wheeling and pooling arrangements yield significant demonstrated benefits.

Interconnection physically connects two or more utilities' transmission facilities. Interconnection has been encouraged under the Federal Power Act since 1935. Utility interconnections can perform two basic functions: interconnections can be designed principally for emergency use and to improve reliability; and interconnections can be designed to provide various kinds of pooling services, such as economy energy, and to support coordinated or integrated operations of groups of utilities that intend to integrate their planning and operations.

A power pool is a formal contractual agreement which includes arrangements for coordinated planning and integrated operation of a group of cooperating utilities. Pooling, in the electric utility sense, does not involve merger of the participating utilities. Interconnection for integrated operations is a necessary element of pooling.

Wheeling is the transmission of electricity by means of the facilities on one utility on behalf of another utility. Appendix A elaborates on the well-established benefits of interconnection, pooling and wheeling.

EXISTING LAW

Existing statutory law regarding the regulation of bulk power facilities is contained in Part II of the Federal Power Act (Power Act), 16 U.S.C. 824 et. seq. Under Section 205, a power pool agreement is a "rate schedule" and its provisions are subject to Federal Power Commission jurisdiction and regulation.

Under Section 202(b), the Commission may direct a regulated, interstate "public utility" to establish physical connection of its transmission facilities with the facilities of one or more persons (regulated or unregulated) engaged in the transmission or sale of electric energy, and to sell or exchange energy with such persons, if the Commission finds such action to be "necessary or appropriate in the public interest" and that "no undue burden" will be placed on the ordered public utility by virtue of such order. Moreover, the Commission may not compel enlargement of generation facilities for such purposes nor compel sales or exchanges which would impair the ability to render adequate service to the customers of the public utility.

The Commission may act only upon the application of a State Commission or of any person (regulated or unregulated) engaged in the transmission or sale of electric energy. Under section 202(b) the Commission may only issue orders to investor-owned utilities engaged in interstate commerce.

Where section 202(b) applies, the Commission "may prescribe the terms and conditions of the arrangement to be made between the persons affected" including the apportionment of the cost between them and the compensation or reimbursement reasonably due to any of them.

The Power Act does not mention the term "wheeling." The Supreme Court, *Otter Tail Power Company v. United States*, 93 S. Ct. 1022 (1973), indicated that the Commission had no authority to order wheeling of electric energy in that case, but that Otter Tail could be subject to antitrust liability under the Sherman Act for refusing to "wheel" from one point to another, under the factual circumstances of the case. The Commission has clear authority to order wheeling only in conditions of an "emergency" under section 202(c) and (d) of the Power Act.

THE ADMINISTRATION'S PROPOSAL

Section 521 of Title I of the National Energy Act would amend the Commission's responsibilities in the following significant ways:

The Commission would be authorized to issue interconnection orders under section 202(b) to any non-Federal utility, including unregulated interstate and intrastate utilities which are now beyond the reach of section 202(b).

The Commission would be authorized to act on its own motion to issue orders under section 202(b).

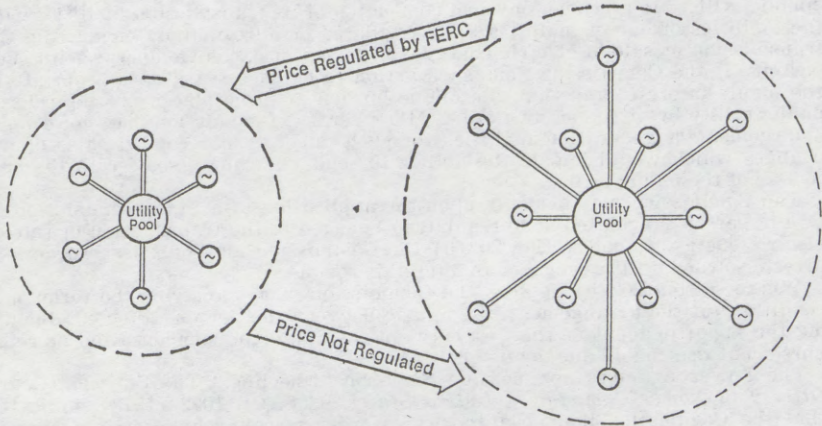
The Commission would be authorized to require interconnection with a co-generation facility under section 202(b).

The Commission would be expressly authorized to issue orders requiring a non-Federal utility to provide wheeling and pooling services, or otherwise to coordinate with other utilities and co-generators.

DRAFT SUBSTITUTE

The Draft would exempt from continuing Commission jurisdiction any intrastate utility whose interconnection with the interstate transmission network was ordered pursuant to the proposed new provision. The exemption resembles proposals that were considered and rejected by the Congress during the 1960's. Under the terms of the Draft, if the Commission were to order Houston Lighting and Power Company (the country's fourth largest utility measured by kilowatt hour sales) to interconnect with utilities in Louisiana, Arkansas or Oklahoma, the Commission would have continuing jurisdiction to regulate the rates for sales to the Houston utility, but that company would be exempt from regulation when it sold back to the other utilities. (See diagram.) Such a one-sided exemption would be grossly unfair and irresponsible.

Inequity that would result from exempting an interconnected utility from FERC jurisdiction



David J. Bardin testimony on the National Energy Act, (S1469), Title 1, Part E, Subpart 3, September 20, 1977.

The Draft would do nothing about the critical problem of assuring that backup power is provided for co-generation facilities, thereby preventing the Commission from exercising its authority to assure that institutional and other non-market barriers to co-generation do not block the re-emergence of co-generation as a significant supplemental source of electric energy.

The Draft would not clarify the authority of the Commission to order the provision of pooling and wheeling services or to otherwise coordinate with other utilities or co-generation facilities. The Commission would not be given clear responsibility to order power to be wheeled, to bring about the formation of power pools, or to encourage additional coordination between bulk power facilities where such wheeling, pooling, or coordination is in the public interest.

Finally, the Draft appears to impose an "economic loss" test that contradicts the established FPC standard developed under section 202(b) which seeks the overall economic benefit of the several participating utilities with reimbursement for any one of them on account of costs it may sustain. The FPC precedent, established in the *Gainesville* case, is fair and equitable and should be followed.

CONCLUSION

The Carter Administration strongly urges the Committee to act favorably upon section 521 as proposed in S. 1469 and to reject the Draft substitute.

APPENDIX A

INTERCONNECTION FOR IMPROVED RELIABILITY

Over the years, the optimal size of a base load electric-generating unit for lowest power cost, on a cents per kilowatt-hour basis, has increased. In the 1930's the optimal size of such units was below 100 megawatts; today on many of the larger utility systems the optimal size of base load units is in the range of 400-1200 megawatts. However, the power cost advantage of large units is not available to small systems since the immediate generating reserve must at least equal the capacity of the largest unit. Thus, construction of large generating units entails proportionately larger generating reserves to ensure adequate reliability, and the cost of this infrequently used reserve capacity will exceed the cost advantage of a larger operating unit. Interconnected utilities, in effect, form a larger system so each small or medium sized utility does not have to bear on its

own the full cost of carrying a reserve large enough to meet the possibility of an outage of its largest unit. New York Power Pool and General Electric engineers reported in a 1976 technical paper that the NYPP could decrease its reserve margin from 29 percent to 18 percent by installing 7000 MW of interconnection capability. Because the required investment in transmission would be substantially less than the costs of additional generating capacity, the savings to the utilities and to the consumer could be substantial. By sharing in the installation of larger facilities a company may also avoid large increments of capacity additions and achieve a capacity installation schedule more closely aligned with its system demands. As an example, in the period from 1967 to 1971 the PJM companies placed in service three large mine-mouth generating plants with a combined capacity of 4,580 MW using large units of 660 and 820 MW. Probably none of these companies on an independent basis could have built such large plants with their attendant advantages. The temporal diversity of peak demands of the several interconnected utilities, coordination of maintenance and refueling schedules, and spreading the impact of future demand uncertainty over a large base, all tend to reduce the required amount of reserve capacity needed to provide a given level of reliability.

Interconnection is also important in order to provide co-generators backup power and a market for power produced in excess of their needs. Co-generation is the simultaneous generation of electricity and useful thermal energy and is significantly more efficient in the use of fuel than either process individually.

Utilities have recognized the benefits of interconnection, and as a result most have been extensively interconnected. However, the pace of new interconnects has for a variety of reasons been slower in some parts of the country than the national interest requires.

WHEELING

Wheeling is a transaction among utilities wherein the transmission facilities of one system are utilized to transmit power for another system. Transmission service may be accomplished by displacement. The ability to wheel power is a necessary condition for vigorous competition in the bulk power market. Without wheeling privileges, bulk power buyers/sellers could only negotiate with those few bulk power sellers/buyers to whom they are directly interconnected. It is in the national interest that economic power be wheeled from predominantly coal and nuclear fired plants across several service areas to an area that is served by oil or gas plants. For example a National Electric Reliability Council Study ["A Study of Interregional Energy Transfers for the Year 1980; National Electric Reliability Council, May 1976] found that it would be technically feasible to displace 125,000 barrels of oil per day in 1980 by wheeling coal based electric energy from the Mid-Western States to the Eastern United States. For these oil savings to be achieved a number of problems must be resolved, including obtaining wheeling agreements.

POWER POOL

A power pool is an arrangement whereby two or more electric systems coordinate the planning or operations of their bulk power facilities for the purposes of achieving greater economy and reliability under a contractual agreement establishing the responsibilities of each member. [1970 National Power Survey (Part 1) p. 1-17-2]. As stated above interconnection is necessary for power pooling. Beside the reliability and reduced reserve margin requirements that accrue from interconnection, energy and cost savings can be achieved by two or more utilities integrating their planning and utilizing central economic dispatch in a pooled system. Central economic dispatch is an arrangement whereby all units within an integrated pool are dispatched so that the total pool cost of generating electricity is minimized. Examples of benefits already achieved by existing power pools include:

PJM estimates that central economic dispatching saved \$157 million in 1975 and 17 million barrels of oil in 1974.

New York Power Pool estimates that the central dispatch system which is about to be initiated will save the Pool over \$10 million annually.

New England Power Pool estimates it achieved fuel cost savings in 1976 of over \$26 million.

Over $\frac{1}{3}$ of the Nation's total generating capacity is already within interconnected centrally dispatched power pool systems. ["Factors Affecting the Electric Power Supply 1980-1985", Bureau of Power, Federal Power Commission, De-

cember 1, 1976, p. 28.] There are also a number of pools that are not centrally dispatched. Recently, however, there has been some indication of a trend toward break-up of pools. One recent example is the CARVA pool. In addition, the Kentucky-Indiana Pool has discontinued its planning function because the parties to the pool have been unable to agree on the terms for the inclusion of two proposed nuclear generating plants in the pool. Power pools require regulation because corporate interest and public interest with respect to power pools do not always coincide.

APPENDIX B

Existing section 202 authorizes Commission involvement in utility interconnections in three ways. First, the Commission is directed under section 202(a) to divide the country into regional districts for the voluntary interconnection and coordination of facilities for the generation, transmission, and sale of electric energy and to promote such interconnection and coordination within each district and between districts. Second, under section 202(b), the Commission, upon application of any State commission or of any person engaged in the transmission or sale of electric energy, may by order direct a "public utility" to establish physical connection of its transmission facilities with the facilities of one or more other persons engaged in the transmission or sale of electric energy, and to sell or exchange energy with such persons, if the Commission finds such action "necessary or appropriate in the public interest" and if no "undue burden" will be placed on the ordered public utility by virtue of such order. The Commission may issue such an order only upon the application of a state commission or "any person engaged in the transmission or sale of electric energy." The term "public utility" is limited in the Power Act to exclude public systems, cooperatives, and any other utilities not engaged in interstate commerce.

Section 202(b) prohibits the Commission from ordering the enlargement of a "public utility's" generation facilities or from compelling a public utility to sell or exchange electric energy with another utility when to do so would impair the ability of the ordered utility to render adequate service to its customers. Section 202(b) also authorizes the Commission to prescribe the terms and conditions of the arrangement made between persons affected by a Commission order under section 202(b) including the apportionment of cost between such persons and the compensation or reimbursement reasonably due to any of them. Third, under subsection 202(c), the Commission is authorized during a period of "emergency" to order the temporary connection of transmission facilities and such generation, delivery, and exchange of energy as the Commission, in its judgment, determines will best meet the emergency and serve the public interests.

The Administration's proposal would amend section 202(b) of the Power Act to authorize the Commission (1) to issue orders, in certain circumstances, requiring a utility to provide wheeling and pooling services or to otherwise coordinate its actions with utilities and co-generation facilities, (2) to issue orders under section 202(b) on its motion, and (3) to issue such orders to any non-Federal electric utility instead of only to "public utilities" as such term is limited under the Power Act. In addition, the section would be amended to delete the need for the finding by the Commission that there is no "undue burden" placed on the utility by virtue of any order issued thereunder. Finally, the section would be amended by inserting the word "Unreasonably" before the phrase "impair its ability to render adequate service to its customers."

Subsection 521(b) of the Administration's proposal contains technical amendments to conform the Power Act to the amendments to section 202(b) proposed in section 521(a). The word "voluntary" would be stricken from the first sentence of section 202(a) of the Power Act to indicate that interconnection arising after division of the country into districts may be by Commission order under section 202(b). The phrase "(other than 202(b))" would be inserted in the first sentence of section 201(b) in order to indicate that the order issuance provisions of section 202(b) may extend to utilities not now engaged in interstate commerce. The final technical amendment would amend section 201(e) to make it clear that the extension of the Commission's jurisdiction under section 202(b) to heretofore nonregulated municipal and cooperative systems will not make them jurisdictional for other purposes of the Federal Power Act.

Senator JOHNSTON. Next we have a panel with Mr. Merl L. Burgin, general manager of Cajun Electric Power Cooperative, New Roads, La. He is representing the National Rural Electric Cooperative Association.

We also have Mr. Larry Hobart, assistant executive director of American Public Power Association, Guy W. Nichols, president of New England Electric System, and Mr. William A. Duncan, president of Kentucky Utilities.

Gentlemen, you have heard the thrust of our conversation this morning, and I wish you would zero in on all those questions. Mr. Burgin, do you want to go first?

Mr. BURGIN. Yes, sir; if you please, Mr. Chairman.

I have a transportation problem and I appreciate your indulgence. I am going to brief my paper because it has already been given to you. I will read for a couple of minutes to get certain things in.

Senator JOHNSTON. Can't you summarize?

Mr. BURGIN. Yes; I can summarize.

Senator JOHNSTON. Why don't you summarize, because that's more meaningful.

STATEMENTS OF MERL L. BURGIN, GENERAL MANAGER, CAJUN ELECTRIC POWER COOPERATIVE, NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATIONS, NEW ROADS, LA.; LARRY HOBART, ASSISTANT EXECUTIVE DIRECTOR, AMERICAN PUBLIC POWER ASSOCIATION, WASHINGTON, D.C.; GUY W. NICHOLS, PRESIDENT, NEW ENGLAND ELECTRIC SYSTEM, WESTBOROUGH, MASS.; WILLIAM A. DUNCAN, PRESIDENT, KENTUCKY UTILITIES

Mr. BURGIN. My name is Merl Burgin, and I am general manager of Cajun Electric, New Roads, La., representing the National Rural Electric Cooperative Association and the Association of Louisiana Electric Utilities.

The first thing that I am going to speak to is the national part of our interest in interconnection, wheeling and cooling, with respect to all of the rural electric co-ops and municipal utilities, which Larry Hobart will speak to a little later.

In order to put our interest in perspective, let us take the situation in Louisiana; it is kind of a classic case. We were presented—in 1964 we were given a loan to build generation and transmission to serve the 13 electric co-ops in the State of Louisiana as we are responsible for all of the wholesale power, for all the co-ops in the State.

Senator JOHNSTON. Big Cajun No. 1.

Mr. BURGIN. Yes, sir; Big Cajun No. 1. REA allowed us to build a generating plant but they said we were to make a deal with the power companies to have that power transmitted to our members.

We negotiated for 3 years; we tried to get an interconnection and wheeling agreement with the three companies. We finally succeeded. About 9 months after the plant was completed, we finally did complete an interconnection agreement with Gulf States to serve our members on their system.

The other two companies who serve our members—

Senator JOHNSTON. To serve your members on their system.

Mr. BURGIN. Yes, sir, we were buying all of the power we needed from three companies, Gulf States Utilities, Louisiana Power & Light, and Central Louisiana Electric Co. For the co-ops who were being served by Gulf States Utilities, GSU transmitted the power from Big

Cajun No. 1, our first generating plant, to the members that were on their system.

We had to buy the additional power we needed——

Senator JOHNSTON. Do you mean to member cooperatives on their system?

Mr. BURGIN. Member co-ops, yes; distribution co-ops.

Senator JOHNSTON. When you say they are on their system——

Mr. BURGIN. The delivery points where they take their wholesale power is on the transmission system of Gulf States. We have nine that are on the transmission system of Louisiana Power & Light.

We were able to serve only the members who were on Gulf State systems from Big Cajun No. 1, because we could not reach interconnection agreements with the other two companies. Consequently we had to buy wholesale power from them.

Senator JOHNSTON. In other words, you could not wheel power across their lines so that you therefore had to buy from them.

Mr. BURGIN. That's right. They would not accept the power from Big Cajun No. 1 and wheel it over their system to serve our members.

Senator JOHNSTON. That was more expensive.

Mr. BURGIN. The cost at that time was about the same. Right now, the power from Big Cajun No. 1 is about 50 percent of the cost of the power we are buying from Louisiana Power & Light.

At the present time we are building two 540 megawatt generating plants, coal-fired, that will be large enough to serve all of our membership.

Senator JOHNSTON. Are you going to need to wheel?

Mr. BURGIN. I need wheeling for all of that power. I have been able to work out arrangements with all three companies for wheeling that power, but, unfortunately, it had to be done by means of an antitrust suit. We don't like to go that way.

The antitrust suit was used to bring the companies to the bargaining table so that we could work out arrangements; which we have done, that are relatively satisfactory. I am already planning for Big Cajun No. 3, in order to meet our loads in 1983. I don't know what results I'm going to have in being able to work out the contractual agreements to carry that power from our plant.

Senator JOHNSTON. Let me ask you this, Mr. Burgin. I would guess that the reason the utilities would not want to wheel is that they are in competition with you and they don't want to use their facilities to help you to expand in your market at their expense.

Is that a fair statement?

Mr. BURGIN. If they were to prevent us from transmitting power from our generating plants to our members, so that our members did not have adequate power, then they would be able to come in and take the loads from our distribution cooperatives.

Senator JOHNSTON. The existing loads?

Mr. BURGIN. It could be existing, but at least any future loads.

Senator JOHNSTON. Should our action in ordering wheeling and pooling be neutral, be necessarily neutral in its effect on competition between two competing companies, or should we just order the wheeling and pooling and let the chips fall where they may?

Mr. BURGIN. We are not asking for a big break in this sort of thing, but we think we should be able to serve the territory that we

have developed, and to serve all the loads that come within that territory. The only way we can do that is to build our own generation and have that transmitted for us, or build competing transmission lines.

We don't think we should have to build competing transmission lines. We believe the public is better served if we work together and use existing facilities to the maximum extent possible.

Senator JOHNSTON. At one time there was that problem of competing lines when the electric co-ops and investor-owned people in Louisiana were really competing, literally, by putting lines right next to each other and ripping down each other's wires and all of that, and then you had an agreement where you sort of got together.

Is this accurate?

Mr. BURGIN. It's almost. We have a type of territorial protection, but it is not on the basis of geography. It's on the basis of distance from existing transmission lines.

There is a corridor along a line in which if the company has a line, they have a right to all customers 300 feet on either side of that line. The same is true of the cooperatives. If they have a line, they have a right to serve those customers within 300 feet of that line.

Anything lying outside of that is based upon the customer's determination. So we believe that if you have an act that calls for interconnection and wheeling and pooling, it will help us to bring these companies to the bargaining table so that we can sit down and work out an agreement together, that will be mutually beneficial.

