EXHIBIT NO.:
WITNESS: Derick O. Dahlen
TYPE OF EXHIBIT: Prepared Testimony
SPONSORING PARTY: MOPSC Staff
CASE NO: HO-86-139

MISSOURI PUBLIC SERVICE COMMISSION
UTILITY DIVISION

KANSAS CITY POWER AND LIGHT COMPANY
CASE NO. HO-86-139

PREPARED TESTIMONY
OF
DERICK O. DAHLEN

JEFFERSON CITY, MISSOURI
FEBRUARY 23, 1987

Exhibit No. 28
Date 7/8/87 Case No. HO-86-139
Reporter JD

OFFICIAL CASE FILE

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the matter of the investigation)
of steam service rendered by)
Kansas City Power & Light Company.)

Case No. HO-86-139

AFFIDAVIT OF DERICK O. DAHLEN

STATE OF MINNESOTA)
) ss
COUNTY OF HENNEPIN)

Derick O. Dahlen, of lawful age, on his oath states: That he has participated in the preparation of the attached written testimony in question and answer form, consisting of ____ pages of testimony to be presented along with the schedules attached thereto in the above case, that the answers in the attached written testimony were given by him; that he has knowledge of the matters set forth in such answers and schedules; and that such matters are true to the best of his knowledge and belief.

Derick O. Dahlen

Derick O. Dahlen

Subscribed and sworn to before me this 20 day of February, 1987.

JAMES D. LARSON
NOTARY PUBLIC - MINNESOTA
HENNEPIN COUNTY
My Commission Expires Sept. 12, 1988

Notary Public

My commission expires 9-12-88

PREPARED TESTIMONY

OF

DERICK O. DAHLEN

KANSAS CITY POWER AND LIGHT COMPANY

CASE NO. HO-86-139

I - STATEMENT OF QUALIFICATIONS

Q. Would you please state your name and address?

A. My name is Derick O. Dahlen. My business address is 1330 TCF Tower, 121 South Eighth Street, Minneapolis, Minnesota.

Q. What is your occupation?

A. I am a principal in Dahlen, Berg & Co., a Minneapolis based management consulting firm, practicing in the areas of business planning, utility operations and regulation and litigation support.

Q. Would you please describe your experience in the area of district heating?

A. I have conducted several engagements regarding district heating and cooling operations and planning including:

- Evaluation of alternatives for the Blue Earth Steam Heating System including analysis of the economics of district heating system operations, evaluation of the steam heating market, recommendations for changes in the operation of the system, and rate projections and recommendations. As a result of study and public meetings, customers decided to retain the system.
- Economic feasibility and business planning engagements for district

heating/cogeneration projects in Red Wing, Minnesota and Grand Haven, Michigan. These engagements included identification of load characteristics, fuel price projections, construction scheduling, rate approach and design, risk analysis, and financial projections.

- Review of district heating and steam generation plant operations and alternatives for future operation in Fairmont, Minnesota.
- Review of district heating and cooling expansion plans of Metropolitan Medical Center (MMC) district heating system in Minneapolis, Minnesota. Developed alternative expansion plans and prepared financial projections.
- Testified before the Minnesota Public Utilities Commission regarding district heating economics in Northern States Power (NSP) gas rate case.

Q. Are there any other district heating projects on which you are currently working?

A. Yes. Our firm has been engaged to review alternatives for the City of Virginia, Minnesota district heating system (which sends out approximately 421,000 million BTU per year) including conversion of the system from steam to hot water . In addition, I continue to provide consulting services to MMC's district heating and cooling system.

Q. Would you please summarize your experience related to feasibility studies?

A. I have conducted economic feasibility studies for a wide variety of projects including:

- Study of proposed waste-to-energy facility to be located in Fairmont, Minnesota. Also prepared decision planning document to aid project participants to move project ahead.
- Feasibility study of $14 million renovation for electric production of the Coon Rapids dam for the City of Anoka, Minnesota. Project tasks include

projection of future electric prices.

- Economic feasibility study for a proposed biomass cogeneration facility and negotiations of rates for sale of power to a public utility.
- "Assessment of Industrial Cogeneration Potential in Minnesota" for the Minnesota Department of Energy and Economic Development.
- "Preliminary Feasibility Study of the Proposed Refuse-to-Energy Facility at the St. Cloud Correctional Facility" for the State of Minnesota.