Senator JOHNSTON. Let me ask you this. How common is the Louisiana situation in this country where you have companies competing for territory?

Mr. BURGIN. I think it is throughout the United States.

Senator JOHNSTON. That's not uncommon at all.

Mr. BURGIN. Not at all uncommon. You have certain areas that are geographically outlined, and each party serves within the confines of that geographic location. Many of States have no territorial protection whatsoever.

Senator JOHNSTON. Isn't that going to be part of this law, if we enact what we are toiling with here. Wouldn't it give a Federal solution to territorial claims?

Mr. BURGIN. I don't see that it would. I think that, again, would be left up to the State regulatory commission to determine who has what territory. We are in the same situation right now in Louisiana.

Senator JOHNSTON. Let me ask you this. Who would be on the other side of this argument?

Mr. NICHOLS. Guy Nichols.

Senator JOHNSTON. Mr. Nichols, just respond to that one question.

Mr. NICHOLS. Obviously we are very much concerned about this issue of wheeling because while there is a track record in the courts already as regards wheeling, this question is still very much up in the air.

Senator JOHNSTON. With respect to that one question, we will get into the whole argument.

Mr. NICHOLS. As an investor-owned utility I would be very much concerned that the FPC would have the right to order wheeling so that a friend on my right, who has the benefit of tax exempt financing,

can sell to some new customer he generates on the other side of me through my lines, a customer I now serve.

And I serve him with facilities built with money that does have to pay taxes. That is a very real concern, and I think this is one of the reasons why we should be very careful before ordering the FPC to go further in this wheeling area.

Senator JOHNSTON. What I'm getting at is the power to order wheeling. Does that necessarily involve an issue of competition in geographic areas?

Mr. NICHOLS. Not necessarily, but it would have to be carefully worded.

Senator JOHNSTON. Should wheeling be made in such a way as to be neutral on the question of competition?

Mr. NICHOLS. Yes, sir; because anything we do to disturb the balance between Government-owned and investor-owned utilities is going to take us away from the main job at hand, which is to build facilities that are essential to meeting the energy needs of the country.

We don't need any more fights on our hands.

Senator JOHNSTON. Mr. Burgin, would agree with that, if we put in one of the factors that if the FPC made these findings could produce an order of wheeling, but it should structure its order in such a way that the net effect would be neutral on the question of competition.

Mr. BURGIN. I think so. I don't see that it should give one party or the other any particular benefit. But, of course, I disagree with my friend as far as to his tax structure and all this sort of thing. But we will lay that aside.

Senator JOHNSTON. In other words, you would not object to some provision that would make it clear in the report language or—the pooling and wheeling should not be to give the co-ops, for example, the ability to pick off some businesses that they would not otherwise be able to pick off, that the electric people want, or that they already have.

Mr. BURGIN. If you take this in the right context, if the wheeling is not provided, then of course there's no chance for them to pick up any new loads whatsoever. In that area, if the wheeling were granted, then naturally they would be able to pick up new customers.

But certainly the power companies ought to be willing to compete with the co-ops in the areas where there is no special advantage to either.

Senator JOHNSTON. For example, let's assume a utility has this area that it serves almost exclusively. Right in the middle of this area a new factory wants to locate. Certainly you should not have the power to get FPC to let you wheel right into the heart of that country in order to serve somebody right in the middle of their geographic area simply because you are able to make a contract with them, should you?

Mr. BURGIN. I don't believe so.

Senator JOHNSTON. I think we need to address that question in this legislation. Is this a real big concern?

Mr. NICHOLS. Yes, sir.

Senator JOHNSTON. Go ahead, Mr. Burgin, I interrupted you.

Mr. BURGIN. I don't have too much more to say, other than I noticed there was considerable confusion as to the interpretation of what wheeling was and what interconnection is, and what pooling is.

I think for the purposes of this act, that you should define interconnection not only as a physical connection, but also the associated commercial agreements to make the interconnection effective.

By that I mean—well, we've got those schedules, but really they are just little contracts within a contract. For instance, economy energy means the sale of low-cost energy to someone who has high-cost energy and both benefit. This is voluntary on the part of the supplier and on the part of the buyer.

It is purely a monetary transaction.

There is a requirement for maintenance energy which means that your neighbor that you are interconnected with will provide power to you while you are repairing some of your units.

This, again, goes both ways. Another is an emergency energy—

Senator JOHNSTON. You want the FPC to be able to order these things, don't you?

Mr. BURGIN. Not these specific things, but I think it ought to be in general language, that the necessary commercial arrangements can be made to make the interconnection effective.

But you must have—

Senator JOHNSTON. You want to give the FPC the power to order sales and exchanges of electric power before that interconnective system.

Mr. BURGIN. Again, the supplier has the option as to whether or not he has any excess energy, whether or not he has any excess firm power he wants to sell. Conversely the buyer has the right to determine whether he wants to buy it.

Senator JOHNSTON. You would make it entirely voluntary and not give the FPC the power to order sales or exchanges of power. Is that correct?

Mr. BURGIN. If the schedule I am talking about is just a hollow agreement, in which one party never intends to make any power available in that area, then I think the FPC should get into the act.

Senator JOHNSTON. You would give FPC authority over terms and conditions of the agreement?

Mr. BURGIN. That's right.

Senator JOHNSTON. In other words, Houston Lighting & Power and Central & South West negotiated and could not agree, you would give FPC the authority to say you sell and exchange power according to these conditions under these circumstances at these times and at these prices.

Mr. BURGIN. They will be in a review position rather than a determining position.

Senator JOHNSTON. I say, if they can't agree.

Mr. BURGIN. Then they will have to make some kind of determination in order to make the interconnection effective. That was mentioned here this morning, if you are not going to flow any power over it from A to B, why build it.

These things are for the benefit of both parties. It is becoming more and more—I think the power companies in Louisiana working with Cajun Electric have recognized it's good for them and for Cajun.

Senator JOHNSTON. You need power, don't you? Louisiana Electric needs power.

Mr. BURGIN. Yes, we do but by 1980 when our contracts run out, they have already told us that they will not have any power for us, as have the other companies.

Senator JOHNSTON. When that time comes, Big Cajun No. 2 has to be on line with the power to wheel to its customers presently served by those L.P.&L., et cetera, contracts.

Mr. BURGIN. That's right.

Senator JOHNSTON. That operation does not involve a predatory competitive practice on your part to get their customers, but it's designed merely to serve your own existing customers who are presently being served.

Mr. BURGIN. That's right, we will sell no retail power.

Senator JOHNSTON. Let me ask Mr. Nichols, what's wrong with that?

Mr. NICHOLS. I think that nothing is wrong with that concept of voluntary arrangements between different groups and these have been successful, as the gentleman on my left has pointed out.

They were not only able to make the arrangements, but during the interim they suffered no economic harm.

Senator JOHNSTON. It took them 3 years, and they had to threaten an antitrust suit.

Mr. NICHOLS. Yes, it's taken us more than 3 years to get many matters through the Federal Power Commission and I wonder which route is better.

Senator JOHNSTON. Touché, OK. Even so, these people definitely ought to be served under that circumstance, and the limits of goodwill are not inexhaustible. Sometimes it breaks down.

Mr. NICHOLS. I am sure that if the conditions he is willing to accept as regard to the raiding of territories and the like were uniform throughout the country, we would proceed much more rapidly on some of these voluntary arrangements that we would all like to see under our belt.

Senator JOHNSTON. What is your objection to interconnection? Wheeling and pooling. Is your concern the raiding of territories?

Mr. NICHOLS. That's just one concern. An additional layer of bureaucracy is certainly another concern, and what that bureaucracy will do to our ability to build the facilities we should build.

I was reminded as I sat in the back of the room this morning that we are talking about expanding the role of a specific Federal bureaucracy. I would not like to answer the question you asked some witnesses, to comment on the type of regulation that my particular agency has received from that bureaucracy.

However, I would suggest and ask because you are so close to the national gas side what you think its track record there as regards economics and availability of gas supply.

Furthermore, I am reminded that we do have, public and private together, national reliability council that reported to you last week. And in their most recent report they pointed out five principal concerns that are agreed upon across the industry, public and private, as regards reliability concerns.

I will not go through them on a one-by-one bases, as you may remember them, perhaps, better than I. They do not include the need for further expansion of the Federal role, rather they call for reducing the duplication and overlapping we now have.

Senator JOHNSTON. You are saying you are afraid that FPC won't let you build the plants that you want to build?

Mr. NICHOLS. We are saying, we are already subject to FPC regulation. We have the benefit of the State and Federal regulation now. Giving them further power above and beyond what they have now will not help us get on with the job of building facilities that are necessary.

I fear it will allow additional regulation and that is something we don't need, is additional regulation at this point in time.

Senator JOHNSTON. I want to get to this point where you say they won't let you build, using this power as if it necessarily entailed the right to site plants and get involved in questions of financing these plants.

Mr. NICHOLS. I don't read that into the specific legislation you are contemplating. I read into it interconnection and not beyond that wheeling and pooling to a limited degree. Your committee has indicated the past few days that it planned to go very slowly in this area, and I recommend moderation.

Senator JOHNSTON. By the way, were you satisfied with Mr. Bardin's answer that a company can never be ordered to sell power that it feels it doesn't have, and when it needs its power for its own customers under the present law, that it can keep that power.

Mr. NICHOLS. Absolutely not. I think Mr. Bardin is overlooking the pressures of the economic thumbscrews that rate proceedings put on all of us.

That chart he had up here that showed the Louisiana companies, for example, would have to just take whatever came out of Texas without benefit of regulation. That is nonsense.

Those Louisiana companies, I'm sure, are in a rate proceeding nearly every year during these inflationary periods. The State regulatory authority in those proceedings can look at the purchase in question and say, "We think this company paid too much for it, or should not have bought it."

That kind of regulatory pressure exists already, so I think that was a vast overstatement.

Senator JOHNSTON. I asked that question of Mr. Bardin in the context of a company having excess power now being ordered to sell it in the next year, having the new industry that they want to bring into their territory, to get their power back which they have been selling.

His answer was, in that kind of situation, that their customers always came first. You are not—are you are satisfied with that and is that a concern?

Mr. NICHOLS. That is obviously a concern and obviously one that must be addressed. In addition, on this very issue of wheeling that power over the existing lines, as an old operating man I would say that the best transmission line is the unloaded transmission line that is available during periods of emergency, to fully perform the service of bringing in power from other parts of the system.

The company may not—

Senator JOHNSTON. Let me get back to the question I have been concerned about. Let me ask this of the panel, generally. Should it not be specified, if it is not already, that you cannot be ordered to sell or exchange that which you need yourself?

We all agree that that ought to be a part of the law. Do you agree with that, Mr. Burgin?

Mr. BURGIN. Yes, I do.

Senator JOHNSTON. Do you agree with that?

Mr. HOBART. Yes, Mr. Chairman. I might point out, if you don't mind, something about the situation in New England. I don't think Mr. Nichols has taken into account what has happened in New England the past few years.

Senator JOHNSTON. We will get into that. I want to take a question at a time. Are you satisfied that that is the present law?

Mr. NICHOLS. I have to say no because pressures can be put upon companies through the regulatory process to do things that they might prefer to not do, in the best interests of their own customers.

Senator JOHNSTON. Would you have a suggestion as to how to change this law so as to accommodate this question?

Mr. NICHOLS. I think any suggestion I came up with would probably be more dangerous than enacting no additional legislation.

Senator JOHNSTON. For example, doesn't this take care of subsection three where we say the Commission shall have no authority to compel the enlargement or construction of generating facilities for purpose of the section, or to take any action which would adversely affect the reliability of any electric system, impair its ability to render adequate service to its customers, or to take any action which would result in the economic loss to an electric utility or its customer.

Doesn't that cover it?

Mr. NICHOLS. I would like to add something to that, or result in the replacement of electric service to a retail or wholesale customer receiving service from an electric utility.

That locks in the part we talked about earlier, I think whether we were all in agreement.

Senator JOHNSTON. Run that by again.

Mr. NICHOLS. Or result in the replacement of electric service to a retail or wholesale customer receiving service from an electric utility.

Senator JOHNSTON. Or result in replacement of electric service to a wholesale or retail customers—

Mr. NICHOLS. Receiving service from an electric utility. I think we are all in agreement, we were a moment ago.

Mr. HOBART. I think we are not in agreement on that point, Mr. Chairman, as regards wholesale sales.

What Mr. Nichols is suggesting is that he is not against something new, but he doesn't want to do it for the first time. There is no reason to think it is desirable public policy to lock a utility in place with its existing supplier.

That's one of the problems we have faced over the past few years.

Senator JOHNSTON. If that provision came in, and the Cajun is serving at retail or are served by you, are served by whoever you represent—Gulf States—wholesale, is that what Mr. Burgin is suggesting?

Mr. BURGIN. That would make it impossible for us to build Cajun No. 2 because already we are buying power from Louisiana Power & Light to serve those loads. This would lock them in permanently.

Mr. HOBART. Mr. Chairman, there was a suggestion in the House dealing with retail customers which responded to a concern expressed

by Consolidated Edison in New York, that its retail customers might be pirated under interconnection authority given to the FPC. I think that House language prevents the kind of situation about which Mr. Nichols is concerned.

Senator JOHNSTON. What is the House language?

Mr. HOBART. Section 541, Mr. Chairman, subsection (b)(1) on page 212 of the House-passed bill, line 5: such terms do not include transmission of electric energy to an ultimate consumer. There is a qualifier with respect to cogeneration.

Mr. NICHOLS. I don't happen to read that on my copy of the House-passed act. Maybe I am wrong—

Mr. HOBART. You haven't got the right bill, Mr. Nichols: same number, but different language.

Senator JOHNSTON. All it says is for purpose of this paragraph, the term wheeling means transmission on electric utilities, et cetera, but such terms does not include transmission of electric energy to an ultimate consumer. That bill does not give us a complete answer of how we can be neutral, in this question of customers.

The language suggested by Mr. Nichols would prevent Cajun from serving its present retail customers now served by wholesale purchase of power?

Mr. NICHOLS. I don't think so, Mr. Chairman, but I am reminded I indicated if we get into this area, we are going to wind up opening all the old wounds of public versus private, and addressing this area is going to take, I am afraid, more than a couple of simple amendments to do it properly.

I would strongly urge that you not get into this area of wheeling at this time, or, if you do, wait until we have been able to establish carefully what those rules should be.

Mr. DUNCAN. Mr. Chairman, I am W. A. Duncan with Kentucky Utilities. I would like, with your permission, call attention to what appears to be in this exchange that has just taken place, in my view, the real motivation of the proponents of this legislation, and that is for subsidized entities to raid the business territory; served by investor-owned utilities that are not presently entitled to similar concessions.

Senator JOHNSTON. Let's see if that is a correct statement. Mr. Burgin says that they ought to serve—they were to build big Cajun No. 2, an electric generator, to serve their own retail customers, which are now being served by purchase of wholesale electricity from Gulf State and Louisiana Power & Light.

They've been served notice from L.P. & L. that in 1980 they will no longer be able to receive electricity. He wants to wheel across L.P. & L.'s lines to get its own electricity to its own retail customers. Is that a legitimate thing to do, and if not why not?

Mr. BURGIN. I am not commenting on that particular instance—

Senator JOHNSTON. That sort of thing is OK, that's not raiding, is it?

Mr. DUNCAN. It would be raiding if Cajun were seeking business of a wholesale customer now supplied by my company or some other company. This is the type of raiding that I suspect may be the basis

for urging that this legislation deal with this general subject of wheeling.

Senator JOHNSTON. What I'm getting at is if he wants to sell to his own retail customers who are now being served wholesale by investor-owned, is it legitimate for him to do so or for FPC to order it to be done?

Mr. DUNCAN. It would be legitimate for him to serve his own customers, but I have serious misgivings about the prospect of the Commission being authorized to require an intervening utility, whatever it might be or wherever the situation might be, to resolve Cajun's problem in getting service from a generating plant that it proposes to build to its customers.

Senator JOHNSTON. I would suggest to you that it is very clear to me—and you are here to tell me why it should not be clear—that if you can conserve energy or maximize the efficiency of your generating facilities, and have a net economic benefit and not hurt the reliability, it is not against public policy to make it possible for him to serve his own retail customers, by wheeling over your lines. I don't see how that is.

Mr. NICHOLS. May I respond to that by agreeing with you that where everyone benefits, as you have just suggested, it is obviously already in our best interest to do so. We are doing it—

Senator JOHNSTON. I can tell you why it wouldn't be, because if they can't wheel across your lines and can't service their customers, you've got them.

Mr. NICHOLS. I want to say that where you are able to prove all the points you just raised, it would obviously be in the best interest of all parties concerned to go forward with the arrangement.

We have gone forward with arrangements like that, all across the country, and I assure you that the chances of succeeding in those voluntary arrangements to the benefit of both parties are probably better on the voluntary basis than doing it in a Federal procedure.

Senator JOHNSTON. You would agree that sort of thing ought to be done voluntarily, or if it cannot be done voluntarily, somebody ought to order it, because as this gentleman expressed his concern, if I were a manager in his position, I would have a similar concern and be looking to work out a good solution.

As manager of the utility in between, I would want to be protecting my customer's interest and my investor's investments. I think we would sit down and work it out. We have had a big success in this country working out these arrangements over the past many years.

From my own view, and this is stated in a most simple way, Mr. Burgin ought to be able to serve those customers, his existing customers, by wheeling or by interconnection, or however.

But, the contrary pole of that is that he should not be able to raid your customers. Can we get that idea a little more refined for purposes of putting it in the statute?

Mr. NICHOLS. Yes; and with your permission we will try to work out some language and submit it to your staff.

Senator JOHNSTON. Your phrase here, "or result in replacement of electric service to a wholesaler, retail customer receiving a service from an electric utility," does not do it because of the word wholesale in there.

Suppose we just left out the word wholesaler and said, or result in replacement in electric service to a retail customer receiving service from an electric utility.

Mr. NICHOLS. Not being a lawyer by training I would want to go back and check and make sure how that fits into the Federal Power Act. But let us work on it and we will submit something within 24 hours.

Mr. DUNCAN. Mr. Chairman, pardon me again, but I have great problems with the suggestion that deletion of wholesale from the suggested modification covers the point adequately. It is not reasonable and in the public interest for the mandatory wheeling provisions of this proposed legislation to provide a basis on which the Commission would order wheeling, if in the process a wholesale customer now served by my utility will under a wheeling arrangement become served by some other entity.

I don't know whether I have yet made the point clear. Neither retail customers nor wholesale customers. I hope this committee might view both in a similar light so far as any grant of authority with respect to wheeling being mandated by the Commission.

Senator JOHNSTON. Suppose you put it like this: "or result in replacement of electric service to a retail customer receiving service from an electric utility or to a wholesale customer receiving service from an electric utility, unless the retail customers of such wholesale customer were served by the person seeking to wheel the power."

Do you follow that?

Mr. DUNCAN. Prior to the event of wheeling—

Senator JOHNSTON. In other words, suppose we draft it so that you could not order it if it would result in the replacement of retail or wholesale customers unless, in the case of wholesale customers, the retail customers of the wholesale customers were the retail customers of the person seeking to wheel the power, trying to cover the Big Cajun situation.

Do you follow that?

Mr. BURGIN. Mr. Chairman, may I suggest I think that is very well taken care of on page 212 in the definition of wheeling. It says it will provide transmission service among electric utilities and qualified cogeneration facilities, but such term does not include the transmission of electric energy to an ultimate consumer.

This prevents the thing they are talking about—

Senator JOHNSTON. Is ultimate consumer defined?

Mr. BURGIN. Ultimate consumer is a retail customer.

Mr. HOBART. Ultimate consumer is a term of art in the industry that means the retail customer.

Senator JOHNSTON. Let's say you have some customers and you wheel across somebody else's territory, you reach a connection point with a transformer that then goes to three homes. Is that service to an ultimate consumer?

Mr. HOBART. It would be, Mr. Chairman. Under this language in the House bill, that would not happen.

Mr. Chairman. I think it is worthwhile to figure out exactly what we are talking about when we talk about the wholesale part of this suggested language.

Take a State like Louisiana. There are a number of small electric systems in Louisiana that are interested in coordinating their existing generation, or building additional generation which they will share.

Reasons for such action are obvious. You heard much of the explanation for that approach all through this morning's testimony. Economy is the driving force, and if you are concerned about the cost of power to your consumers, that is a goal you would seek.

In order to have this happen, you have to have access to transmission services. If there is not access, then any plans are bound to go awry. The only way you can get the transmission is to purchase such services from existing facilities where there is excess capacity or to build your own transmission lines. As Mr. Burgin indicated, duplication of transmission lines is not in the public interest.

Mr. Nichols has made quite a point of worrying about raiding; bureaucracy; building facilities; pooling and wheeling; and whether people can regain power they sell once they need it themselves.

The fact of the matter is, over an extensive period of time—6 or 7 years—there have been at work in New England arrangements which allow all of these adverse things to be prevented, and all of the beneficial things that we like to talk about—reliability of service, adequacy of supply, and keeping a damper on cost—to take place.

But it occurred because consumer-owned electric utilities in the region initiated an extensive fight—using the courts, the Nuclear Regulatory Commission, the FPC, and any forum they could find—to get rights automatically available to investor-owned companies in that area.

Private companies resisted all the way—until there were sufficient decisions to allow those rights to accrue to consumer-owned systems.

Senator JOHNSTON. How would you deal with the situation Mr. Burgin defines?

Mr. HOBART. Let me continue and explain how it was done in New England.

Senator JOHNSTON. I know it can be done but it stretches credulity to the point of disbelief to say that it always can be done, and that investor-owned companies can be counted on to serve power when they can get the customers themselves.

Competition would say, get a customer yourself, if you can get it, wouldn't it?

Mr. HOBART. Are you talking about retail customer?

Senator JOHNSTON. Yes.

Mr. HOBART. Most municipalities around the country are concerned about satisfying existing loads. I find no evidence to indicate to indicate there has been raiding of retail customers in New England—

Senator JOHNSTON. You say it never happened.

Mr. HOBART. I didn't say it never happened. I say there is no evidence to find there is a current concern.

Senator JOHNSTON. Mr. Burgin is worried to death about it, about losing his existing retail customers who are now being served wholesale by L.P. & L.

All he wants to do is wheel across their lines, his own power, but they're saying no. Why are they saying no?

Mr. HOBART. Mr. Chairman, I am somewhat puzzled by that myself. As Mr. Nichols pointed out, we have a problem assuring there is enough power on line to take care of everybody's needs.

It's incumbent on all utilities to make a contribution to building additional facilities, and, assuring they are on line. In New England, consumer-owned utilities are making capital contributions to be sure that those plants can go forward and get built.

I don't see that it's in the interest of private companies to prevent the arrangements Mr. Burgin—

Senator JOHNSTON. You have not been able to work it out, have you?

Mr. BURGIN. Yes; we finally worked it out, for Cajun No. 2. I am looking forward to Cajun No. 3. We don't have the same antitrust clause that we had.

Senator JOHNSTON. What's the situation with Cajun No. 3? Do you serve existing customers?

Mr. BURGIN. It will serve our additional load.

Senator JOHNSTON. Additional load of the same territory?

Mr. BURGIN. Yes.

Senator JOHNSTON. Why wouldn't—what happens if you are not able to serve them?

Mr. BURGIN. They will have to get their power from someplace. I may have to buy wholesale power from the companies, or the companies that take over the retail customers of my members.

You see, I don't serve retail, I serve wholesale, to 13 distribution co-ops in Louisiana, and they serve retail.

Senator JOHNSTON. Gentlemen, what we want to do here is try to work on something where this law is neutral. He ought to be able to serve existing customers, and you are going to have a great difficulty in trying to influence me to the contrary.

I think we'd better spend our time here trying to figure out a way to make the effect of this law neutral so he can't raid you and you can't raid him. It will call for some very subtle drafting to get that done.

Mr. NICHOLS. I happen to think you are on the right track with your addition to my suggested amendment. I think that can be developed, and not being a good enough practicing attorney, I would suggest let us take that and all parties submit to you those words and do it within a very short time period.

Senator JOHNSTON. Have you got some ideas—

Mr. HOBART. I have a problem on the point just raised.

Most of the arrangements—virtually all arrangements—relating to retail customers in the United States are matters of State law.

They vary considerably from State to State, but you find that there are territorial patterns existing in some States with assigned service areas and rules, as Mr. Burgin alluded to, indicating when you can take a customer and when you cannot.

Other States have a free, open situation where customers can be attached to the lines of the utility nearest to them.

I think you will have a difficult time trying to write into a piece of Federal legislation something that affects retail sales.

The converse is true on the wholesale level. There, the Federal Government is in a preemptive position. Wholesale and—

Senator JOHNSTON. Are you suggesting that we order wheeling and put no restrictions on it?

Mr. HOBART. I am suggesting that, and I think that would be neutral. Neutrality would take place by assuring that all utilities, regardless of their ownership, have an opportunity to engage in the transac-

tions they need to make economic and efficient power systems for their ultimate consumers.

Mr. NICHOLS. I assure you it would not be neutral because those investor-owned companies that have to raise their money, money that is taxed, will then be in direct competition with tax subsidized money being used on Government power projects.

Senator JOHNSTON. You would like to express that neutrality as best we can in the statute.

Mr. NICHOLS. I think it would be much safer, rather than wheeling, as has been suggested. That would certainly not be neutral and it would get us all into a bunch of divisive fights that we do not need at this point in time.

I want to mention, because New England has been mentioned—

Senator JOHNSTON. Let me throw out an idea here. How about referring the question of customers to the State commission. I don't know whether the multiplication of authority might be unworkable, but there is a way that we could give effect to State rules on that if they were willing to act. We would deal with the question of wheeling within the context of saving power, et cetera.

Mr. NICHOLS. We'll take a crack at it.

Senator JOHNSTON. What do you think of that?

Mr. BURGIN. It might be workable.

Mr. DUNCAN. Mr. Chairman, the Cajun witness has alluded to situations in which his wholesale customers, his members, are facing the need for power from another source.

I would assume that those members are currently under contract to Cajun for their entire funds. In that situation, those members are currently customers of Cajun.

The suggested words, replacement of electric service to retail or wholesale customer, it seems to me that it would fit very nicely into a situation in which—to which the witness has referred.

The other point I wanted to make is that my company presently supplies wholesale service to about 10 municipalities. We have supplied it for 40 years, and we want to continue to supply that service, and we would certainly urge that the committee seriously consider limiting the authority granted to the Commission to order wheeling in such manner that my company would be protected against the use of this new wheeling authority, as a means of pirating these wholesale municipal customers which we have supplied, for a number of years.

I would like to retain the reference to wholesale customer in a draft which—

Senator JOHNSTON. You are speaking of the kind of wholesale customer or a municipality but not of retail customers. You are not anxious to try to get his wholesale municipal customers are you, Mr. Burgin?

Mr. BURGIN. No, but I am a wholesale customer of the power company, and if that were to go in then I could not build any generation. I would be his customer in perpetuity.

Actually, we are a customer by contract for a certain specified period of time.

Senator JOHNSTON. We want to make it clear that we are going to order wheeling only for the purposes specified, that is to save energy,

for the efficient utilization of generation facilities, but not to allow co-ops to shop around for the cheapest wholesale energy they can find. You don't want to use—you don't want to do that, do you?

Mr. BURGIN. Yes, sir.

Senator JOHNSTON. You want to be able to shop around for the cheapest power, even though it might not save energy, or would not necessarily—

Mr. BURGIN. I still want to get the best deal for my members that I can. If that means buying power from one company or buying from another, or generating my own power, I would like to use that which is best for my members.

Senator JOHNSTON. I think what we've got to do here, Mr. Burgin, we don't want to give either side a competitive advantage in the present situation, but it might give investor-owned people a competitive advantage by being able to freeze you out from serving your own customers.

In the process it might result in loss of energy, and inefficient use of facilities. What we intend to do here is narrowly define the purposes for which wheeling, pooling, and interconnection can be used to include conservation of energy, efficient use of facilities, economic, net economic benefit, and not unreasonably affect reliability.

So those will be the factors, and that would not include shopping around for power. We are also going to try to come up with some language of neutrality among the parties on serving customers, because we don't want to make the Federal Power Commission the ultimate authority on the carving up of territory.

We are trying to figure out a way to make that neutral. In the case of your municipals where you are serving wholesale, I think you ought to be able to do that and I don't think that FPC ought to have the power to subsidize that traditional customer.

Conversely, where he is a wholesale customer of yours, but has a retail load to serve with that wholesale purchase, he ought to be able to continue to do that.

Mr. HOBART. Mr. Chairman, it seems to me with that approach, in part, what you are doing is not neutral at all. You are suggesting that we lock in place existing relationships between electric utilities who sell at retail to different constituencies without giving one set of utilities the opportunity to better their position on power supply, while you simultaneously preserve that opportunity for another group of utilities.

I did not sense that that is what you started out to do when you began working on this amendment, and indicating the details of a bill you might put together.

It does not seem to me to be equitable that in the State of Louisiana, for instance, if a group of municipalities determined that they can put together a power supply scheme which over a long period of time will be beneficial to their consumers, and if they are buying at that time at wholesale from a private power company, when their contractual obligation concludes that they would somehow be locked in place and unable to implement that new scheme.

I should think there would be a significant legal question about the ability of anybody to do that. Furthermore, it does not seem to be a desirable policy to adopt in any event.

That was not done in New England. The ultimate solution there was to allow people to find power supplies they thought were best for them,

and that resulted in a lot of cross-fertilization of ideas and contributions of capital—

Senator JOHNSTON. We are not locking these people in place, we simply don't want to make the FPC the one to further their scheme.

Mr. HOBART. If you buy Mr. Duncan's idea, you would be locking people in place. They are attempting to extract themselves, and one of the ways they can do so is to assure that there is someplace they can go where they can get some relief if they cannot negotiate a wheeling arrangement.

Senator JOHNSTON. They can negotiate a wheeling arrangement.

Mr. HOBART. They have been unable to do so.

Senator JOHNSTON. There would be no restrictions on their authority to negotiate.

Mr. HOBART. Mr. Chairman, the point is what do they do if they come up to an impasse? I am assuming that what we're trying to deal with is exactly that kind of a question.

If Mr. Duncan's wholesale customers determine there is a better way, the contractual obligation lapses, and they are free to implement that better way, Mr. Duncan's utility says flatly: "We will not negotiate any arrangements with you which allows you to wheel power from another source." How will they implement their plans, unless they have a forum to repair to where they can present their case and allow impartial determinators to negotiate between the two parties?

They may have to forget the whole thing, and go back to Mr. Duncan.

Mr. DUNCAN. Mr. Chairman, I would like to suggest that in such a situation, if in fact—as has been suggested by earlier testimony this morning—the authority to order wheeling may be implemented only in those situations in which both the wheeler and the wheellee, and their customers, are benefited, the reluctance to reach an agreement, it seems to me, might be minimal.

Senator JOHNSTON. We are not saying that each party must be benefited. We are saying the net economic impact would be positive, and any economic harm to any party be reimbursed. But we are not requiring that both be benefited. At least that's the present thinking.

Mr. DUNCAN. I am suggesting that an economic benefit to one party to such an arrangement and their customers which arises as a result of economic detriments experienced by the other parties or their customers—perhaps incapable of precise measurement—is not, in my view, too closely associated with efficiency, economy, conservation of energy, which are of the principal purposes here.

Senator JOHNSTON. You have to make the finding that it is for conservation or proper utilization of facilities and resources and a net economic benefit and that the person who would be otherwise hurt by it would be reimbursed.

That is capable of precise enough measurement that you can order reimbursement in dollars.

Mr. DUNCAN. I question whether a detriment from the standpoint of increased reliability is subject—

Senator JOHNSTON. Now, reliability, we have said that you cannot impair another's reliability unreasonably. Depending on how we define reliability, you can—if you put reliability in the absolute sense, then, 100 percent excess capacity is better than 99 percent excess capacity, so you could never hurt someone.

We're talking about reasonable limits on reliability, and there might be some instances where someone—a detriment to their reliability could be easily offset by the expenditure of some additional lines, or what have you.

Mr. DUNCAN. How would you measure and how would a utility be paid for the loss of a customer? Customer's revenue and business, a wholesale customer down through the years. I fail to see any basis on which a party could be compensated for that loss occurring.

Senator JOHNSTON. I think you can compensate a party for the loss of a customer; it is done in law all the time. We are not suggesting that we use wheeling as a means of acquiring somebody else's customers.

Mr. DUNCAN. Yet I gather the suggestion is that, in the context of the findings necessitated—that you have some problem with a further finding that the action of the Commission will achieve net benefit to each electric utility affected.

Senator JOHNSTON. Well, we have not drafted all of this language yet. We have that net economic benefit in there.

Net economic benefit, that is not to each customer.

Mr. DUNCAN. I am suggesting that the desirability of adding those words in paragraph (g) (1), immediately following the reference to carrying out the purposes of section 1 of the Public Utility Regulatory Policy Act of 1977, at that point, and insert "finds it will receive net benefit to each electric utility affected."

Then you continue on with the staff draft.

Senator JOHNSTON. This is your draft, your suggested draft that you are reading from.

Mr. DUNCAN. Yes.

Mr. NICHOLS. Mr. Chairman, I think with the protection against piracy, and other protections you've just enunciated, we will be glad to try to draft something and get it back to your staff this afternoon, and I am sure others would like to do so too. We will work toward that end very quickly.

Senator JOHNSTON. Unless someone else——

Mr. BURGIN. I would like to make one comment, Mr. Chairman.

One of the things you must take into account in all of these things that you are talking about is time. Now, the wholesale customer that you have today, 5 years down the road, or 2 years down the road, you are going to build generation to serve him.

You might be better served, your company might be better served to let him go and keep the low cost of generation for your own member, than it would be to put in your high-cost generation and average out the cost.

So what is surplus today may not be surplus tomorrow, and these conditions change every year. In my own experience, at Cajun Electric, we have received notice from each of the three companies we are serving, that they will not have power for us after our contracts expire by 1980.

They are not interested in serving us wholesale, and this may very well be a situation in which our friend here may find himself at a later time.

Senator JOHNSTON. On that note, let me say, gentlemen, that our plan is to introduce an amendment on the floor. How long natural gas

will go, I don't know, and I suspect it will be up some time next week, hopefully, on this bill.

We have to move rather quickly, and I would appreciate draft language from any of you on the panel, or indeed anyone in the room, who can help us strike that neutral stance.

We don't want to put in wheeling as a competitive weapon of either the co-ops or the investor-owned utilities. But we do want to affect the savings of energy and make efficient use of power, and have it an overall and economic benefit, without impairing unreasonably the reliability of either system.

Within that context, if you can help us draft the language, I think it would help this legislation a great deal. Thank you all very much, you have been very patient this morning. Sorry we didn't come into the hearing with intimate knowledge about all electric matters, but maybe we will be by the time we get on the floor.

[Whereupon, at 12:30 the hearing was adjourned.]

[The prepared statements of Messrs. Hobart, Nichols, Duncan, and Burgin follow:]

STATEMENT OF AMERICAN PUBLIC POWER ASSOCIATION
ON INTERCONNECTION AND WHEELING
SUBMITTED TO SENATE SUBCOMMITTEE ON ENERGY CONSERVATION AND REGULATION
September 20, 1977

My name is Larry Hobart. I am Assistant Executive Director of the American Public Power Association. APPA is a national service organization representing about 1,400 local public power systems in 48 States.

APPA supports amendment of the Federal Power Act to give the Federal Power Commission -- and its successor agency, the Federal Energy Regulatory Commission -- authority to order an electric utility to interconnect with another electric utility for the purpose of selling, exchanging, delivering, wheeling, pooling, or coordinating electric energy.

Such action has been recommended by President Carter and Secretary Schlesinger of the Department of Energy. The House of Representatives on August 5 passed legislation to implement that recommendation; it is found in Section 541 of H.R. 8444.

Last year, the Senate Commerce Committee favorably reported S. 3311, the Electric Utility Coordination Act, which included a Section 201 authorizing the FPC to order -- on reasonable terms and conditions -- transmission, exchange, and coordination when necessary or appropriate in the public interest and not unduly burdensome to such utilities. APPA urges that the Senate Energy and Natural Resources Committee take similar action this year.

Our Association believes that granting of these powers to FPC and FERC would do the following things:

- . Insure equality of opportunity to all electric utilities to engage in transactions which allow access to economies of scale in electric power generation and transmission.
- . Assist smaller power systems with generation in making the transition from oil and natural gas to coal and nuclear facilities as called for by national policies.
- . Aid in slowing down rate increases to consumers.
- . Help protect against possible power shortages.

- . Permit infusion of additional capital into financing of required plants and transmission.

- . Save resources by making better use of existing facilities and by encouraging more comprehensive planning for future facilities.

- . Support efforts to improve power supply by states which have authorized joint action programs by local public power systems.

Advancement in the planning and building of transmission facilities and coordination has varied from region to region for many years, and the Federal Power Act has not proved to be entirely adequate in assuring such arrangements are available to all utilities.

For example, small system participation in the New England Power Pool was the result of proceedings initiated by consumer-owned utilities in many forums, including FPC, the Securities and Exchange Commission, and the former Atomic Energy Commission. Had the Federal Power Act been amended to give the Commission the powers under discussion here, it is probable that a great deal of expense and litigation could have been avoided which achieving the benefits of NEPOOL. Today a large number of small municipal electric systems are active participants in NEPOOL, and are beneficiaries of fractional shares of large nuclear power plants, the output from which is moved for them over lines of private power companies. Although they fought against inclusion of publicly-owned electric utilities in the program, private power companies now call the group effort a success. James Tribble of the New England Electric System described the progress being made under the agreement this way:

"The Pool has operated successfully since 1971. Reliability and economy have been improved markedly by central dispatching. Economics of scale are being realized as numerous jointly-owned generating units are committed and inter-pool purchases arranged. Membership in NEPOOL has grown to include over 50 utilities having over 98% of the total New England load. This record of success is expected to continue in the future."

An example of how municipal electric systems participate in NEPOOL is provided by the experience of the Massachusetts Municipal Wholesale Electric Company formed in 1969.

MMWEC has launched a decade-long power supply program that will cost approximately \$1 billion and provide Massachusetts municipal electric systems with some 900 mw of generating capacity under the NEPOOL program.

MMWEC member systems include 27 municipal electric systems in Massachusetts. These utilities have approximately 65% of the municipal electric load in the state and serve a population of about 500,000 people.

Today the MMWEC member systems are participating in "nuclear mix" financing which will be used to pay a portion of MMWEC's ownership interest in five nuclear plants planned for New England. These projects are scheduled to come on line during the early and mid 1980s, and will be operated by private power companies in the region.

During the next 10 years, MMWEC also expects to build two fossil-fired units with a capacity of 400 mw, and share in a power company fossil-fuel unit.

MMWEC has assisted some of its members in implementing power supply contracts independent of their historic wholesale power suppliers. Under these agreements, participants receive a mix of wholesale power and supplemental entitlements in peaking, intermediate and base load nuclear generating units resulting in interim reductions of total power supply costs prior to the scheduled operation of units included in the long-range power supply package.

MMWEC's Nuclear Mix No. 1 includes 156,231 kw (13.24%) of Boston Edison Company's Pilgrim No. 2 unit at Plymouth, Massachusetts, planned for operation in 1984; 18,440 kw (1.603%) at Millstone No. 3 of Northeast Utilities (1982); and 3,744 kw (0.163%) of Seabrook Units 1 and 2 of Public Service Company of New Hampshire at Seabrook, New Hampshire (1982-84). Nuclear Mix No. 2 includes: 138,184 kw (6.008%) of two units of a proposed New England Power Company nuclear plant expected to begin

operation in 1984-86; and 33,350 kw (1.45%) of the two units of Northeast Utilities' Montague, Massachusetts, plant (1986-88). MMWEC -- which employs both unit purchases and ownership entitlements in these power acquisitions -- will acquire additional output from Millstone and Seabrook in other nuclear contracts. Unit contracts provide for the purchase of a fixed amount of capability from a particular unit during a specific period of time. Ownership entitlements provide for an ownership share of the output of a particular unit for the life of the unit at the owner's cost.