Q. Would you please summarize your experience related to utility operations?

A. Yes. In addition to the reviews I previously described, I have assisted several cities in negotiating power supply contracts and in arranging for the transmission of electricity. For the Blue Earth Light & Water Department, I negotiated the for the purchase of its power requirements from an unregulated supplier and arranged for the wheeling of the power by two wheeling agents. For the City of Mountain Iron, I arranged for the wheeling of its purchased power. For six Minnesota cities, I prepared a study "Power Supply Alternatives: 1986-2000".

I have conducted analyses, on behalf of the River Electric Association, of Northern States Power Company filings for wholesale rate increases before the Federal Energy Regulatory Commission. In addition, I have prepared analyses in several cases of changes in Northern States Power Company's (NSP) "Coordinating Agreement" and "Interchange Agreement" for sharing of cost between the parent company and its subsidiaries. The River Electric Association is a group of municipal wholesale customers of NSP (Minnesota).

I have conducted analyses, on behalf of NSP's wheeling customers, of NSP's filings

for wheeling rate increases. In addition, I have conducted several analyses of losses in the wheeling of electricity.

Q. Would you please summarize your experience in the area of public utility regulation?

A. I have participated in regulatory engagements regarding electric, gas, and telephone utilities. These engagements have included presentation of testimony and supervision of field investigation, including analyses of filings, preparation of testimony and exhibits, assistance in preparation of cross examination and briefs concerning rate base, operating income, rate of return, rate design, and cost allocation. Schedule 1 lists the Case Numbers and clients on whose behalf I have testified. Representative engagements include:

- I testified on behalf of Hennepin Energy Resource Co. (HERC) regarding rates to be paid to HERC for power produced from a waste-to-energy qualifying facility.
- In three Inter-City Gas Company cases before the Minnesota Public Utilities Commission, I testified regarding operating and maintenance expense, purchased gas cost, cost of service studies, and rate design.
- I testified in NSP's filing for a gas rate increase regarding rate base, operating expenses, operating revenues and rate of return.
- In two NSP filings for an increase in transmission rates, I performed analysis and conducted successful settlement negotiations. The settlement of the first case included a reduction of transformation losses.
- I prepared analyses and negotiated settlement of three cases of changes in NSP cost sharing agreement with subsidiaries.
- I negotiated settlement of three wholesale electric rate filings.
- In three Minnesota Power and Light Company electric rate cases before the

Minnesota Public Utilities Commission, I testified regarding class revenue requirements, cost allocation, excess capacity, decommissioning costs and rate of return.

- In three Otter Tail Power Company electric rate cases before the Minnesota Public Utilities Commission, I testified regarding depreciation expense, opportunity sales, rate design, and allowance for funds used during construction.
- I testified in NSP's filing before the Federal Energy Regulatory Commission regarding the cost recovery of abandonment costs of the Tyrone facility.
- In NSP's filing for a retail electric rate increase before the Minnesota Public Utilities Commission, I provided testimony regarding cost of capital, operating costs, and rate base.
- In response to KN Energy, Inc.'s filing for gas rate increase before 135 Nebraska cities, I prepared an analysis of the rate filing and recommended rates on behalf of the League of Nebraska Municipalities.
- Testified in Continental Telephone Company's request for a local service rate increase regarding test year, rate base, and operating expenses.

Q. Would you outline your educational background?

A. In 1975, I received an M.B.A. degree from the Colgate Darden Graduate School of Business Administration at the University of Virginia, Charlottesville, Virginia. From 1966 to 1968, I attended the Massachusetts Institute of Technology, Cambridge, Massachusetts.

Q. Please describe your professional background.

A. In 1968, I started a computer equipment manufacturing company which was acquired by the Bendix Corporation in 1970. I remained the company's marketing

manager until 1973. From 1975 to 1978, I worked with two companies in the Charlottesville area. In 1978, I was assistant to the Vice President - Finance of Deluxe Check Printers. From January 1979 to January 1981, I was a management consultant with Touche Ross & Co. From January 1981 to May 1984, I was a management consultant with Peat, Marwick, Mitchell & Co. In May 1984, I began my consulting practice.

Q. To what associations and societies do you belong?

A. I am a member of the Minnesota Municipal Utilities Association where I am currently Chairman of the Associate Members Committee. I am a member of the Upper Midwest Section of the International District Heating and Cooling Association. I am a member of the International District Heating and Cooling Association. In 1985, I addressed the convention of the International District Heating and Cooling Association regarding current issues in district heating.

II - PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. My testimony presents the results of my review of the Kansas City Power & Light Company's (KCPL) proposals for its district heating system and also presents my financial analysis of alternatives for heating in the area presently served by the district heating system.

Q. By whom were you engaged in this case?

A. Dahlen, Berg & Co. was engaged by the State of Missouri through the Public Service Commission (PSC) as a subcontractor to HDR Techserv, Inc.

Q. What scope of work have you performed?

A. I have reviewed the information originally filed by KCPL, the Company's responses to data requests, and other documents prepared by the Company. In addition, I have worked with HDR Techserv personnel to develop the costs of different district heating configurations and of individual building heating systems. I have also supervised the gathering of information from other district heating systems.

Q. Why did you gather information regarding other district heating systems?

A. Information presented by KCPL suggests that the district heating business is a declining business in which there is no market opportunity. We gathered information from other systems to supplement our knowledge regarding the experience of other systems. Further, we desired to determine if there were any activities which, if implemented, might lower district heating rates or would make district heating a more viable option for Kansas City.

Q. How did you conduct your survey?

A. We surveyed by telephone district heating systems that were operating in the downtown of U.S. cities with a population of over 200,000 and which sold over 300,000 Mlbs. of steam in 1984. We also surveyed three systems which have recently shut down. The systems that were surveyed are shown in Schedule 2. The information developed in the telephone survey was supplemented with information provided by the International District Heating and Cooling Association.

Q. Do you recommend that this comparative information be used for setting rates in this case?

A. The primary purpose for including this information is to demonstrate the viability of other district heating systems and to show what actions could be taken to improve the operation of the Kansas City district heating system. This information is not intended to be used to determine the level of cost for rate setting purposes.

Q. How is your testimony organized?

A. My testimony is presented in the following sections:

- Section III, General Conclusions and Recommendations,
- Section IV, Proposals to Purchase System,
- Section V, Freeze Current Rates,
- Section VI, Comparison of the Cost of District Heating and Individual Gas-Fired Boilers,
- Section VII, KCPL's Plan to Install Electric Boilers, and
- Section VIII, Service Territory Abandonment.

III - GENERAL CONCLUSIONS AND RECOMMENDATIONS

Q. What are your general conclusions regarding KCPL's management of its Kansas City District heating system?

A. KCPL has not managed the district heating system in the best interest of its district heating customers. This is supported by several factors including:

- KCPL management encouraged shut down of the district heating system to increase sales of electricity,
- KCPL did not pursue sales to new customers to offset volume declines,
- KCPL did not make investments required for the continued efficient operation of the system as Mr. Fuller testified,
- Until recently, KCPL did not adequately maintain the system as Mr. Fuller testified,
- KCPL's allocations of administrative and general expense to the district heating exceed those of an efficiently run independent district heating system, and
- KCPL failed to pursue sale of the district heating system as an alternative to abandonment.

KCPL Management Actions

Q. What leads you to the conclusion that KCPL management encouraged the shutdown of the district heating system?

A. The KCPL studies were not designed to determine whether the district heating system should be continued. For example, the most recent study, "Downtown Steam

System Conversion Study" attached as Schedule 1 to the testimony of Company witness Beaudoin appears to have been designed to reach the conclusion that the district heating system should be abandoned and that individual building electric boilers should be installed. The title of study isn't "Review of Alternatives for the Kansas City District Heating System". The title is "Downtown Steam System Conversion Study". KCPL's intent is clear---convert the system to electric boilers and electric resistance heat---thereby garnering sales for the electric utility without apparent consideration for the cost of electric heat compared to other alternatives.

KCPL has prepared three studies of the its district heating system: "A Study of KCPL's Steam Heat Business", December 1981 (1981 study); "KCPL Long-Range Steam Heat Planning Study", September 14, 1982 (1982 study); and "Downtown Steam System Conversion Study", revised March 1, 1986 (conversion study).

These studies show KCPL's progression toward the conclusion that distributed electrode boilers or on-site electric boilers represent preferred alternatives to the current district heating system.

- The 1981 study recommended that KCPL review the economics of providing steam supplied with electricity.
- The 1982 study recommended that KCPL promote customer conversion to electric heat if a large steam customer were not found.
- The conversion study recommended that KCPL complete the conversion of district heating customers to on-site electric boilers no later than 1990 with KCPL providing the boilers as has been proposed by KCPL in this case.