None of the MMWEC bulk power supply arrangements would have been possible, of course, without access to transmission service and coordination cooperation.

It is sometimes suggested by opponents of FPC authority to order transmission and coordination that this would be disruptive, threatening adequacy and reliability of service. There is, of course, no need for this to be so. An example of such a transition is currently provided by experience in Georgia.

In 1972, the 50 municipal electric systems in Georgia decided that the soaring cost of wholesale power and lack of assurance of future supply dictated that they get into the business of generating electricity. The Georgia Power Company had opposed such efforts in the past. In 1974, faced with antitrust review of its activities at the Nuclear Regulatory Commission the company decided that joint ownership with its wholesale customers was a better course to follow in meeting power needs, and agreed to sell the municipals portions of the company's generating capacity and transmission system. In 1975, the Georgia legislature passed legislation creating the Municipal Electric Authority of Georgia. In 1976, MEAG and Georgia Power signed agreements providing for joint ownership and operation of certain generating and transmission facilities. In 1977, MEAG purchased 17.7% of the company's 2,320,000 kilowatt Vogtle Nuclear Plant, 17.7% of the 1,630,000 kilowatt Hatch Nuclear Plant, 10% of the 1,730,000 kilowatt coal-fired Wansley plant, and 10% of the 3,240,000 kilowatt coal-fired Scherer plant. Some 885 miles of transmission lines, and 53 substations were bought from the company. Under the terms of an integrated transmission system agreement, MEAG has pledged to purchase facilities proportionate with its share of

the load on the system of the company, which will transmit for the cities. Total investment by MEAG by 1985 is expected to be more than \$1.6 billion. When every unit is operational, MEAG's share of the output still won't be sufficient to supply all the requirements of its participants. Then, as now, MEAG will purchase from other sources.

In less than five years, the 50 Georgia municipals serving a combined population of 500,000 persons moved from wholesale customers to major power suppliers -- without destroying the adequacy or reliability of the State's power supply but rather enhancing both. At a time when capital accumulation for capital expansion is alleged to be a significant problem, Georgia's municipal electric systems are making a massive infusion from sources unavailable to the company for facilities to serve their own needs. The operation is economically and technically feasible, and benefits consumers of the cities, who estimate that power bills will be 16% lower because of the arrangement.

There is no "free ride" for municipal electric systems involved in the Georgia situation. They pay for what they get. The same is true of other kinds of arrangements around the country. When municipal electric systems in southern California receive surplus power from the Pacific Northwest over the Pacific Northwest-Southwest intertie, they pay. When unit power is delivered to municipal electric utilities from private power company nuclear generating plants in New England, they pay. When power is wheeled from British Columbia to cities such as Seattle and Tacoma, they pay. When electricity sold by the Southwestern Power Administration or the Southeastern Power Administration is transmitted by private power companies to municipals and co-ops, they pay.

These transactions are no different than transactions in which private power companies engage. When private power companies obtain Federal power from the Tennessee Valley Authority as a seasonal exchange, they pay. When private power companies in New York receive power from the Power Authority of the State of New York, they pay. When private power companies in the Southwest secure capacity and

energy from Southwestern Power Administration and Southeastern Power Administration, they pay.

In the Pacific Northwest, availability to all utilities, regardless of ownership, of the extra-high voltage transmission grid owned and operated by the Bonneville Power Administration allows coordinated movement of power in a manner benefitting every electric system -- large or small. Economies of scale are accessible throughout the region because the arrangement stimulates planning and coordination.

Section 521 of S. 1469 would help insure that the Federal Power Act reflects the current state of bulk power supply technology and arrangements. The 1970 "National Power Survey" issued by the FPC stated both the problem and the solution in two brief paragraphs:

"Simultaneous outages of major generating plants, delays in placing new generation in service on schedule, fuel shortages, and unforeseen power demands have jeopardized or degraded bulk power supply in some sections of the country. Overall system stability must be protected at all times in spite of these difficulties, so there is need to provide large blocks of economic and reliable generation, and to provide transmission networks capable of transferring large amounts of power from one area to another.

"The electric utility industry can achieve full coordination, without altering its pluralistic character, by coordinating the planning, construction, and operating activities of all utility groups in areas with loads of sufficient size to realize all the potential benefits of modern technology for assuring adequacy and economy of power supply. Certainly, from both the resource conservation and economy of service viewpoints, coordination among all of the utilities within the respective regions should be a major objective."

It should be noted that the problems faced by smaller power systems affect all ownership segments in the electric utility industry -- public, cooperative, and private. Attached to this statement is a table included in the 1970 "National Power Survey" published by the FPC and showing a breakdown of systems by ownership and size. "Many of the small systems supply only a portion of their total power requirements with a large number of the systems operating solely as distribution companies," the Federal Energy Administration reported in a 1976 study. "Nearly 70 percent of the electric power systems in the United States operate in this fashion. These include approximately 93 percent of the cooperatives, 65 percent of the non-Federal systems, and 29 percent of the investor-owned systems."

Rising energy rates to consumers make it desirable to cut utility costs where possible. Local public power systems are seeking to achieve this goal, and FPC authority to order transmission services would help. The Senate Commerce Committee explained one reason why in its report of September 30, 1977 on S. 3311:

"A phenomenon of recent years is the skyrocketing cost and increased time to construct bulk electric power generating facilities. Naturally, generating utilities would prefer to serve their retail consumers in advance of their wholesale customers during periods of possible power shortage. Consequently, distributing utilities in many parts of the country who must purchase wholesale power are finding it increasingly difficult to obtain bulk power supplies. Often an alternative bulk power supplier can be located, but the prospective bulk power purchaser is not physically interconnected with the prospective bulk power supplier. In these circumstances, it is necessary to purchase 'wheeling' (transmission) services from the electric utility or utilities that are located between the potential supplier and purchaser and through which power would have to be transmitted to physically connect the potential supplier and purchaser. Some intervening utilities are unwilling to provide this wheeling service, and the FPC is without authority to order wheeling. Some small distributing utilities have been unable to receive new supplies of power because of the denial of such wheeling service, and have been forced to sell their systems to large generating utilities, many of which have denied the wheeling in the first place. The national trend is toward consolidation of utility systems, particularly the acquisition by investor owned utilities of small publicly owned systems through what sometimes amounts to a forced sale. It should be noted that these small distributing utilities have resource against this practice in the courts, through allegations of antitrust violation. However, this type of litigation is frequently lengthy and expensive.

"Section 201 of this bill would amend the Federal Power Act to give authority to the FPC, where necessary or appropriate in the public interest, to order utilities to provide wheeling and other transmission services, or enter into pooling or coordination arrangements. Utilities providing these services would be compensated under the long-standing 'just and reasonable' standard applicable to FPC regulation. The FPC could still not require a utility to enlarge its transmission facilities, nor to sell or exchange energy if to do so would impair the utility's ability to adequately serve its own customers."

In addition to the long range joint planning, construction, and operation programs such as are underway in New England and Georgia, smaller systems may find it desirable to contract separately for emergency resources, coordination of maintenance, economy or diversity interchanges, and short-term capacity sales. These are standard types of transactions among utilities.

Availability of both long and short term opportunities are necessary to allow smaller systems to secure optimum bulk power supply arrangements. Although progress has been made in many regions in recent years in assuring better coordination and pooling of all utilities, there are still cases of smaller systems being denied access

to transmission and coordination where there is no economic or technical justification for such action. Anticompetitive motivation should not be allowed to decide the issue. Basic fairness means that all utilities have an equitable chance to take part in activities necessary for economic survival. Expansion of the FPC's authority would supply an impartial forum to resolve conflicts about the issues.

There are about 675 local public power systems in the United States with generating capacity. Of the total number of systems with generation, 500 have diesel engine sets and 172 have steam plants -- many of which are in small units. While the thermal efficiency of these machines may be high, the economics of today's power production technology work against them.

The price of natural gas burned in diesel sets or steam plants has escalated severely in the past few years, and curtailments of interruptible service have increased year by year. National policy is currently directed at phasing out natural gas as a utility fuel. The alternate fuel for natural gas is oil. But the price of oil has also risen rapidly since the Arab oil embargo of 1973.

Thus, the two conventional fuels for much small scale generation -- natural gas and oil -- are high priced and of questionable availability. Technologies which would provide "more power for the price" by using these two fuels more efficiently, such as the fuel cell or waste heat recovery systems, are not yet commercially accessible to utilities, although significant R&D work is underway.

Diesel engines cannot now use coal, and small steam generation is a victim of scale when it uses this fuel. The latter fact is demonstrated by studies carried out for the Missouri Basin Systems Group, a regional planning and pooling organization operated on behalf of 110 consumer-owned electric utilities in a six-state area. MBSG is supporting construction of three 500,000 kilowatt units at a plant in Wyoming designed to serve regional needs in the most economic manner. Why is this regional approach to power supply cheaper? Because it permits the construction of larger, more efficient units. MBSG recently pointed out these examples of savings:

. One 500,000 kilowatt coal-fired unit costs approximately \$35 million less to construct than ten 50,000 kilowatt units.

. One 500,000 kilowatt unit burns 500,000 tons per year less coal than ten 50,000 kilowatt units -- and nearly 18 million tons less in a 35-year lifetime.

. Operating costs of one 500,000 kilowatt unit are nearly \$400,000 per year less for one large unit than for ten smaller ones.

. A 500,000 kilowatt unit also requires some 300 acres less land for siting purposes than the ten smaller plants.

. The 500,000 kilowatt unit would emit nearly 8,000 tons less sulfur dioxide to the atmosphere, because of its greater efficiency, than the ten smaller plants.

. Benefits of scale carry over to transmission lines. On a per unit energy basis, one 345 kv line can move nine times the energy of a 115 kv line, and at less than three times its cost.

Scale is even more important in the case of nuclear power. There are no projected new small nuclear power plants. Indeed, most planned units exceed 1,000,000 kilowatt name-plate ratings. In order to take advantage of low fuel costs currently associated with use of uranium, a large unit is required.

In other words, the two fuels which are now the least expensive or the most available -- uranium and coal -- are either unsuitable for small scale generation or provide optimum benefit in large units. Joint action permits the smaller system to overcome these facts.

There are other economic advantages to joint action in providing bulk power supply for local public power systems. It allows a smaller utility to avoid putting all of its eggs in one basket. Joint action permits an individual system to, in effect, spread its risk by buying pieces of plants constructed over a period of years geared to load growth rather than sinking its money in a single shot investment in plant for its own use over a long period of time. Joint action encourages power pooling with its opportunities for economy exchanges and emergency support. It may help minimize siting and water use problems by decreasing the number of separate regulatory actions required. Joint action through a recognized entity representing the interests of a number of smaller systems may result in improved bond ratings and easier access to financing.

Federal power marketing agencies today supply about 33% of the total kilowatt-hour sales by local public power systems to ultimate consumers. But in a number of instances, Federal power marketing agencies have indicated that they will no longer be able to meet the increasing power requirements of these systems. Publicly-owned utilities must explore other options and, again, joint action is frequently the most promising line to pursue.

Another development which supports the move toward joint action by local public power systems is the general recognition by students of government of the need to apply area-wide solutions to many municipal problems for the purpose of increasing efficiency in the delivery of services. This trend toward regional answers is evident in a variety of local governmental functions including transportation, pollution control, water supply, and sewage disposal. In the area of electricity, the Council of State Governments pointed out 10 years ago that:

"There are tremendous present and future economies to be derived from large scale electric operations and the pooling of generation and transmission resources. Increasingly, municipalities which own and operate their own electric systems will find it necessary to join with others in construction and operation of facilities at some distance from the municipal borders, and to effect interconnections at points located outside the municipal boundaries."

* * *

"The states have a vital interest in facilitating the legal arrangements which will permit the various electric systems to take maximum advantage of the opportunities offered by the current generating and transmission technologies. Lower energy costs can mean lower prices generally to the consumers of a state. Moreover, such lower energy costs can have a vital bearing on the relative attractiveness of the states to industry."

Following the suggestion of the Council, a number of states have enacted enabling laws which permit joint action by municipalities and their publicly-owned electric systems in the field of power supply. Recent examples include Colorado, Connecticut, Georgia, Kansas, Massachusetts, Michigan, Minnesota, North Carolina, North Dakota, Texas, Utah, Vermont and Wyoming.

The private sector of the electric utility industry is also expanding its involvement in joint action generation solutions. Last year the trade publication Electrical World reported that the trend toward joint ownership of large generating

facilities is strengthening and is expected to expand sharply in future plant additions. Attached to this statement is the magazine's 1977 listing of such projects headed: "Participation in joint generating units stays high; 80 scheduled".

FPC already has the authority, on complaint, to order interconnections under certain conditions for the purpose of selling or exchanging energy. Making explicit power to require transmission and coordination services as specified in Section 521 of S. 1469 would seem a very logical extension of the Federal Power Act in light of current conditions.

Control of transmission can give a utility a make-or-break grip over another utility which seeks support or access to other suppliers. By setting arbitrary conditions or unreasonable prices, the utility controlling transmission can make impossible conclusion of agreements which may be of substantial advantage to a smaller system and to the public. Transmission control can be employed to "kill or cripple a competing utility. FPC responsibility to initiate action to solve these problems and to assure fair answers is needed. Utilities are granted special powers by government to condemn land for transmission rights-of-way and use public thoroughfares to move electricity; it would seem that the public has a clear interest in insuring that these powers are not used to promote monopolistic practices.

Here are some examples of problems which local public power systems have experienced:

. This year the Kansas legislature passed and Governor Bennett signed into law a bill allowing 63 Kansas municipal electric generating utilities to form "municipal energy agencies" with unified financing authority. The statute is the product of a five-year legislative effort, and was enacted in the face of the continuing opposition of the State's six private power companies. Putting together power supply programs under this law will involve construction of major plants with power moved to delivery points of participants via a transmission grid. Today that grid is controlled in many parts of the State by the same private power companies which opposed the Kansas legislation. Only one of the six companies will wheel power for the Kansas municipals, and then only within its service area, even

though they would be fully compensated. If transmission service is not available, duplicate facilities would be required with resultant higher economic and environmental costs.

. The Northern California Municipal Power Agency made arrangements to secure co-generation power from the Georgia-Pacific lumber company. However, the private company over whose lines the power must flow to individual municipalities refused to move the power. Yet the feasibility of such arrangements is graphically demonstrated by the experience of the Eugene, Oregon, Water and Electric Board. EWEB financed a 51.2 mw turbine utilizing steam generated for paperboard manufacture by the Weyerhaeuser timber company. The estimated 240-million kwh annual output is sold to California municipal electric utilities in Burbank, Glendale, and Pasadena delivered over the Pacific Northwest-Southwest Intertie. The contracts enable Eugene to recall the power after 1983 if needed by its system.

. Cleveland, Ohio, and other members of the AMP-Ohio municipal electric group were unable to receive any assurance of wheeling for an allocation of hydroelectric power from the Power Authority of the State of New York marketed in accord with Federal law. On the other hand, consumer-owned systems in Vermont and Pennsylvania are able to receive such power due to workable arrangements with private utilities. Because the power could not be secured in Ohio, it was available to private power companies in New York.

There is need for a Federal forum where these kinds of issues can be aired, facts analyzed, decisions made, and action enforced. Smaller systems lack leverage in obtaining answers now. The multi-state character of the electric utility generation and transmission network prevents individual states from dealing effectively with the problem.

APPA supports the expansion of Federal Power Commission authority to permit the Commission to order an electric utility to provide pooling, wheeling, and coordinating services to another electric utility or a co-generator subject to the conditions that (a) hearings are held prior to issuance of an order, (b) the action is

determined to be in the public interest, (c) costs are apportioned between the utilities and reasonable reimbursement is provided the parties, (d) enlargement of existing generating facilities is not required, and (e) provision of the services would not impair the ability to serve the electric utility's customers.

Several versions of legislation to achieve these purposes are available to the Subcommittee. One is the language approved by the Senate Commerce Committee last year; it is attached. Another is Section 541 of H.R. 8444 passed by the House of Representatives. A third is Section 521 of S. 1469. And a fourth is a draft proposal transmitted to us by the Chairman's letter of September 15. APPA would be pleased to work with your Subcommittee in perfecting the language of any of these proposals.

With respect to the new draft proposal, it should be noted that:

1. While the title includes the word "wheeling", the term is found nowhere else. Wheeling should be specifically mentioned.

2. Transmission, pooling, and coordination arrangements are not explicitly covered. They should be included, as they are in H.R. 8444 and S. 1469.

3. Several new tests are imposed before an interconnection can be ordered. Unlike the existing findings which the Commission must make before ordering an interconnection, these standards have not been used previously by the Commission and have not been interpreted by the courts. Protections contained in H.R. 8444 and S. 1469 deal with the same questions and reinforce existing law.

Fossil-F Nuclear-N																
Commercial operation date	F	F	F	F	F	N	N	F	F	N	N	N	N	N	N	F
Total net capability, Mw	1978	1981	1984	1982	1985	1979	1982	1977	1980	1977	1983	1985	1981	1983	1986	1981
	500	600	600	600	600	840	856	825	825	906	906	906	1,205	1,205	1,200	440
Cincinnati G&E	320	306	306	306	306	336										
Dayton P&L	180	294	294	294	294	265										
Columbus & So Ohio						239										
Duquesne Light							117	66	113		124	124	166	166	164	
Ohio Edison							359	380	346		190	190	252	252	252	
Cleveland Elec Illum							210	236	202	430	222	222	295	295	294	
Toledo Edison							170	143	164	476	190	180	240	240	239	
Pennsylvania Power											190	190	252	252	251	
Montana-Dakota Util																88
Otter Tail Power																154
Northwestern PS																66
Minnkota Pwr Coop																132

Fossil-F Nuclear-N																
Commercial operation date	N	N	F	F	F	F	F	F	F	F	F	N	N	N	F	F
Total net capability, Mw	1980	1982	1979	1980	1978	1983	1984	1978	1977	1979	1983	1984	1983	1985	1980	1981
	1,250	1,250	550	550	528	250	250	330	500	500	1,240	1,240	1,288	1,260	700	700
Houston L&P		388														
Central P&L		312														
San Antonio, Tex		350														
Austin, Tex		200	200	275	275											
Lower Colo River Auth				275	275											
Southwestern Elec Pwr					264											
Arkansas Elec Coop					264											
Nevada Power						188	188									
St. George, Utah						62	62									
Black Hills P&L								132								
PS of Colorado								116								
Idaho Power									82	335	335	124	124	258	315	70
Pacific P&L											165	165				70
Portland GE											124		386	693	140	140
Puget Sound P&L											62		515	252	175	175
Wash Water Pwr											62		129		105	105
Wash PPSS											868	1,116				
Montana Power															210	210

*includes 189 Mw reserved for future

Fossil-F Nuclear-N																
Commercial operation date	F	F	F	F	N	N	F	N	N	F	F	F	F	F	N	N
Total net capability, Mw	1980	1980	1978	1979	1982	1984	1979	1981	1983	1978	1977	1978	1979	1983	1980	1982
	500	500	380	380	1,270	1,270	500	1,100	1,100	750	750	750	750	750	1,150	1,150
Basin Elec Pwr Coop	212	212														
4 municipals	168	168														
Tri-State G&T Assn	120	120	86	86												
Platte River Pwr Auth			74	74												
Colo-Ute Electric			110	110												
Salt River Project			110	110	357	357										
PS of New Mexico					127	127	240									
Tucson G&E							260									
El Paso Electric					204	204										
Arizona PS					357	357										
So Calif Edison					192	192	880	880								
San Diego G&E							220	220								
Ariz Elec Pwr Coop					33	33										
Dallas P&L										150	150	150	150	150	383	383
Texas Elec Serv										450	450	450	450	450	384	384
Texas P&L																

Participation in joint generating units stays high; 60 scheduled

	Millstone 3		Montague 1		Montague 2		Seabrook 1		Seabrook 2		Pilgrim 2		Wm Wyman 4		Oswego 6		9 Mile Point 2		Homer City 3		3 Mile Island 2		Salem 2		Hope Creek 1		Hope Creek 2		Pleasant 1		Pleasant 2	
Fossil-F																																
Nuclear-N																																
Commercial	N		N		N		N		N		N		F		F		N		F		N		N		N		N		F		F	
operation date	1982		1986		1988		1981		1983		1983		1978		1979		1982		1978		1978		1979		1984		1986		1979		1980	
Total net capability, Mw	1,150		1,150		1,150		1,150		1,150		1,160		800		850		1,100		540		905		1,115		1,067		1,067		626		626	
Mass Munic Whale Elec	37																															
United Illum	72				115		115																									
Northeast Utilities	748 ¹		863 ²		863 ²		138		138		154																					
Central Maine Pwr			35		35		59		59		34		377																			
PS of New Hampshire							838		838				18																			
Boston Edison											992		35																			
Bangor Hydro-Elec													50																			
Maine PS													20																			
New England Pwr													56																			
Vermont Electric													18																			
New Bedford G & Ed L													8																			
Newport Elec Corp.													6																			
Montauk Electric													12																			
Niagara Mohawk Pwr													646		451																	
Rochester G&E													204		154																	
Central Hudson G&E													99																			
Long Island Lighting													198																			
New York State E&G													198		320																	
Pennsylvania Elec													320																			
General Public Util																					905 ³											
Philadelphia Elec																							475									
Delmarva P&L																							83									
Atlantic City Elec													82		107		107															
Public Service E&G																							475		960		960					
Allegheny Pwr System																													626 ⁴		626 ⁴	

¹Includes 25.5% unsubscribed. ²Includes 22% unsubscribed. ³Metropolitan Ed 453 Mw, Jersey Central P&L 226 Mw, Pa. Elec Co 226 Mw.