Q. Is the "Downtown Steam System Conversion Study" a complete study of all the alter-

natives for KCPL's Kansas City district heating system?

A. No. Mr. Fuller's review of the most recent study reveals that the following alternatives were not investigated:

- Gas-fired district heating boilers,
- Gas-fired individual building boilers,
- Sale of the system to another operator,
- Alternative steam line routing,
- Single distribution system pressure, and
- Modern construction techniques.

Q. What was KCPL's position regarding the installation of new gas/oil-fired boilers at Grand Avenue Station in its conversion study?

A. KCPL stated on page 5.5 of its conversion study that because of gas curtailments between 1976 and 1982 "gas is not considered a dependable fuel for winter operation." KCPL ignored commonly available information from the American Gas Association (AGA) that natural gas supplies would be sufficient to meet demand through the year 2005. In addition, KCPL ignored the gas price forecasts which KCPL had prepared for it by Data Resources, Inc. (DRI) and Troupe Kehoe Whitaker & Kent which projected relatively stable gas prices for the remainder of this century.

Q. Are there any other problems with the KCPL "Downtown Steam System Conversion Study"?

A. Yes. The study shows a lack of supporting detail for the analyses performed. The study doesn't present analyses of the customer's cost of heating from different alternatives. Finally, as I will show later in my testimony, the study reaches an unreasonable conclusion---that the heating system with the highest capital cost and highest operating cost should be installed.

The conversion study also masks the true economic cost of the electric boiler conversion and does not provide the information necessary for customer to make well-informed choices of central steam heat, individual gas-fired boilers, or electric boilers.

Marketing

Q. Why was it necessary for KCPL to pursue sales to new customers?

A. The district heating business is largely a fixed cost business. The number of administrative and general personnel, operating and maintenance personnel, distribution maintenance, return on investment, and depreciation are essentially all fixed. KCPL needed additional sales to be able to spread the fixed cost over more Mlbs. of steam sales.

Q. Prior to 1981, did KCPL recognize the need for any marketing effort?

A. I have seen no information that KCPL recognized the need for any marketing effort prior to 1981.

Q. When did KCPL recognize the need for additional sales?

A. In "A Study of KCPL's Steam Heat Business", December 1981, KCPL recognized the need to add additional large customers.

Q. What activities did KCPL undertake to market its steam service?

A. KCPL signed a contract to supply interruptible steam to Corn Products with an approximate demand of 240,000 pounds per hour.

Q. What other action should KCPL have undertaken?

A. KCPL should have developed a marketing program and marketing staff to sell steam to new customers. KCPL's sales to Corn Products, Vista International, and the Jack-

son County Jail were the result of customers seeking steam from KCPL rather than the result of KCPL's marketing. Instead of selling steam, KCPL is selling electricity for space heating to downtown buildings including the AT&T building.

Q. Do other district heating systems have marketing personnel?

A. Yes. All of the district heating systems we surveyed have personnel responsible for marketing district heating[1]. Twelve of the systems have personnel that are dedicated exclusively to marketing district heating. In the five utilities that have combined marketing of district heating and electricity, three utilities have two people with both responsibilities, one utility has three people, and one utility has four.

Q. How many marketing personnel do other district heating systems have?

A. The seventeen district heating systems surveyed have an average of 2.1 marketing personnel. The twelve district heating systems with personnel dedicated exclusively to district heating have an average of 1.8 marketing personnel. The following table summarizes the number of district heating systems marketing personnel for all seventeen surveyed systems.

Number of systems	Number of personnel
8	1
4	2
3	3
1	4
1	6
Average	2.1

Q. How many district heating marketing personnel does KCPL have?

[1]The system in Atlanta, Georgia is using a utility marketing person to sell customers on the idea of leaving the district heating system and on installing electric heat. The results of the Atlanta system are not included in any part of our survey.

A. In response to Data Request No. 216, KCPL responded that "The marketing, sales, and service work for the steam system has been assigned to our engineers and/or market representatives." It appears that KCPL doesn't have any district heating marketing personnel.

Q. Does KCPL have any marketing activity?

A. No. KCPL unilaterally implemented a moratorium on customer hookups in 1985. Further, with the exception of Vista International and the Jackson County Jail, KCPL has had no hookups since 1982. We have seen no evidence of a marketing program. KCPL's studies which were provided in this case do not recommend the establishment of a marketing program. The only evidence of any marketing activity which we have seen relates to KCPL's decision-making process regarding whether Corn Products, Vista International, and Jackson County Jail should be accepted as customers. Rather than having a proactive marketing program, it appears that KCPL had difficulty determining whether it wanted new customers.