⁴Monongahela Pwr 157 Mw, Potomac Ed 156 Mw, West Penn Pwr 313 mw.

	Ottumwa 1		Council Bluffs 3		George Neal 4		Iatan 1		LaCygne 2		Wolf Creek 1		Jeffrey
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TABLE 2.3

Number of Electric Utility Systems in the Contiguous U.S. by Size and Ownership Classifications

	Annual Sales (millions of MWh)	Investor- Owned	Public Non-Federal	Federal	REA Cooperatives	Total
<i>1962</i>						
Over 10.....		18	0	3	0	21
1-10.....		88	20	2	1	111
0.1-1.....		85	136	0	64	285
Under 0.1.....		289	1,968	0	904	3,161
Total.....		480	2,124	5	969	3,578
<i>1968</i>						
Over 10.....		35	2	3	0	40
1-10.....		100	34	2	5	141
0.1-1.....		61	234	0	150	445
Under 0.1.....		209	1,805	0	805	2,819
Total.....		405	2,075	5	960	3,445

Under subsection (f), commencement of construction of a bulk power facility is prohibited after June 30, 1978, unless the lead agency has notified the applicant that all necessary Federal approvals have been obtained.

Finally, subsection (g) provides that this section does not expand Federal review or approval authority for bulk power facilities.

CHANGES IN EXISTING LAW

In compliance with subsection (4) of rule XXIX of the Standing Rules of the Senate, changes in existing law made by the bill as reported are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, and existing law in which no change is proposed is shown in roman) :

SECTION 202 OF THE FEDERAL POWER ACT

SEC. 202. (a) For the purpose of assuring an abundant supply of electric energy throughout the United States with the greatest possible economy and with regard to the proper utilization and conservation of natural resources, *while insuring maximum competitive opportunities for the purchase and sale of electric energy at wholesale*, the Commission is empowered and directed to divide the country into regional districts for the [voluntary] interconnection and coordination of facilities for the generation, transmission, and sale of electric energy, and it may at any time thereafter, upon its own motion or upon application, make such modifications thereof as in its judgment will promote the public interest. Each such district shall embrace an area which, in the judgment of the Commission, can economically be served by such interconnected and coordinated electric facilities. It shall be the duty of the Commission to promote and encourage such interconnection and coordination within each such district and between such districts. Before establishing any such district and fixing or modifying the boundaries thereof the Commission shall give notice to the State commission of each State situated wholly or in part within such district, and shall afford each such State commission reasonable opportunity to present its views and recommendations, and shall receive and consider such views and recommendations. *Section 201 (f) shall not apply to this subsection.*

(b) Whenever the Commission, upon application of any State commission or of any person engaged in the transmission or sale of electric energy, and after notice to each State commission and public utility affected and after opportunity for hearing, finds such action necessary or appropriate in the public interest it may by order direct a public utility (if the Commission finds that no undue burden will be placed upon such public utility thereby) to establish physical connection of its transmission facilities with the facilities of one or more other persons engaged in the transmission or sale of electric energy, to sell energy to [or exchange energy with such persons], *transmit energy for, provide transmission services or wheeling for, exchange energy with, or pool or coordinate with, such persons: Provided, That* the Commission shall have no authority to compel the enlargement of generating facilities for such purposes, nor to compel such public utility to sell or exchange energy when to do so would impair its

ability to render adequate service to its customers. The Commission may prescribe the terms and conditions of the arrangement to be made between the persons affected by any such order, including the apportionment of cost between them and the compensation or reimbursement reasonably due to any of them. *Section 201(f) shall not apply to this subsection.*

(c) During the continuance of any war in which the United States is engaged, or whenever the Commission determines that an emergency exists by reason of a sudden increase in the demand for electric energy, or [a] *an unanticipated shortage of electric energy or of facilities for the generation or transmission of electric energy, or of fuel or water for generating facilities, or other causes, the Commission shall have authority, either upon its own motion or upon complaint, with or without notice, hearing, or report, to require by order such temporary connections of facilities and such generation, delivery, interchange, or transmission of electric energy, including wheeling, as in its judgment will best meet the emergency and serve the public interest. The Commission shall require, in order to insure continuity of service to retail and wholesale customers in an equal and nondiscriminatory manner, each public utility to report promptly any anticipated shortage of electric energy which would affect the utility's capability of serving its wholesale customers, and may (1) require by order the utility to accommodate such shortage in a manner which affects the retail customers of the utility and the retail customers of the utility's wholesale customers in an equal and nondiscriminatory manner, with special regard for service to residential customers, and (2) require by order such connection of facilities and such generation, delivery, interchange, transmission of electric energy, pooling, wheeling, or other transmission service as in its judgment will best serve the public interest.* If the parties affected by any such order fail to agree upon the terms of any arrangement between them in carrying out such order, the Commission, after hearing held either before or after such order takes effect, may prescribe by supplemental order such terms as it finds to be just and reasonable, including the compensation or reimbursement which should be paid to or by any such party.

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STATEMENT OF GUY W. NICHOLS

on behalf of

THE EDISON ELECTRIC INSTITUTE

SECTION 521 OF S. 1469

BEFORE THE
SUBCOMMITTEE ON ENERGY CONSERVATION AND REGULATION
OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

SEPTEMBER 20, 1977

My name is Guy W. Nichols, President and Chief Executive Officer of New England Electric System.

As I sat in the back of the room this morning I was reminded that your Committee is considering the expansion of a specific Federal bureaucracy giving it powers to order interconnection. These mandatory interconnections are being justified in large part by the need to improve reliability. Last week, Mr. William McCollum testified on behalf of the National Electric Reliability Council, an organization of all major government-owned and investor-owned utilities. He told you of five major problems as regards maintaining reliable service. They are:

1. Overlapping and conflicting governmental regulations impeding the siting and the timely completion of new generation and transmission facilities,
2. Conflicts that exist between environmental goals and energy requirements,
3. Lack of timely and adequate rate relief adversely affecting the ability of utilities to finance construction of facilities required for the future,
4. Existing and possible future impediments which will impact on the ability to develop the necessary coal and uranium fuels to supply future planned generation facilities, and
5. Lack of stable government policies relative to the supply of electric energy.

In other words, the people most involved don't see a need for the expansion of FPC authority. Instead, they call for reduction in the layers of overlapping and conflicting existing regulation.

Prior testimony this morning has indicated the complexity of these issues. Passing legislation without a thorough understanding of this complexity and without specifically directing and limiting the power of the Federal bureaucracy to whom you might delegate powers would, I believe, be a very dangerous undertaking.

I think the discussions this morning point to the need to go very slow on new interconnection law. I would particularly recommend the Federal bureaucracy not be given the right to go into the states and pre-empt the power pooling issue.

Today's power pools are unbelievably complex undertakings. When putting such a pool together, the questions that must be considered include:

1. Will there be adequate benefits to offset the costs for the customers of each system?
2. Will the benefits and costs be shared equitably?
3. Will the arrangements proposed increase system reliability? If not, how can the costs of maintaining adequate reliability be properly allocated?
4. What new engineering and operating arrangements will be required and who will undertake these?
5. Will the arrangement result in a shifting of ultimate customer sales and usage from one utility to another?
6. Will the arrangement support long term economies of scale as opposed to subsidizing small and perhaps otherwise unjustified facilities?
7. Will any participant incur undue burden or suffer economic hardship or loss? and
8. How will the proposed pooling arrangement affect the existing contracts and responsibilities of the participants with other electric utilities?

In New England it took us over six years of dedicated effort by over a dozen major groups to achieve a working pool. The documents I have in my hand are the final agreements that came from that effort. These documents are just the tip of the iceberg.

In my company alone there are fourteen file cases filled with the paperwork of those six years of pooling effort. I am confident that if the Federal government had tried to step in and dictate the rules for this pool, three things would likely have happened:

- (1) The pool would not work as well from the viewpoint of the consumer's two principal interests--namely, reliability and cost;
- (2) The federally dictated pooling agreement would still be hung up in the courts by dissatisfied participants; or

More likely, the bureaucracy would not yet have made a decision on the final pooling agreement.

Last week I had the opportunity to testify before this Committee as regards some of the problems associated with wholesale rate regulation. At that time I displayed a chart showing the length of time the Federal bureaucracy now takes in a typical contested rate proceeding. These rate proceedings are simple compared to the complexities of a power pool. Therefore, if anyone ever wishes to speed up the development of power pools, I would suggest giving the Federal bureaucracy the authority to decide is the wrong way to go.

Turning to what seems to be the principal or key issue of this hearing--namely, interconnection--Senator Jackson has suggested that interconnection is largely an engineering question. I agree, but to determine its desirability the costs of interconnection must be weighed against the benefits that would result.

Another issue, in addition to cost, is the reluctance of utilities to embrace the Federal regulation that interconnection may entail.

To solve this problem, Senator Matsunaga suggested that if such an interconnection is ordered under this act, "It will not, for any other purposes, subject the utility to Federal control." Senator Jackson concurred.

This appears to be a good approach and I would like to suggest if you decide to give the FPC the right to order interconnections, the authorizing legislation should limit this authority to cases where the following four conditions are met:

1. There should be a finding required that there will be net benefits to each participant and that none will suffer economic loss or pirating of customers.
2. There should be a finding required that system reliability will not be impaired.
3. There should be a requirement that any participant, for whose benefit the compulsory interconnection is ordered, will pay current and future costs of the arrangement, unless it can be established that there will be cost savings to each other party, which should be equitably apportioned.

and, as recommended by Senator Matsunaga and Senator

Jackson:

4. There should be a provision that any electric utility interconnected as a result of an order under this act, that is not already subject to FPC regulation, will not thereby become subject to the act.

Thank you for the opportunity to testify and if you do decide to pass any interconnection legislation, I hope it will limit ordering authority to cases where the four provisions I have just listed have been met.

BEFORE THE SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT
OF THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

Testimony of William A. Duncan

on behalf of

Kentucky Utilities Company

on

Section 521 of S. 1469, titled

"The Public Utility Regulatory Policies Act"

September 20, 1977

My name is William A. Duncan. I am President and Chief Executive Officer of Kentucky Utilities Company. Kentucky Utilities Company is an investor-owned electric generating, transmitting and selling utility, supplying the wholesale and retail electric requirements of some 311,000 customers located in about two-thirds of the counties in Kentucky. The depreciated value of our plant in service plus construction work already in progress is in excess of \$600 Million.

I am not going to speak to you long this morning -- not because the subjects of interconnection, pooling and wheeling can be covered briefly, and not because you have already heard all about them in prior hearings. Just the reverse. I am going to speak briefly, because the general subject

is such a technical one -- and the ramifications of passage of this Section of the Bill would be so far reaching -- that I can do no more than touch a few high spots.

The organization and operation of a power pool form one of the most complex engineering and economic transactions now being carried on in American business. A typical power pool agreement, with its schedules governing half a dozen different kinds of power transactions, is about 100 pages long. From the time the several utility companies decide to organize a pool, it takes their executives, engineers, accountants and lawyers from one to six years to negotiate and prepare the basic agreement.

And, even then, the work has only begin. Even such an extensive agreement can do no more than prescribe broad guidelines for conduct of the pool. Day-to-day decisions and agreements on subordinate issues must continually be reached during the life of the pool. Continuing extremely important matters -- such as the addition of major new generating and transmission facilities -- must be negotiated and agreed upon as they arise.

When an electric utility joins a power pool, it commits the time of several of its executives and engineers, and a lot of the time of its accountants and lawyers, to the successful operation of the pool.

This Bill would transfer all of these responsibilities, functions and prerogatives of utility managements to the Federal Power Commission.

There are many reasons why this would be totally unwise.

First, no one has even attempted to demonstrate a need for such a drastic move. We already have the most highly integrated, efficient and reliable electric system in the World. Power can be transmitted from the Gulf of Mexico to the Canadian border, from the Atlantic ocean to the Rocky Mountains. There are three large interconnected systems groups covering the country: the part of the country east of the Rockies, except the Texas systems, the western part of the country west of the Rockies, and, third, the Texas interconnected system. With the exception of the Texas situation which I will not address, no proponent of this Bill has pointed out the need for any further interconnection which the Commission should order into effect.

If the engineering and economic studies which utilities are continually conducting show the desirability of additional interconnections, they will be made without any compulsion from the Commission -- just as the thousands of interconnections now existing have been made by the utilities without compulsion power FPC.

Second, the Commission simply does not have the manpower, or the familiarity with details of utility operations all over the Country, to be able to soundly order pools and transmission services into effect. Also, cooperative spirit and endeavor are absolutely essential to the success of any of these cooperative, coordinated undertakings. Pooling, wheeling and the other activities referred to in the original Bill simply cannot be effectively and efficiently compelled by the Commission.

Third, a basic fallacy in the proposals would be the extent to which they would separate the planning function of utilities, from the financing responsibility. The Commission would mandate various forms of utility conduct which might require -- and certainly would affect -- very large capital investments. But the responsibility for financing would remain with utility managements. They could well be in the position of having to finance activities which they deem uneconomical, unnecessary and unwise. It could easily develop that managements could not finance activities ordered by the Commission.

Fourth, I believe that you gentlemen have concluded generally that Washington is not the place from which utilities in Michigan, Kentucky, Arizona and Washington State should be managed and operated. I cannot overemphasize to you the extent to which these activities -- coordinations, pooling, wheeling, etc. -- encompass day-to-day decisions in the planning,

construction, management and operation of electric utilities. The Commission's takeover of these activities would shortly result in its takeover of all management functions. When that happened, and managements could no longer finance -- the next step would have to be federal subsidies. (I am told that yesterday's discussion illustrated what happens when Federal regulation takes over. The pressures mount for Federal subsidy.) The final inevitable step would be nationalization of the industry.

Fifth, the lineup on this panel demonstrates that this fight is a renewal of the fight, dormant for some years, between the privately-financed segment of the industry and the already heavily subsidized segment. A major objective of the President's overall energy program is to price electricity at its full true cost, as a means of encouraging energy conservation. One of the major true costs is the cost of capital in the free money market. Another is the taxation of income from power operations. The taking of customers service area and business from utilities whose rates reflect payment of the full costs of producing power, and turning those customers over to subsidized utilities where the customers will not pay the full costs of their power, would be contrary to the stated objectives and certainly contrary to the public interest.

We have received a draft of this Section providing only for Interconnection. If there is to be such a section, I urge that several protections be provided by way of amendment.

First, the words "and Wheeling" were inadvertently left in the title. Since provision is made only for Interconnection, the words "and Wheeling" should be deleted.

Second, where any of these types of utility cooperation and coordination are engaged in, it is only upon a basis that they produce economic or reliability benefits which can be shared in by all participants. The concept is that each participant must receive some measure of net benefit for its participation. This is a fundamental premise which should be maintained in any legislation on the subject. The principle is not to take from one group of consumers and give to another; but to create a benefit in which each group receives some share.

Third, all proponents of this legislation disclaim that it has any purpose of enabling one utility or class of utilities to private service areas, business or customers from another utility or class of utilities. That restraint on the authority to mandate actions should be expressed in the Bill. Without it, the result would be a fragmenting of the business of the integrated systems of the investor-owned utilities -- directly contrary to the objectives of efficiency, economy and reliability of utility operation. More specifically, the sufferers would be the consumers not served by a subsidized, municipally-owned system. Their resulting higher rates would further subsidize the already-subsidized public systems.

I will close my testimony with a truism which I urge the members of this Committee to recall in their deliberations.

We all agree that economy, efficiency and reliability are the objectives of electric utility operation. My truism is that these objectives will best be attained -- and, in fact will only be attained -- by experienced and informed management of each utility, acting in its best judgement, to serve the interests of its own ratepayers and stockholders. I believe this is called capitalism -- the system which has produced the electric system we have today. It is my conviction that S. 1469, as originally proposed could destroy that system.

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-7-

TESTIMONY OF MERL L. BURGIN
ON BEHALF OF THE
NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION
BEFORE THE
SENATE ENERGY & NATURAL RESOURCES SUBCOMMITTEE ON
CONSERVATION AND REGULATION
ABOUT
SECTION 521 OF S. 1469
SEPTEMBER 20, 1977

Mr. Chairman and members of the Subcommittee, my name is Merl L. Burgin. I am general manager of Cajun Electric Power Cooperative in New Roads, Louisiana. I am appearing today on behalf of the National Rural Electric Cooperative Association (NRECA) as well as Cajun Electric Power Cooperative and the Association of Louisiana Electric Cooperatives.

NRECA is a national service organization representing about 1000 rural electric cooperatives in 46 states. These cooperatives serve about 25 million consumers in 2600 of the 3100 counties in the United States. Members of NRECA provide electricity to about 75% of the land area of this nation.

Cajun Electric Power Cooperative (Cajun) is a generation and transmission cooperative whose membership consists of the thirteen distribution cooperatives in Louisiana. These distribution cooperatives provide central station electricity to about 900,000 rural citizens. Cajun currently operates one 230 mw generating unit and will have two coal fired units in operation within the next three years. During our negotiations concerning the construction of this powerplant, Cajun has experienced difficulties with investor-owned utilities which we believe should be settled pursuant to the Federal Power Act. It would, however, take an amendment like the one proposed in Section 521 of S. 1469 to allow the Federal Power Commission (FPC) or its successor agency, the Federal Energy Regulatory Commission (FERC), to work out these difficulties.

NATIONAL NEED FOR SECTION 521

Before explaining Cajun's specific situation, I would like to comment on the national need for the inclusion of Section 521 of S. 1469 in energy legislation passed by the Senate. As you know, the FPC currently regulates the rates and manner in which wholesale electric service is provided by most investor-owned utilities. The procedures through the years have come close to allowing investor-owned utilities to set rates at will and provide service in any manner they so choose. NRECA believes that a provision like Section 521 will remedy the latter problem as well as assist smaller utilities in obtaining a more adequate reliable source of electricity.

The utility industry has long recognized the value of power pools in achieving economies in bulk power supply. This has been demonstrated in the Pacific Northwest where the region gains roughly 2000 MW through pooling and a strong transmission system and in the TVA area and other regions of the country where the utilities achieve economies through interconnections and interchanges. However, there are still opportunities for saving resources and achieving greater economies through strengthening interconnections. Examples include the extra high voltage dc intertie under study between the Pacific Northwest and Phoenix, Arizona, interconnections between the Southwest and Texas, and stronger interconnections between the Pacific Northwest and the Missouri Basin.