Q. In general, what has been the experience of other district heating systems in marketing?

A. As the downtown areas served by many district heating systems are redeveloped, customers are lost. However, customers that are lost are generally smaller and are supplanted by fewer but larger buildings with larger energy use which can often be served at lower cost per Mlb. than several smaller customers.

Q. Would the KCPL Kansas City district heating system have lower costs per Mlb. today if KCPL had implemented a marketing program?

A. It is difficult to predict the success of any marketing program. However, without any marketing program, the failure of KCPL's district heating system is nearly certain. If new customers are not added to replace customers lost to redevelopment,

sales will clearly decline and fixed costs will be spread over fewer Mlbs. of steam resulting in higher and higher costs per Mlb. until steam is not price competitive.

Administrative and General Expense

Q. What is the value of comparing KCPL's administrative and general (A & G) expense to independent district heating systems?

A. KCPL's administrative and general expense is an allocation. If the Kansas City district heating system were an independent system its administrative and general expense would not be an allocation. By comparing the estimated A & G cost of an independent system with KCPL's allocated A & G cost, we may determine whether A & G represents an opportunity for cost saving.

Q. What is the amount of KCPL's administrative and general expense?

A. KCPL has proposed test year administrative and general expense before adjustment of $1,506,000 ($1,534,000 after adjustment) that is comprised of the following major elements in Company witness Cattron's testimony Schedule 12, page 2 of 2:

• Salaries	$786,000
• Employee Benefits and Pensions	544,000
• Other A&G	176,000

The KCPL allocation of administrative and general expense to district heating is increasing. For 1986, KCPL reports that its allocated administrative and general expense was $1.7 million.

Q. For the district heating systems you surveyed, what are typical administrative and general staffing levels?

A. Only ten of the district heating systems with their own management revealed the

number of administrative and general personnel. The following table summarizes the number of systems with various numbers of administrative and general personnel including marketing personnel.

Number of Systems	Number of A&G Personnel
2	4
1	6
5	7
1	15
1	35

It appears that, with two exceptions, independent district heating companies are operating with lower levels of personnel than implied by KCPL's A & G allocation.

Q. If the Kansas City district heating system were an independent company, what level of administrative and general expense would you project?

A. Administrative and general expense is largely fixed and depends most on the number of personnel. If KCPL had 7 full time administrative and general personnel at an average annual salary of $33,000, salaries would be only $231,000 which is $550,000 less than the KCPL allocation.

Based on 40% employee benefits and pensions for administrative and general personnel and KCPL's test year allocation of other A & G expense, an independent district heating operation would likely have A & G expense of approximately $499,000 comprised of the following:

- Salaries $231,000
- A & G Employee Benefits and Pensions 92,000
- Other A & G 176,000

This estimate of $499,000 is approximately $1,035,000 less than the KCPL allocated amount of $1,534,000.

Sale of District Heating System

Q. Why is KCPL's failure to pursue sale of the district heating system not in the best interest of customers?

A. KCPL recognized in its 1981 study that sale of the system was a possible alternative for the district heating system. Potentially, the system could have been sold to another operator with a commitment to district heating. An alternative operator might have been able to keep customers and add new customers thereby reducing fixed cost per Mlb. and the need for rate increases. Further, an alternative operator might have reduced total fixed costs resulting in lower revenue requirements.

Recommendations

Q. What do you recommend the Commission do in this case?

A. I recommend that the Commission order the following:

- That KCPL solicit proposals for the sale or other transfer of the Kansas City district heating system and conduct negotiations with prospective purchasers,
- That steam rates be frozen at current levels until a decision is reached regarding the future of the district heating system,
- That KCPL present all proposals and the results of negotiations for sale or transfer of the system to the Commission along with KCPL's recommendation regarding the proposals,
- That KCPL not be permitted to abandon the Kansas City steam system under the plan filed proposed by KCPL; however, if the Commission allows KCPL to abandon the system that KCPL be required to file with the Commission a plan to discontinue the operation of the Kansas City steam system which

does not cause a hardship for customers and which is consistent with Commission rules and conditions determined by the Commission, and

- That no electric boilers be installed by KCPL on customer's premises under the plan described in its "Downtown Steam System Conversion Study".

This process should be completed in as short a time period as possible so that customers are able to reach conclusions regarding their future heating systems.

IV - SOLICIT PROPOSALS TO PURCHASE SYSTEM

Q. Why should KCPL solicit proposals to purchase the Kansas City district heating system?

A. The primary advantage of having KCPL solicit proposals for the purchase of the Kansas City district heating system is that potential system purchasers will indicate whether district heating is viable in Kansas City rather than relying in KCPL's assertion that the system should be discontinued. Further, KCPL should have considered sale of the system in its conversion study and should have previously solicited proposals for the sale of the system rather than simply dismissing the sale of the system as an alternative because sale is in the best interest of both KCPL and its steam customers.

Q. What are the advantages to steam customers of selling the system to another operator?

A. Another operator would presumably continue to operate the system which would not require customers to make investment in individual boiler systems. In addition, customers would then have an additional choice for heating buildings which would provide more competition for natural gas and electricity in heating and should serve to keep prices lower than they would otherwise be.

Q. What advantages are there to KCPL of selling the district heating system?

A. KCPL expects to lose money on the phase out of its district heating system. (See Appendix A of Company witness Beaudoin's testimony.) Sale of the system to another operator could reduce or eliminate the losses that KCPL expects on the phase out of its district heating system. In addition, KCPL would not have to invest the significant amounts of capital potentially required under its conversion plan in-

cluding the investment in both electric boilers and electric distribution plant.

Q. What disadvantages are there to KCPL if the district heating system is sold?

A. There are few, if any, disadvantages that have a financial cost. However, if the district heating system were sold, KCPL would probably convert very few district heating customers to electric heat. This loss of market opportunity for electric boilers is probably very small because customers know or will learn that the cost of steam produced by electric boilers is higher than either district heating or gas-fired individual building boilers.

Q. Why is KCPL likely to be unsuccessful as an operator of the district heating system?

A. Based on its past activities, KCPL is likely to be unsuccessful in retaining customers. KCPL has actively engaged in "demarketing" the district heating system. KCPL has discontinued taking customers except for Vista International and the Jackson County Jail. KCPL has communicated to customers and the press that it intends to discontinue operation of the system. KCPL has also stated that it intends to donate the only source of steam for the system, Grand Avenue Station, to a not-for-profit organization for use as an aquarium.

By not seeking to add new customers while losing existing customers, KCPL is driving up its steam rates. Lower sales volumes cause fixed cost to be spread over fewer units of sales resulting in higher prices. As long as existing customers believe that the Company is discouraging customers and that prices will be higher, customers will continue to leave the system further exacerbating the problem of increasing prices.

Q. What is KCPL's position regarding sale of the system?

A. Company witness Beaudoin testified on page 14 of his direct testimony that sale of

the steam business "would not eliminate substantially higher rate increases for customers."

Q. Do you agree with Mr. Beaudoin that sale of the system would not eliminate substantially higher rate increases for customers?

A. No. A purchaser of the Kansas City district heating system would have several actions that could be taken to control rate increases. Increased volume and cost control could permit a purchaser of the Kansas City district heating system to keep rates at current levels or to, perhaps, reduce rates. An alternative operator would, therefore, probably work to:

- Keep current customers on the system,
- Attract new customers,
- Reduce the amount of general and administrative expense,
- Reduce the number of operating personnel at Grand Avenue Station,
- Improve maintenance practices,
- Invest capital in cost reduction,
- Develop and implement a long-range plan for system operation.

The lower fixed cost and higher volume which an alternative operator would seek to achieve could result in lower fixed cost being spread over a greater volume which could permit rates to be reduced.

Further, other district heating systems have committed to stabilizing prices in order to keep customers and, therefore, mitigate the need for rate increases. An alternate owner may stabilize prices rather than promise greatly increased rates as KCPL has done.

Q. How should KCPL approach selling the system?

A. KCPL should prepare a request for proposals that outlines the requirements of the proposal and should contain:

- Proposer's qualifications;
- Sales price;
- Approach to providing steam service including:
  - Steam source,
  - Customers to be served,
  - Investment to be made,
- Steam rates to be charged customers;
- Disposition of Grand Avenue Station; and
- Proposers should be given sufficient time to prepare a proposal, but this process should be conducted as expediously as possible.