Our members have been concerned when certain utilities have refused to allow other utilities, particularly small ones, to participate and share in the benefits of power pools. In such situations, if the small utility desires to participate in a pool, other utilities should not be allowed to prevent the small utility from joining the pool. In such circumstances, Federal authority requiring the necessary interconnections and pooling services may have to exist in order to prevent discrimination against the smaller utility.

Under current law, the FPC is generally not required to order wheeling, pooling services and interconnections; they are to be undertaken on a voluntary basis. This has worked to the detriment of many small cooperatively and municipally owned electric utilities when large utilities, by refusing to provide some of these services when they are capable of providing them, have cut off small utilities from power supplies. The net effect of refusal to provide some of these services is that cooperatives and municipally owned systems may have to go out of business and thus what competition there is in the industry is reduced. Alternatively, the utility requesting the wheeling, pooling services, or interconnection may have to build facilities duplicating already existing ones.

Section 521 provides an opportunity for systems requesting such service to have recourse to the FPC. The FPC would be required to order interconnections, wheeling and other pooling services where efficiency and necessity dictate. These orders would be applicable to all types of utilities -- municipally, cooperatively and investor-owned. They would apply only to wholesale electric service, not to any retail sales of the wholesale customer.

Opponents of Section 521 have suggested that it might put an unfair burden on utilities ordered to provide such services. We would respectfully point out that under the provisions of Section 521 before issuing such an order the FPC must in an evidentiary hearing find that issuing such an order would be in the public interest, a standard which is now used by the FPC in much of its decision-making. In the comparable section in H.R. 8444, specific findings relating to the utilities are spelled out in greater detail.

Under Section 541 of H.R. 8444, the FPC must find that:

"(A) Such order will benefit consumers of an electric utility by reducing cost of supplying electric energy to such consumers or will otherwise provide public benefits in assuring that supplies of electric energy are generally made available with greater economy and with

regard to the proper utilization and conservation of natural resources, and

(B) no utility subject to such order or consumers of such utility will suffer economic hardship thereby."

The necessity of these findings will protect the reliability and the consumers of utilities subject to orders of the FPC.

With respect to wheeling, the FPC must, under Section 541 of H.R. 8444, find that there is capacity on an existing line if it is to order wheeling, that system reliability will not be impaired and that, in the case of an interconnection, a utility requesting such an interconnection is ready, willing and able to pay for it. The costs determined by the FPC are to include both capital and operating costs.

NRECA supports such modifications of Section 521 of S. 1469 in order to spell out the conditions under which an order could be granted. We would also support definitions of terms such as "wheeling", "interconnection" and "pooling services" and will work with the Committee staff to arrive at workable definitions.

Finally, we must note that voluntary arrangements are not precluded by a provision like Section 521. In fact, it may be that this section will give incentives for companies to enter more voluntary agreements. However, the protection of Section 521 is needed in the event that such arrangements cannot be made.

CAJUN SITUATION

It was just this kind of situation -- where agreements could not be negotiated with the companies -- that Cajun found itself in. If available, we would have used remedies like those in Section 521.

In 1964, the Rural Electrification Administration approved a loan to Cajun for the construction of generation and transmission facilities. After delay caused by a lawsuit brought by the three Louisiana investor-owned

electric utility companies challenging REA's authority to make loans for generation and transmission facilities, REA agreed to advance loan money only for the generation plant. Cajun had to work out arrangements with the three investor-owned companies for transmitting the power from its plant -- essentially wheeling the power -- to its member cooperatives.

In June, 1972, the first unit of the plant began operation. However, the companies had refused to work out long-term transmission agreements so power was transmitted only on an interim basis. Eventually, one of the companies, Gulf States Utilities, did reach an agreement with Cajun. The other two, Louisiana Power and Light Company (L. P. & L.) and Central Louisiana Electric Company (CLECO), never did agree to wheel power from this unit. Instead Cajun had to buy power wholesale from those companies to serve its distribution cooperatives.

Since those companies were providing power over their lines to our customers, I do believe that they had the capacity to wheel power from our generating plant. These companies, while engaged in litigation to stop the construction of our first unit, were building new plants to serve our member cooperatives at wholesale.

Now these same companies have served notice that when existing wholesale contracts expire in 1980 and 1982, they will no longer serve our members. Thus, Cajun has to use its own generation and to supply its member cooperatives. It was only through antitrust action against the companies and a pre-licensing antitrust review for a nuclear plant they wanted to build that Cajun was able to secure arrangements for wheeling contracts for power from units scheduled to come into operation. Otherwise, I am not certain where we would be today in terms of getting those agreements from the companies.

We are still having difficulties with L. P. & L. concerning some of the terms of our wholesale power contracts respecting delivery points. However,

we are in the process of arranging for pooling services with Gulf States Utilities, an arrangement which will work to both systems' advantage.

If a provision similar to Section 521 had been in force, I believe it would have saved Cajun and its member-consumers many millions of dollars. Adoption of a provision like this is necessary to prevent other situations like ours from occurring.

Mr. Chairman, I would like to make one comment on the draft amendment which was included with the letter of invitation to testify before this subcommittee. In that draft, subsection 4 of a new Section 202(g) of the Federal Power Act states that "Compliance by any electric utility with an order issued under this subsection shall not subject such electric utility to regulation under the Federal Power Act if such electric utility is not otherwise subject to regulation under this Act."

Let us assume for the moment that an interconnection agreement was worked out between Cajun and a Texas utility which had not previously been subject to FPC jurisdiction. This would mean that while the terms of the "physical connection of the transmission facilities" would be subject to FPC approval and negotiation, rates charged for power flowing through that interconnection from the Texas utility, because it was not previously subject to FPC jurisdiction, could be set by the utility without FPC approval. This could in effect make the establishment of the interconnection a futile effort because rates charged by the Texas utility could be so high as to make the operation of the interconnection uneconomic. If you do adopt a proposal similar to the staff draft, I would urge that you drop subsection 4.

CONCLUSION

In the National Power Survey published in 1964, much attention was given to the need for better interconnections and pooling services. The report noted that improvement in these areas could be made without altering patterns

of ownership and that small systems -- like Cajun -- could achieve particular economic benefits. It was anticipated in 1964 that these benefits could be achieved by 1980. My experience tells me that they will not be achieved unless the FPC is given the authority to order such services where it is in the public interest. Adoption of a provision like Section 521 of S. 1469 is essential to the survival of small systems but even more importantly to the establishment of a nationwide transmission network for reliable electric service.

APPENDIXES

APPENDIX I

Staff Draft of Bulk Power Supply Provision

DRAFT BULK POWER SUPPLY

INTERCONNECTION AND WHEELING

SEC. —. (a) Section 202 of the Federal Power Act is amended by adding a new subsection (g) to read as follows:

"g(1) Whenever the Commission, upon application of any State Regulatory Authority or any qualifying cogenerator as defined in the Public Utility Regulatory Policy Act of 1977 or any electric utility, and after notice to each State regulatory authority, qualifying cogeneration or electric utility affected and after opportunity for hearing, finds such action necessary or appropriate to carry out the purposes of paragraphs 2(a) or 2(b) of the Public Utility Regulatory Policy Act of 1977, it may by order direct an electric utility (other than a Federal agency)—to establish physical connection of its transmission facilities with the facilities of any other electric utility or qualifying cogenerator; and to order such utility or qualifying cogenerator to sell energy to, to exchange with, and to otherwise coordinate with said parties only as necessary to effectuate the intent of the interconnection.

"(2) The terms and conditions of agreements among the parties affected by an order issued under this subsection shall be determined by negotiation among said parties subject to approval by the Commission; *Provided*, that in the event that the parties do not reach an agreement approved by the Commission, the Commission may prescribe the terms and conditions of the agreement among the parties affected by such agreement, including the apportionment of cost among them and the compensation or reimbursement reasonably due to any of them.

"(3) The Commission shall have no authority under this subsection to—

"(A) compel the enlargement of generating facilities for purposes of this subsection,

"(B) take any action that would result in an uncompensated economic loss to the electric utility or its customers, place an undue burden on such utility, unreasonably impair the reliability of the system of any utility, or impair its ability to render adequate service to its customers,

"(C) direct an electric utility to deliver, transmit, or wheel energy from any other source or supplier to, or take any other action which could result in the loss of, a retail or wholesale customer served by the utility ordered under paragraph (1) of this subsection, or

"(D) direct any action under this subsection unless there are aggregate net benefits to the parties affected taken as a whole.

"(4) Except as provided in this subsection, compliance by any electric utility with an order issued under this subsection shall not subject any electric utility to regulation under the Federal Power Act if any such electric utility is not otherwise subject to regulation under such Act.

"(5) For the purposes of this subsection the term: "electric utility" means a utility as defined in the Public Utility Regulatory Policy Act of 1977 which sells or exchanges electric energy;"

(b) (1) The first sentence of section 201(b) is amended by inserting "(other than section 202(g))" after "Part" and by adding the following at the end thereof: "The provisions of section 202(g) shall apply to the electric utilities and other persons specified therein."

(2) Section 201(e) is amended by inserting "(other than facilities subject to such jurisdiction solely by reason of section 202(g))" before the period at the end thereof.

(c) Upon the effective date of the Department of Energy Organization Act (Public Law 95-91) the authorities vested in the Federal Power Act by this section shall be transferred to and vested in the Federal Energy Regulatory Commission.

APPENDIX II

ADDITIONAL MATERIAL SUPPLIED FOR THE RECORD

R. FRANCISCO-ARNOLD

September 16, 1977; Bronxville,
New York.

Senator J. Bennett Johnston,
Chairman,
Senate Subcommittee for Energy
Conservation and Regulation,
Suite 3106, Dirksen S. Office Bld.,
Washington, D.C. 20510

Certified Mail,
No. 967623,
Return Receipt Req.

SUB: Subcommittee Hearings in the matter of;
WHEELING, POOLING & INTERCONNECTION aspects
of the Administration's Energy Program.

REF: International High Voltage Grid Plan;
constituting the OCEANA PROJECTS, North
Atlantic and North Pacific, Submarine High
Voltage Interconnections; and supplementary
to the proposed NATIONAL ELECTRICAL POWER
GRID SYSTEM, S.R.1991 of the present session.

Dear Senator Johnston:

Enclosed please find a brief data summary of the
above proposed International Electrical Power Grid concept.

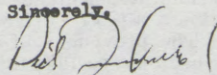
This expansive scheme has been in private development for a number of years with a host of prominent organizations; and has recently been reviewed by the Carter White House Office of Energy Policy and Planning/DOE, as well as the Vice President. Their prima facie consideration is enclosed for your own and the Committee's benefit.

Unfortunately, due to serious and extensive criminal allegations against the Energy Research and Development Administration for fraudulent handling of this proposal under the former Administration-and which is presently pending before the Justice Department-proper disclosure and presentation of this sizable effort is obstructed.

This is presently most unfortunate in view of the instant hearings in the matter of the Administration's proposals first hereinabove noted; as well as ongoing efforts by Senator Lee Metcalf and others in the development of the National Grid Plan.

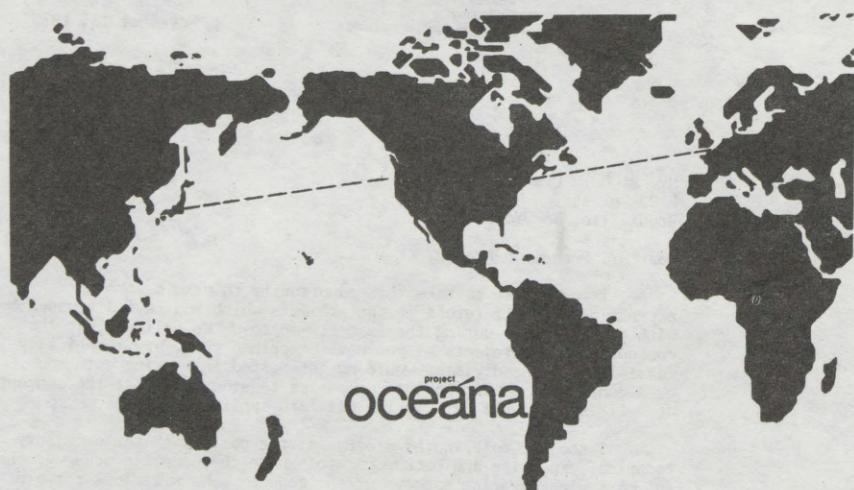
I look forward to the opportunity of formal submission of this effort to the Committee hopefully in the not too distant future. However, circumstances notwithstanding, perhaps the enclosed may be included in the September 20, 1977 hearings record.

Sincerely,



DICK FRANCISCO-ARNOLD

RFA/lb ENCL.
cc- Senators Metcalf & Jackson.
- White House Energy P&P/DOE.



Westinghouse Electric Corporation

Industry & Defense

M S Macovsky
Vice President
Defense & Electronic Systems Center



Box 1488
Annapolis Maryland 21404
(301) 765 5501

November 18, 1975

Mr. Richard Francisco-Arnold
P.O. Box 452
Bronxville, New York 10708

Dear Mr. Francisco-Arnold:

I would like to take this opportunity to make a formal expression of our interest in the projects which you have discussed with our personnel during the last few months. We believe that the concept and the projects as you have described them, are technically feasible, and our division would be interested in working with you or a consortium of appropriate companies to study and test the concept, as well as playing a part in its ultimate application.

I see our role in the program as the party with the necessary technical expertise and background to handle the complete oceanographic and marine engineering aspects of the concept. We will look forward with interest to working with you as well as others in the initial investigative studies, the design and production of prototype hardware for pilot programs, and whatever technical assistance we can lend as consultants in its commercial applications.

Sincerely,

M. S. Macovsky

August 15, 1976

Siberian linkup next Soviet power goal

Annual electric-energy production in the Soviet Union, which surpassed 1-trillion kwhr for the first time in the 1971-75 period, will reach a level of 1.38-trillion kwhr in 1980, according to the USSR's 10th five-year economic plan. Details of that plan's goals have just been released, together with statistics on present Soviet facilities.

Interconnecting the power systems of Central Asia and Siberia with the Unified Power System (UPS) that serves European USSR is one such goal. The UPS, which now includes 150 Gw of generation, will then comprise 230 Gw. The area it encompasses will jump by 54%, to 10-million sq km, with a distance of 6,000 km between the system's most remote points.

To accomplish the interconnection, super-long-distance transmission lines operating at 1,150 kv ac and ± 750 kv dc are planned.

Additional generating capacity of 70,000 Mw will be commissioned in the 1976-80 period, of which at least 15,000 Mw is to be hydroelectric power. This figure includes 6,400 Mw to be generated by the Sayano-Shushansk hydro station, biggest in the world.

In general, nuclear power stations will be built in the European part of the country, where most load is found; nuclear capacity is expected to total 15,000 Mw by the end of 1980. Conversely, fossil-fueled plants will be built farther east, where surface-mined coal is abundant. Such plants now include 500- and 800-Mw units; a 1,200-Mw unit is under construction.

One reason for this increasing scale of construction is economy. Soviet engineers estimate that doubling the capacity of a power station and its associated generators reduces capital outlays per unit of capacity by 20% and fuel

consumption by 5%. Although the average length of transmission exits increases by 50%, the cost of constructing one large station is up to 15% less than for several smaller stations of equivalent capacity.

The UPS is run by dispatchers in Moscow, aided by supervisory control. A control panel to be put into operation this year is designed to accommodate not only Central Asia and Siberia, but also the Far East, which will eventually become part of the UPS. When the system is fully operational, it will obviate the need for up to 25,000 Mw of capacity; this is expected as a consequence of the great load diversity of the USSR, which stretches across 11 different time zones.

The above article was prepared from official Soviet sources, translated by Norman Precoda, Santa Barbara, Calif

Electrical World, August 15, 1976

System Engineering 71

NOTE: The above recent article is extremely pertinent to the PROJECTS OCEANA proposals in so far as it illustrates the vast cost-benefit value of such long distance east-west interconnections. 25,000Mw at current plant capital/fuel costs range between 20 and 30 billion dollars (depending upon type & fueling), with a mean average of 25 billion. Thus, assuming a complete US National HVDC Grid and both the North Atlantic and the North Pacific installations combined capital costs of apx. 7.5 billion dollars (with a thirty year mean cable life vs. a twenty year mean plant life in the alternative), a cost-benefit factor of 4:1 exists over twenty years, and up to 6:1 over thirty years--this without consideration to the values of ecology, fuel consumption, etc.

LICENSE (Major)

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION-----
Consolidated Edison Company of }
New York }

Project No. 2338

PETITION TO INTERVENE (Part 1.8),
and MOTION TO REOPEN THE RECORD.

DATED: January 25, 1977

Petition to Intervene for the purpose of introducing a recently conceived and soon to be developed alternative installation; which is fully professionally substantiated as to practicality and feasibility, ecologically impeccable throughout and economically more advantageous to the Consolidated Edison Company's service territory. This project development has been preliminarily reviewed by the Public Service Commission of New York in mid 1976, and the Consolidated Edison Company of New York.

The attached document, a Comparative Project Analysis NA-ENY-2 of January 1976, offers a preliminary overview of the alternative development. It should be noted that this constitutes, however, only a portion of significantly larger developmental effort; and which includes, in addition to the North Atlantic installation, the institution of an HVDC transcontinental Grid System extending to the Bonneville Power Administration in the north west, and linking the Pacific Northwest-Southwest Intertie (which presently operates between Oregon and Southern California via HVDC circuitry), as well as a trans north Pacific HVDC submarine installation between the BPA and the electrical generating systems of Japan. The entire system constituting a 15 time zone, 10,000 mile installation, operating at 600 thru 750 KVDC[±] and including at least four major inversion/conversion terminals. It should be of course understood that the individual intervening system installation is entirely functionally valid unto itself, and is herewith proposed as such.

The cost estimates noted in the attached document NA-ENY-2 are somewhat dated (late 1975 estimates), and should be updated accordingly.

cont/....2

PETITION TO INTERVENE, Project No. 2338

2

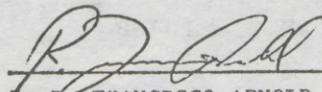
In view of the reduced immediate demand requirements for the output of the Cornwall project, it is deemed beneficial to reopen the proceedings so to allow sufficient time for formal developmental efforts with respect to this Intervention. Irrespective of the Consolidated Edison fisheries findings, in no event can the Cornwall project compete from an ecological and efficiency standpoint.

It should be noted that attached documentation is dated January 1976. This Intervention proceedings has been delayed due to certain Federal government transactions which in the coming months shall be given further vent. Intervention was intended for filing under former FPC ORDER dated January 30, 1975. However, the plan has been reviewed by the State Department and Defense Department, and has been clarified as to acceptability.

The plan has been presented in preliminary form to the appropriate agencies of the British, French and Canadian governments. While certainly more formal documents exist then those included herein, these and future documentation shall be set forth to the Commission as developments warrant.

In view of recent staff counsel recommendations, as well as the new Administrations potential policy alternatives this Intervention requests that said proceedings be reopened in full at this time; notwithstanding the lengthy nature of this case to date. Changes in requirements and technical developments should be given maximum consideration in view of the strong objections posed by the various parties to this proceeding. No doubt questionable actions should not be taken for the sake haste, particularly in view of revised requirements.

Petition dated as first herein above noted.



R. B. FRANCISCO-ARNOLD,
Intervenor.

c/o P.O. Box 452,
Bronxville, New York 10708.
Tel: (914) 961-9375

ENCL. ATTACHED:

- Document, and map
- Tables
- Exhibits

EXECUTIVE OFFICE OF THE PRESIDENT
ENERGY POLICY AND PLANNING
WASHINGTON, D.C. 20500

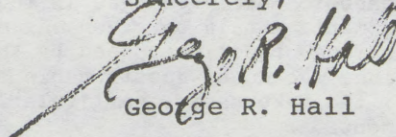
February 14, 1977

Dear Mr. Francisco-Arnold:

On behalf of Mr. Schlesinger, thank you for your letter of January 24, 1977 and the information of the OCEANA PROJECTS. I studied it with interest. However, since your letter states that you are in the process of starting legal proceedings against the Energy Research and Development Agency, it would be inappropriate for me to comment on your proposal.

I do appreciate you bringing this matter to our attention.

Sincerely,



George R. Hall

Mr. R. Francisco-Arnold
P.O. Box 452
Bronxville, N.Y. 10708

Certified Mail;
No. 967493.

RE: OCEANA PROJECTS, North Atlantic &
North Pacific--NATIONAL ELECTRICAL
POWER GRID SYSTEM installations.

Dear Mr. Vice President:

In view of your noted activities I thought the enclosed might be of interest to you. I have recently submitted the same to Mr. Schlesinger, who may or may not have appraised you of subject as yet?

These plans hold vast electrification conservation potential, and are most compatible with the 94th Congressional efforts (proposed by Senators Metcalf, Humphrey, McGovern, Mansfield, etc.) toward the creation of a National Electrical Grid. Senator Metcalf is fully appraised in the matter, though I am not certain as to the other gentlemen as yet?

This scheme has not yet been publically announced. However, the Ford Administration offered little support, notwithstanding State Department prior clarification (no doubt due to Republican election efforts at the time). The utility interests have consistently opposed the national grid on economic grounds overtly, but were most certainly opposed in fact for more partisan reasons. The combined installation, however, cannot be challenged economically; vastly improves the overall potential; and would seem to stand squarely within the current Trilateral policy initiatives... Perhaps Mr. Brezezinski would also benefit by reviewing the material in this respect.

Enclosed with the material is a copy of my recent letter to Mr. Schlesinger; for further background.

Sincerely,

Dick Francisco-Arnold

PS Form 3800, Apr. 1976

RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Form 3800)

No. 957493

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 500 North House
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 Washington, DC 20500

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DATE OF MAILING APR 11 1981

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OFFICE OF THE VICE PRESIDENT
WASHINGTON

February 16, 1977

Mr. Dick Francisco-Arnold
P.O. Box 452
Bronxville, New York 10708

Dear Mr. Francisco-Arnold:

Thank you for your recent letter.

I appreciate your sending me a copy of your report on Oceana Projects and I look forward to looking it over more carefully in the near future.

Again, thank you for taking the time to share this with me.

With best regards,

Sincerely,

A handwritten signature in dark ink, reading "Walter F. Mondale". The signature is written in a cursive, flowing style.

Walter F. Mondale



OFFICE OF THE VICE PRESIDENT
WASHINGTON

March 23, 1977

Mr. Dick Francisco-Arnold
P.O. Box 452
Bronxville, New York 10708

Dear Mr. Francisco-Arnold:

Thank you for your recent letter.

I appreciate your sending me the data on
Project Oceana. I found it very informative.

With best regards,

Sincerely,

A handwritten signature in dark ink, reading "Walter F. Mondale", is written over the typed name.

Walter F. Mondale

projects
oceaña

REFERENCE: Proposed;

(A) and (B)
PROJECT OCEANA, PROJECT OCEANA,
North Atlantic Northern Pacific

Addendum to Proposed Projects;
in the matter of
UNITED STATES CONGRESSIONAL PROPOSAL
FOR A NATIONAL ELECTRICAL POWER GRID
SYSTEM, for the purpose of intercon-
necting east-west generating facilit-
ies via high tension Direct Current in
order to obtain maximum conservation
and efficient utilisation (through the
hourly time zone and seasonal non-coin-
cident peak generating differential as
exists within the United States) of the
national electrical power resources.

Preliminary
Evaluation Series
Document No.
US-GD-S1

SUPPLIMENT TO PROJECTS ANALYSES

Dated: January 1976

ATT: R. F.-ARNOLD, OCEANA DEVELOPMENT,
Post Office Box 452, Bronxville,
NEW YORK 10708

Tel: (914) 961-9375 Cable: ALPHA, Bnxvl.

The following Supplement and Exhibits relate to United States domestic development of a National Electric Grid, and the manner in which the same relates to the proposed Projects Oceana; North Atlantic and Northern Pacific. This does not in itself constitute a proposal, but merely an analysis; and should be reviewed in conjunction with both of the said Projects Oceana proposals put forth under separate cover.

PROJECTS OCEANA

As supplementary to the Oceana Projects proposals, an important related development ongoing within the United States holds considerable potential for cooperative planning and maximum utilisation of the said transocean systems A) & B).

Efforts both inside and outside government for the establishment of a National Electrical Power Grid System between the populous eastern and western sectors of the country (and most logically between the Federally operated Bonneville Power Administration, Oregon and the eastern Tennessee Valley Authority) would mean the establishment of an INTERNATIONAL GRID SYSTEM, extending from Tokyo, Japan -via the United States- through to Paris and London.... well in excess of 10,000 miles, and 15 hrs.

With the increasing tendency to utilise ever higher electrical transmission voltages such a system becomes acceptable for load balancing in spite of the distances (since line losses are contingent upon voltage levels, and thus the major determinant of loss factor acceptability) between load centers.

Notwithstanding private interest resistance to such a national system -principally certain of the major private utilities, land holding groups as relate to transmission line rights-of-way, etc.- a study has recently been prepared by the Library of Congress at the request of certain Congressional

authorities in order to provide further study in the merits of such an installation.

In view of growing resistance to continual expansion of generating facilities which function at less than optimum load factors; especially in view of spiralling capital costs, fuel costs and environmental concerns, it is quite likely that in view of recommendations put forth in the said Grid Study, Governmental efforts shall continue in developing this plan.

Viewed in this context the overall rationale for the installation of the Oceana Systems becomes quite profound, and a full scale coordinated governmental study program into the full ramifications would appear to be quite appropriate; perhaps in concert with ongoing Congressional studies?

As an example of functional validity, it should be noted that overhead (Transcontinental) lines may function at even higher voltages than the OCEANA submarine cables. The estimated DC submarine voltages range from between 550-750Kv±, while overhead capacities may exceed 765KvAC (and 600KvDC±)... Thus, the line loss factor is to some extent compensated in overland portions for 10 hour time zone -plus- transfers.

To understand more clearly what is suggested, it is useful to note that power transfer from, for example, Tokyo through to the eastern United States -where 10 hour time zone shift means 12PM U.S. peak loads may be assisted by participating Japanese systems which are at lowest demand, being 2-3AM in the morning. (This example also of course holds for any other east/west routing within the proposed system; such as London/Paris thru the EPA system and the NW/SW Intertie to Los Angeles: 9 hours).

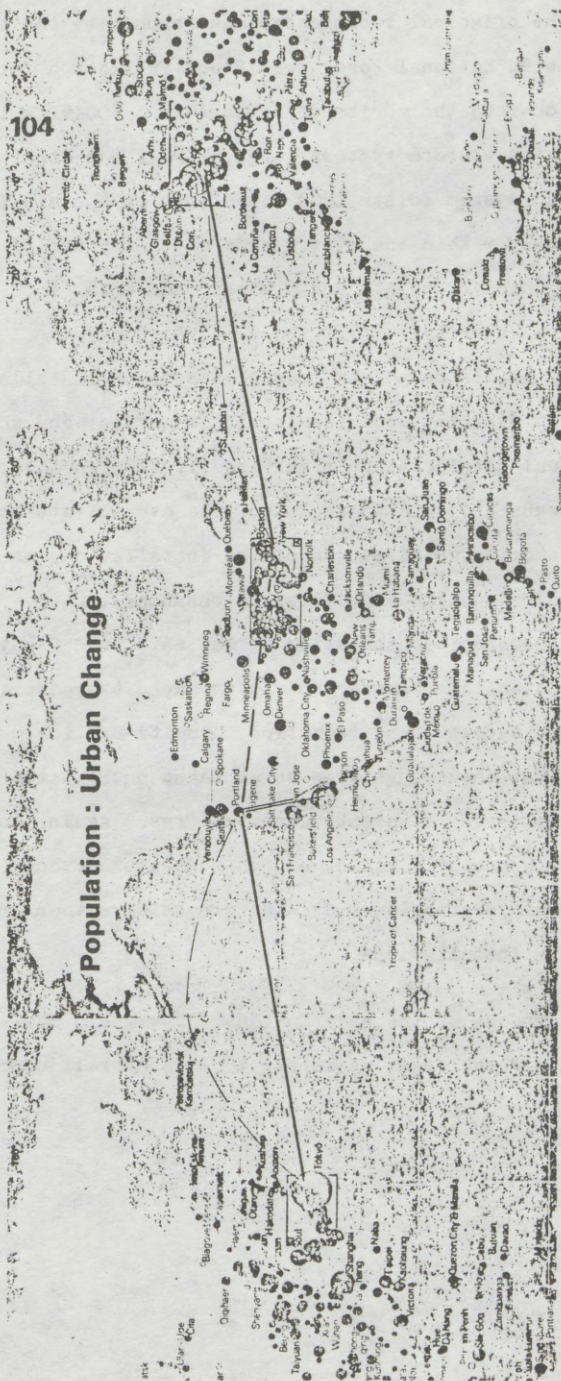
A routing as aforementioned, from Tokyo through New York for instance, would be capable of operating at an estimated 60% efficiency (which more or less parallels within acceptable range standard peaking plant efficiencies; such as turbines or pumped storage hydro, as compared with std. base load facilities).

The principal recommendations reached by the said newly completed National Power Grid Study include; a further investigation into the merits of an east-west 600KvDC± link between the far western systems (e.g., B.P.A. and other western systems) with system points 1900 miles east of the Mississippi and most likely within the system area of the States of Illinois/Indiana/Ohio, or points south within the area of the Tennessee Valley Authority.

It should be pointed out that such an installation is predicated strictly upon its intrinsic merits; and should the additional consideration regarding either/or/both of the proposed Oceana Projects be included, the overall attractiveness and economic justification of the installations as a combined whole is quite significantly enhanced...

A second recommendation of the said Grid Study points out that a potential reserve generating capacity reduction of minimum 1 - 3 percent (and resulting in multi-billion dollar plant installation savings) can be at least anticipated by such major east-west diversity opportunities. Again, this becomes more apparently valid, and on a greater savings basis, in light of an International Grid encompassing either/or/both of the Oceana installations.

Portions of the said National Power Grid System Study are hereinafter enclosed; as relate to this overall concept.



Suppliment to Projects Oceana Analyses

EXHIBITS

National Electrical Power Grid System

January 1976

94TH CONGRESS
1st Session**S. 1208**

IN THE SENATE OF THE UNITED STATES

MARCH 17 (legislative day, MARCH 12), 1975

Mr. METCALF (for himself, Mr. ABOUREZEK, Mr. HATHAWAY, Mr. HUMPHREY, Mr. MCGOVERN, Mr. MANSFIELD, and Mr. MOSS) introduced the following bill; which was read twice and referred to the Committee on Commerce

A BILL

To improve the Nation's energy resources.

- 1 *Be it enacted by the Senate and House of Representa-*
- 2 *tives of the United States of America in Congress assembled,*
- 3 **SECTION 1. SHORT TITLE.**

- 4 This Act may be cited as the "National Electrical Energy
- 5 Conservation Act of 1975".

- 6 **Title I—National Power Grid and Re-**
- 7 **gional Bulk Power Distribution**

- 8 **SEC. 101. DEFINITIONS.**

- 9 For purposes of this Act:

- 10 (1) The term "National Grid" means the National
- 11 Power Grid Corporation, established by section 102.

II

94th Congress }
2d Session }

COMMITTEE PRINT

FROM
SENATOR
LEE METCALF
MONTANA

NATIONAL POWER GRID SYSTEM STUDY—
AN OVERVIEW OF ECONOMICS, REGULA-
TORY, AND ENGINEERING ASPECTS

A STUDY

PREPARED BY THE

CONGRESSIONAL RESEARCH SERVICE

AT THE REQUEST OF

LEE METCALF, *Chairman*

SUBCOMMITTEE ON MINERALS, MATERIALS
AND FUELS

OF THE

COMMITTEE ON INTERIOR AND
INSULAR AFFAIRS
UNITED STATES SENATE



Printed for the use of the
Committee on Interior and Insular Affairs

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1976

67-740 O

NATIONAL POWER GRID SYSTEM STUDY

An Overview of Economics,
Regulatory, and Engineering Aspects

for



The Library of Congress
Congressional Research Service

THIS DOCUMENT IS A
SUMMARY OF PARTS OF THE
ORIGINAL DOCUMENT; AND
WHICH EXCLUDES ORIGINAL
DATA NOT RELEVANT TO
THIS EVALUATION.



November 1975



SUMMARY

The idea of a national power grid system evokes a spectrum of notions as to its form, development, ownership, and regulation. Policy and action alternatives are wide-ranging: "Do nothing, the electric utility industry is doing fine" . . . "encourage development of stronger electric transmission networks generally within the present industry structure but with only a minimum of regulatory and institutional changes to overcome frustrations currently facing electric utilities" . . . "develop regional regulatory and operating agencies to plan, construct, and operate the nation's bulk power transmission systems" . . . "develop a Federal agency to plan, construct, and operate the nation's bulk power transmission systems."

It is within this framework of alternatives that this study examines the technical, economic, and environmental aspects of a national grid. It presents some findings and raises many issues needing further study before a national power grid policy can be developed. This is not a feasibility study, but an overview pointing the way to further examination of this important aspect of the national energy supply program.

There are now three separate power transmission networks that, together, serve essentially all of contiguous United States and parts of Canada and Mexico. One serves approximately the eastern half of the country, another serves Texas, and the third the western half of the country. There are no present plans to interconnect any of these networks, although various forms of interconnections have been studied.

Modern electric power transmission networks in the United States are both regional and partly national in scope. They have evolved from increasing numbers of interconnections among individual electric utilities and groups of utilities. Federal, investor-owned, publicly owned, and cooperatively owned utilities all derive economic and operating benefits from interconnected operation; however, many utilities, mostly smaller ones, still do not participate in these benefits.

The regional and multistate nature of electric transmission systems is a fundamental factor dominating national power grid considerations. We find, therefore, that if anything more than the "do nothing" alternative is undertaken, regulatory agencies and transmission-operating entities should be structured to provide multistate jurisdiction. There are significant regional differences influencing electric power

system characteristics that must be respected in operating and regulating any form of a national grid system.

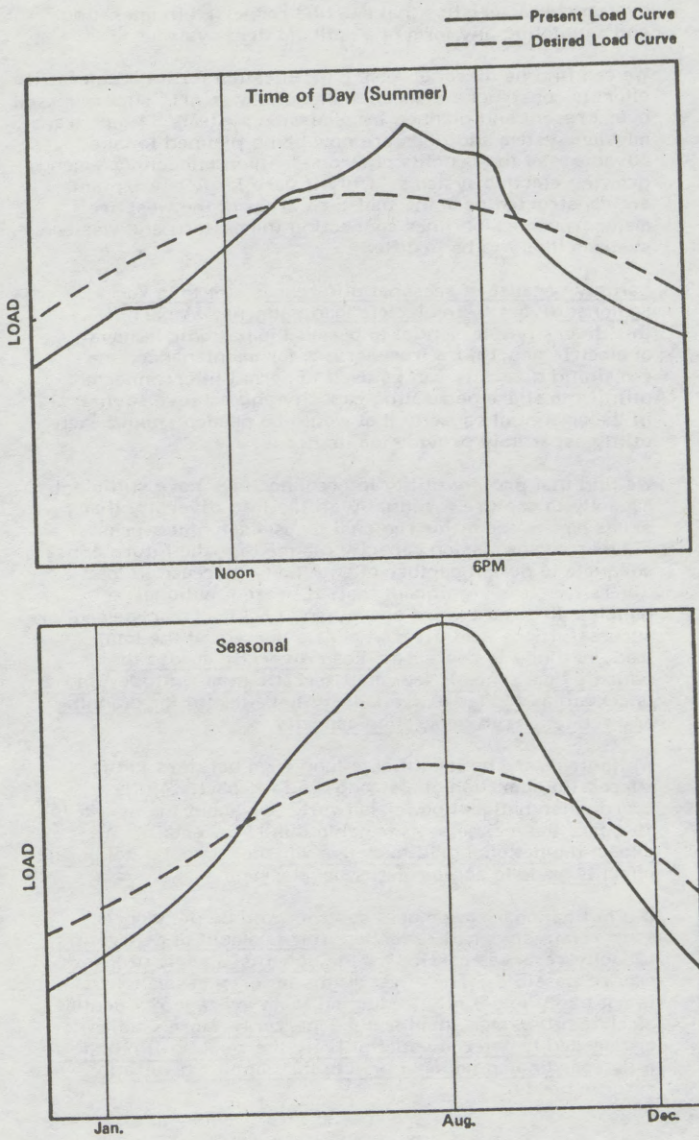
We can find no direct economic justification for an accelerated effort to construct a discrete national power grid superimposed over present and planned transmission systems. Major transmission system additions are now being planned to take advantage of the benefits of stronger interconnections among growing electric systems. Only if very large powerplants are constructed near the coal-rich areas of the west are major transmission lines connecting the eastern and western systems likely to be justified.

Largely because of seasonal differences, there is some regional diversity in electric load patterns. A part of this diversity is essential to permit the periodic removal of electric generators from service for maintenance; the remaining diversity can be used to permit interconnected utilities to share generating capacity and achieve savings in the amount of capacity that would be needed should each utility separately provide for its needs.

We find that present utility interconnections have sufficient capacity to capture essentially all the load diversity that exists among the major regional transmission networks. Further, transmission capacity planned for the future appears adequate to permit capture of any likely increase in load diversity. It is significant that, if present national policies directed toward energy and peakload management are successful, the load diversity, as a percent of the total load, is likely to decrease. Load diversity across the nation's time zones is too small, erratic in magnitude, and uncertain as to time of availability to be useful for planning any reductions in generation capacity.

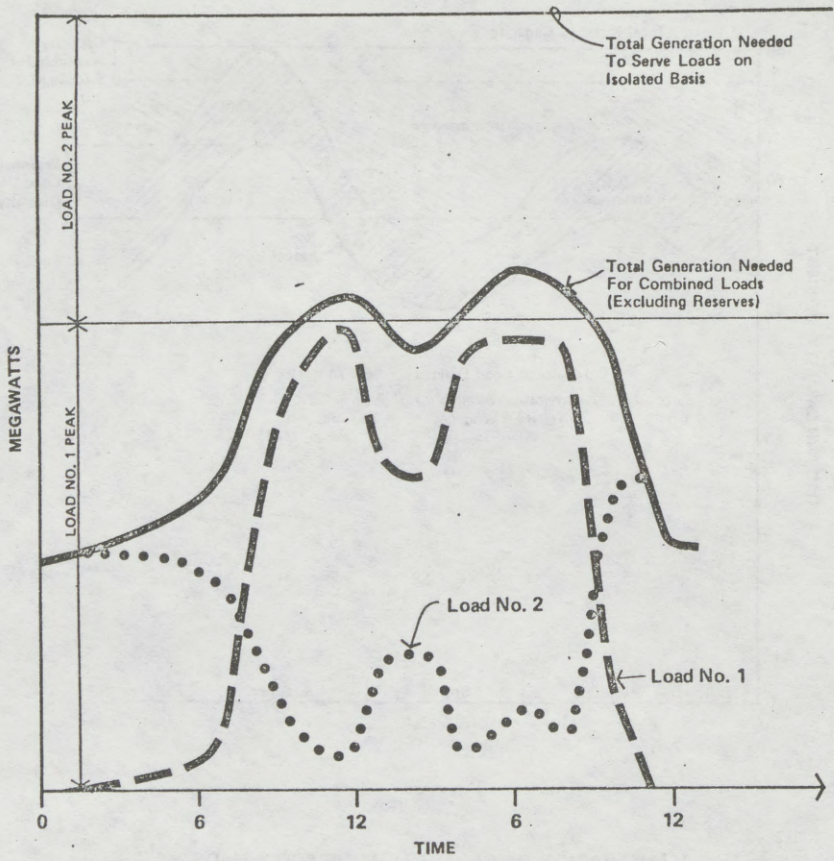
While there are no identifiable long term barriers to the successful operation of a strong, high-capacity, fully coordinated national power network, for about the next 5 to 10 years the technology to enable this is uncertain. We expect the national grid to evolve whether or not a deliberate effort is made to accelerate its development.

If a full national power grid system could be developed, some relatively small reduction in the amount of generating capacity reserves carried by the nation's electric utilities may be possible. The effect of this lowered reserve level is not likely to permit a reduction in an average residential electric bill of more than about 3 percent. More studies are needed to determine definitively the relationship of a fully coordinated national grid to the nation's generation reserve needs.



EXAMPLE OF THE OBJECTIVE
OF PEAKLOAD MANAGEMENT

Figure 3 - 18



A SIMPLE ILLUSTRATION USING LOAD DIVERSITY BY BALANCING LOADS
WITH OPPOSING SHAPES OVER TIME

Figure 3 - 3

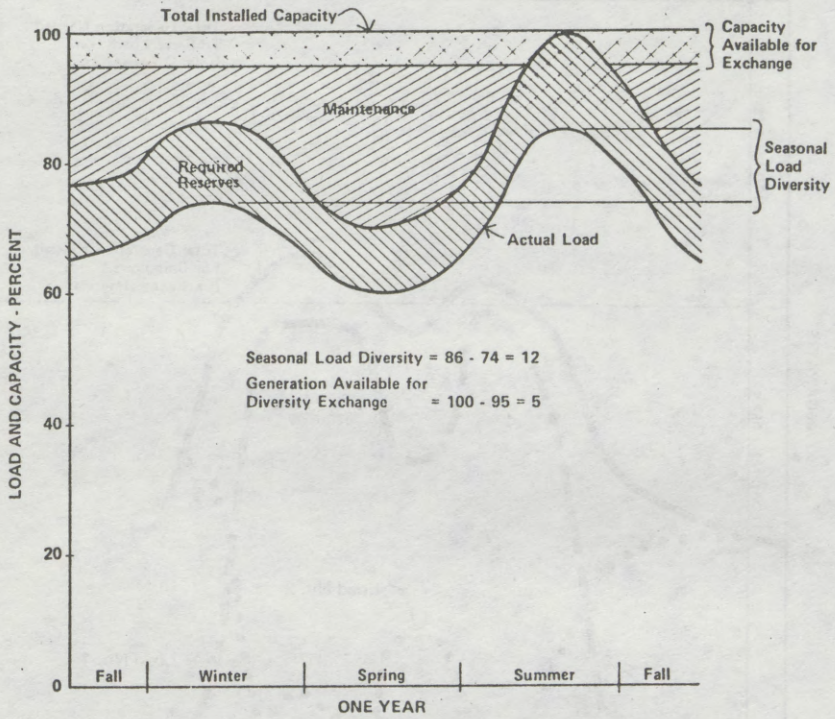


ILLUSTRATION OF GENERATION CAPACITY MADE
AVAILABLE BY SEASONAL LOAD DIVERSITY

Figure 3 - 4

Pumped storage

Pumped-storage hydro facilities are analogous to huge storage batteries, in that they provide a system into which surplus off-peak energy from base-loaded steam electric plants can be stored for later use as valuable peaking capacity. Pumped-storage peaking units have a number of advantages over their thermal counterparts. These include:

KEY POINT:

THAT WHICH IS THE CASE FOR A PUMPED STORAGE SYSTEM ALSO IS EXACTLY THE CASE FOR AN INTER-CONNECTED

1.0.0.1 BASE LOAD FUELING OFF PEAK ADDS LITTLE OR NOTHING TO STD. USE COST AND FUELING OF UNITS.

- When operating partially loaded, pumped-hydro units can be credited as system operating reserve and are available almost instantaneously to supply additional power to meet system requirements.

- Pumped-hydro units can be used for peak shaving to prevent loading combustion turbines, which have significantly higher operating costs.

- By creating off-peak energy demand, hydro-pumped-storage units operating in the pumping mode allow thermal stations to run continuously at very efficient load levels, which normally results in little, if any, increase in fuel consumption on a system. In many cases, pumped hydro can bring about actual savings.

- If an emergency develops on a system while the hydro units are in the pumping mode, this load can be shed quickly, and, if necessary, the hydro units can be brought back on the line in the generating mode to help meet system demand.

- As with conventional hydro units, pumped-storage facilities have a much lower forced-outage rate than do steam-generating units. A specific example: The average availability at the Ludington Pumped Storage Project (six 312-Mw units) has been 95% since it went into commercial service in 1973.

- Because pumped-storage reservoirs are relatively small, construction costs are generally low compared with conventional hydro facilities.

In many cases, the capacities of existing conventional hydroelectric facilities with reasonably high heads and adequate storage can be increased substantially by constructing lower-pool afterlays and by installing some reversible

pump/turbines. This type of combined development usually has some advantages in flexibility of operation because of the larger upper reservoirs that are normally available. Where several hydro plants already exist in series on a river, the present ponds may be adequate for this purpose.

Existing reservoirs and lakes may also often be used as the lower pools with upper ponds, constructed in suitable higher topography to create new pumped-storage facilities.

Fig 3 shows pumped-storage plants that were planned, in operation, or under development in February 1975.

A strong trend toward underground pumped storage has been developing over the past 20 years, influenced by the deep submergence requirements of high-head reversible pump/turbines and by improved excavation methods and construction techniques. Underground hydro storage should be considered where the construction of two open reservoirs is not topographically feasible and particularly where there is ongoing or previous underground construction.

Those areas of the country that are particularly suited for deep underground caverns is shown in Fig 4.

A conceptual layout of a pumped-storage plant using an underground cavern for the lower pool is presented in Fig 5. Where heads higher than those presently practical for reversible machinery (about 2,500 ft) are available, consideration could be given to building intermediate-level reservoir and powerhouse caverns. Otherwise, separate pumps and turbines may be required. Intensive R&D on multi-stage Francis turbines and reversible pump/turbines might also resolve this problem.

Consideration is also being given to storing compressed air in underground caverns for use with compression/combustion (gas-turbine) equipment. This concept (EW, June 15, 1975, p 46)

has fuel-saving advantages similar to hydro pumped storage in that the air to be used in peaking turbines is compressed in off-peak hours by base-loaded steam-generating units, and compression with high-cost fuel is thus avoided.

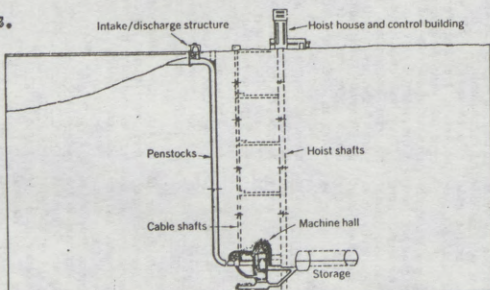
Another interesting concept would combine compressed-air and underground pumped-hydro storage techniques. During the off-peak hydro-pumping and air-compression cycle, the storage cavern is filled with compressed air, while the water is being evacuated and pumped to the upper reservoir. During the generating mode, water spins the hydro turbines as it flows by gravity back into the lower cavern. At the same time, the compressed air is evacuated to serve its own generating machinery.

Economic considerations

Capital costs vary widely among hydroelectric projects; consequently, average dollar figures per kilowatt are not ordinarily stated for hydro as they are for certain categories of thermal plants. Financial data are, of course, available on a plant-by-plant basis. Generally speaking, however, when comparing the capital costs of hydroelectric and steam plants, the former will include a larger percent of construction labor, and future cost escalations are expected to be somewhat higher for labor than for materials. On the other hand, inflation, which is expected to continue at a rate of 7% per annum (or more) over the lifetime of all types of generating facilities, will impact approximately the same on the construction costs of all types of plants—fossil, nuclear, or hydro.

Increases in operating, maintenance, and fossil-fuel costs are particularly significant when a utility must consider its future generating capacities, and, although hydro may not have been considered competitive a few years ago, a reexamination of these variable costs may now lead to some new and different conclusions.

Any analysis of the annual costs of a typical large hydroelectric facility will show the most important component to be fixed charges; return on equity, interest on capital, depreciation, federal and state income taxes, ad valorem taxes, and insurance. All of these are a direct function of the initial capital costs; therefore, they do not vary during the life of a plant because they are not subject to inflation. Moreover, the only variable costs (operating and maintenance) for a large modern hydro plant—one with remote control and/or automation of the entire station—are less than 2% of the total costs. Therefore, hydro plants produce electricity at costs that are almost inflation free.



Schematic (Fig 5) of a high-head pumped-hydro facility with underground storage

National Power Grid Debated

By EDWARD COWAN

WASHINGTON — As Vice President Spiro T. Agnew's man of the hour, the Power Commission, the lawmakers must know more about the need for, costs of, benefits and timing of a national system of power. Then, he says, Congress can decide what government should do and where it should draw the line.

Whether it was Mr. Pinchot, the great conservationist, or someone else who thought of shifting electricity from power-surplus to power-short regions, the idea has been bruited about Washington on and off for decades.

With the electric utility industry now crying that the country will face an acute shortage of power in the nineteen-eighties unless rates are raised, the idea of a new generating capacity is said that the time for a national power grid has arrived—or soon will.

So, anyway, argues Mr. Reiner, it is time for the Senate government operations committee on reports, management and accounting—and the subcommittee chairman, Senator Lee Metcalf, Richard Ottinger of New York, and several other liberal Democrats who are co-sponsors of the National Electrical Conservation Act.

The bill would vest authority in a National Power Grid Corporation and in regional corporations to issue Govern-

ment-backed bonds and even to borrow up to \$750-million directly from the Treasury. Some power plus authority to build, acquire and operate generating and transmission facilities, plus a broad planning mandate, add up in the minds of the private utilities to the wedge of nationalization.

To be sure, this bill will not reach President Ford's desk this year, perhaps not even during the two-year life of the present Congress.

The private utilities oppose it, some passionately. Regional public power systems, the Booneville Power Administration, for one, fear it. Those who are not so sure to be worked out as was made embarrassingly plain at a halting joint news conference held by Senator Metcalf and Mr. Ottinger, in which they bickered minutely with some essential details of the bill.

Even such advocates of a national power grid as Alex G. Radin, general manager of the Western Public Power Association, acknowledge that "more studies are needed" to determine the potential for "wheeling" surplus power between regions.

However, this is essential to "wheeling" surplus power. That power can be traded back and forth between regions as peak demands surge and ebb—that is likely to attract fresh investment in the grid, says Senator Metcalf and Mr.

Ottinger argue that a grid is an idea whose time has come because they see it as a way to provide more power at less cost. That is, they say that exploiting regional and local resources in weak demand areas can significantly reduce the need for new generating capacity.

Congress is worried about electricity costs which have risen since 1974, and in all the preceding 25 years and are still climbing. State public service commissions are trapped in a crossfire of the public's anger at higher rates on the one hand, and the industry's plea for higher rates on the other.

Frank G. Zarb, Federal Energy Administrator, expresses fear that electric power shortages in the early nineteen-eighties will lead to a rapid expansion of industry and jobs, choking American economic growth because of an energy shortage for the first time in the nation's history.

ment voiced populist suspicion in earlier Congressional sessions. "The excess profits sought by utilities to please the financial institutions which are major purchasers of utility preferred and common stocks would no longer be justified," he says. Congress should decide what government should do and where it should draw the line.

As to the fear that a grid would represent the thin wedge that has split the two camps, the bill intended "only to complete the system" by creating incentives and filling gaps in generating capacity, he argued. Indeed, he said, by giving "breathing space" to the industry, the bill would "avoid nationalization."

Chairman Nassikas of the Power Commission depicted an earlier version of the bill as "a kind of 'blueprint' of the industry—the co-existence of private utilities and big Federal generating systems like the Bonneville and Tennessee Valley Authority. It will electric cooperatives and the 2,000 municipally owned systems."

The issue is not merely ideological, Mr. Radin of the Public Power Association says. His constituents favor a grid because it might let them buy power for less than they now pay private utilities. They might even be able to sell surplus power to utilities for big industrial accounts, in effect beating out the private utilities with their own power.

But there is an emotional broils their in Congressional sessions. "The excess profits sought by utilities to please the financial institutions which are major purchasers of utility preferred and common stocks would no longer be justified," he says. Congress should decide what government should do and where it should draw the line.

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Project Is Moving National Power Grid Near Reality

By REGINALD STUART
Special to The New York Times

STEGALL, Neb.—The establishment of a nationwide electric power grid is moving closer as construction here nears completion on the first permanent tie between the huge Eastern and Western power grids.

At present, both grids terminate in this isolated western Nebraska community. The towers of each are separated by only a few hundred yards of wheatfields and a narrow, lightly traveled road. The power networks covering the Eastern and Western parts of the nation meet at a point about 200 miles east of the Continental Divide.

Once completed, the tie—a transmission station — will enable utilities in this region to make routine exchanges of small amounts of power between the grids, just as utilities in other part of the nation do within the same grid on a larger scale. The link is scheduled to be completed in October.

Although it is the lone project of its type linking the Eastern and Western power networks, and a small one at that, the transmission facility could be viewed as a first step to development of a full-scale high-capacity power East-West grid capable of transmitting vast amounts of power from huge generators for consumption in areas hundreds of miles away.

In recent years there has been considerable debate over the merits of such a grid. A study on the subject by the Congressional Research Service was recently released by the Senate subcommittee on minerals, materials and fuels.

"Some people might say this facility is like the first bridge across the Mississippi," said Wendell J. Garwood, executive vice president of the Tri-State Generation and Transmission Association, the rural wholesale power cooperative that is building the facility to meet the grow-

ing demand for electricity in its three-state service area. "That bridge is probably long since gone, but succeeded by more and better ones."

Tri-State, organized in 1952 to plan action to meet the power needs of the area, serves 25 rural electrical co-operatives in Colorado, Wyoming and Nebraska.

The \$13-million transmission link will have an average capacity of 100 megawatts, small when compared to the 500,000-megawatt transmission capacity of the nation's entire electric power system.

Designed by the General Electric Company, it is part of a larger project that will enable Tri-State to buy power from the Basin Electric Power Cooperative, which operates in eight states—Montana, Nebraska, Wyoming, Colorado, North Dakota, South Dakota, Minnesota and Iowa. The Basin Cooperative is building a \$1.3 billion 1,500 megawatt coal-fired power plant in Wheatland, Wyo., the major part of the project.

The link consists of two solid-state converters, each of which will include two 25-kilovolt, 2,000-ampere valve assemblies that will convert alternating current to direct current, then back to alternating current.

Power exchanges between electric utilities have been commonplace in much of the industry for several decades, particularly in densely populated areas. However, in sparsely populated areas with little industry, ties have been temporary or nonexistent.

New York Blackout Recalled

Increased emphasis on interconnection of utilities for meeting emergency power needs and strengthening reliability followed the devastating New York blackout in the fall of 1965.

Planners Busy

"Planning on a systematic basis was enhanced and systems began to beef up their connections," said W. Donham Crawford, president of the Edison Electric Institute, the trade association of investor-owned electric utilities.

Although smaller ties such as the one nearing completion are likely to be the extent of East-West grid connections in the near future, the possibility of high-capacity links is attracting increasing interest.

Although the economics are the subject of considerable debate, the Congressional Research Service study found that there were no long-term barriers to the "successful

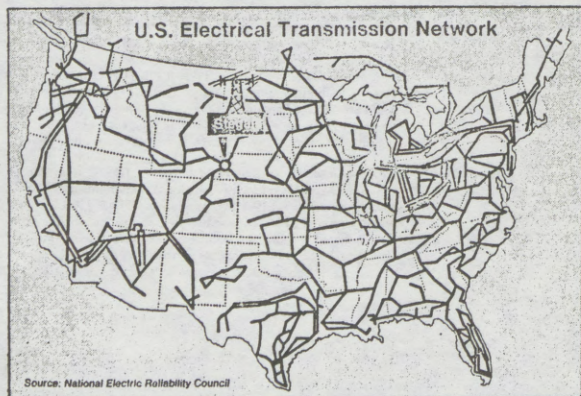
operation of a strong, high-capacity, fully coordinated national power network," although the technology to enable this is still uncertain.

"We expect the national grid to evolve whether or not a deliberate effort is made to accelerate its development," the report said.

The Edison Institute is opposed to a new high-capacity system, arguing that the "alleged benefits" of a high-capacity network "are already provided" by existing electric power systems. Numerous other groups, especially public power systems, have disagreed.

THE NEW YORK TIMES,

TUESDAY, MAY 25, 1976



Source: National Electric Reliability Council

The New York Times/May 25, 1976

Major power transmission lines in the East and West will be linked in western Nebraska

World news beat

for fuel; North Central region (1985)–3¢ (0.55¢) for nuclear and 3.4¢ (1.61¢) for coal; Northeast region (1986)–3.3¢ (0.66¢) for nuclear and 5.1¢ (2.78¢) for coal; East Central region (1978)–2¢ (0.37¢) for nuclear and 3.2¢ (1.55¢) for coal; and Southeast region (1980)–2.3¢ (0.5¢) for nuclear and 3.1¢ (1.7¢) for coal.

The New York PSC will make a similar study. Under the program, the utilities, the state power pool, and the commission staff will prepare and circulate expert testimony on all aspects of the relative economics of nuclear and fossil-fueled generating stations. Representatives of environmental and consumer groups will be permitted to cross-examine the experts at public hearings and to present opposing and rebuttal testimony—which also will be subject to cross-examination by all other parties. After the brouhaha, the PSC will present an opinion, which then can be appealed to the commission and—ultimately—to the courts.

Florida P&L's St Lucie 2 nuclear plant gets construction recommendation from state hearing examiner. Recommendation goes to Florida Cabinet, which must issue a building certificate. Over protests of Ft Pierce residents, the examiner ruled that technical safeguards are sufficient, and "as proposed, [the plant] effects a reasonable balance between the need for generating capacity and the environmental impact" resulting from construction and operation. The proposed plant is the center of a state-federal dispute (EW, March 15, 1976, p 25).

System engineering

The international Grid logically expands upon this concept.

Transmission

This development would be quite beneficial to the North Pacific instl.

A national grid is still for the future, says a Library of Congress report. It says such a grid may be an idea "whose time has not quite come." Sen Lee Metcalf (D-Mont), who released the study, says the findings are preliminary and still need further research to set the direction of possible legislation. The study notes, "There is not enough load diversity among the time zones to justify a grid. Most of the seasonal diversity is already utilized, and the remainder is too scattered." However, the report states that regional reserve pools of electricity could well grow into a "virtual national grid" anyhow within ten years.

Bonneville Power studies second HVDC intertie to connect the Celilo converter station, near the Dalles, Ore. with Phoenix, Ariz. via Hoover Dam. The 1,054-mile line would be used to send surplus hydro energy south during the summer, and to import power from the Four Corners area during the Northwest's winter peak. According to BPA, the \$500-million, 2,200-Mw line would have a cost-benefit ratio of two-to-one, and would save substantial amounts of oil. A line going only as far as Hoover Dam was originally approved in 1964 by Congress, along with the existing HVDC intertie. At that time, however, Southwestern utilities opted for gas turbines as a cheaper source of peaking energy.

New York PSC reconsiders earlier ban and will permit R-O-W clearing by Pasny for a 765-kv line between Fort Covington, on the Quebec border, and Marcy, NY, near Utica (EW, April 15, 1976, p 19). The original order generally limited clearing to the minimum needed to construct the line, but not for its operation. The PSC said the limitations it previously imposed were more stringent than advocated by any party in the proceeding. The commission will continue its hearings into the effect, if any, that high-voltage lines have on people near them.

Environment

EPA Administrator Russell Train defends "CHESS" study. He says that even if the controversial Community Health & Environmental Surveillance System study is repudiated, EPA's SO₂ program is still valid, because "its direction . . . was determined by scientific information in existence before the CHESS studies were initiated." Train told the House Commerce Environmental Subcommittee that the CHESS study represents a "reasonable approach to understanding the

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