Sales of District Heating Systems

Q. Have any major district heating systems been sold in recent years?

A. Yes. Nine systems in larger cities were sold over the 1979 through January 1987 period. The location of these systems, the year sold, and the 1985 steam sales are as follows:

Location	Year Sold	MLBS.
Baltimore, Maryland	1984	1,273,000
Boston, Massachusetts	1987	3,690,000
Minneapolis, Minnesota	1984	944,000
Omaha, Nebraska	1982	404,000
Philadelphia, Pennsylvania	1987	4,242,000
Rochester, New York	1985	600,000
St. Louis, Missouri	1984	889,000
St. Paul, Minnesota	1981	(Hot Water)
Youngstown, Ohio	1979	463,000

In addition, Pennsylvania Electric Co. has recently started qualifying bidders for the Erie, Pennsylvania system which had sales of 376,000 Mlbs. in 1984.

Q. How large is the Kansas City district heating system compared to those that have been sold?

A. In 1986, KCPL sold 431,000 Mlbs. of steam in downtown Kansas City and 547,000 Mlbs. to National Starch for a total of 978,000 Mlbs.

Q. Who purchased the systems that were sold?

A. Seven of the nine systems sold were purchased by private investors. Five of these were purchased by Catalyst Thermal Energy Corporation affiliated companies. The Rochester system was sold to a user cooperative organization, and the St. Paul system was sold to a non-profit organization.

Q. Were any of the systems in apparent decline at the time of purchase by private investors?

A. Yes. Our survey results indicate that four of the seven systems sold to private investors had each lost 30 or 40 per cent of their load in the four or five years prior to purchase.

The Youngstown, Ohio, system sold 374,000 Mlbs. in 1975 and 164,000 Mlbs. in 1980.

The Baltimore, Maryland, system sold 1,993,000 Mlbs. in 1980 and 1,589,000 Mlbs. in 1984, the year of purchase.

The St. Louis, Missouri, system sold 1,272,000 Mlbs. in 1980 and 840,000 Mlbs. in 1984, the year of purchase.

The Philadelphia, Pennsylvania, system sold 6,044,000 Mlbs. in 1980 and 4,298,000 Mlbs. in 1986, the year of purchase.

The Boston, Massachusetts, system sold 3,993,000 Mlbs. in 1980 and 3,727,000 Mlbs. in 1985, the year prior to purchase.

Q. How has the Youngstown system changed in the six years since it was sold?

A. Survey results show that the system was losing money when it was purchased in 1979. First, a five-year plan was conceived and implemented. Capital was invested to upgrade the steam production plant and distribution system. An aggressive marketing effort succeeded in recovering lost customers and gaining new ones. Youngstown University was connected in 1980 and 3,400 feet of new main was installed to serve a new hospital customer in 1986. The system has been operating profitably since 1983. The customer's cost of steam has decreased from $10.00 per Mlb. in 1980 to $8.56 per Mlb. in 1986.

Q. What kind of business results were reported for the Baltimore and St.Louis systems?

A. Both systems report profitable operations.

Q. Does there seem to be a current, active investor interest in metropolitan district heating systems?

A. Yes. The sales of the Boston, Massachusetts, and Philadelphia, Pennsylvania, systems were closed in early 1987. One company stated that they plan to respond to Pennsylvania Electric Company's invitation to qualify as a bidder for the Erie, Pennsylvania, system. These sales and potential sales indicate continuing investor interest in district heating systems.

Q. What were the circumstances which led the Rochester, New York, system to become a user cooperative?

A. By order issued by the State of New York Public Service Commission on April 15, 1983 in Rochester Gas and Electric Corp. Case 28316, a combined gas and electric rate case, an expanded proceeding was initiated to consider the prospects for steam service. On July 18, 1983 a temporary steam rate increase was set to provide less than a full return on investment in order to discourage further the departure of customers while the system's future was being considered. In 1984, with support and assistance from the City and County governments and the Rochester Engineering Society, a local professional group, the Rochester District Heating Corp. (RDHC), a non-profit corporation, was formed with 35 members who represented 40 downtown buildings. Tax-exempt bonds were issued. In December of 1985, RDHC purchased an abandoned electric generating plant and the steam distribution system from Rochester Gas & Electric. In their 1985 annual report, Rochester Gas & Electric Corp. reports $750,000 cash proceeds and a $11,673,000 pre-tax write off associated with the sale. Rochester Gas & Electric offered low cost financing of replacement boilers to those customers who did not join RDHC.

Q. How did RDHC effect the transition and what is the current status of the system?

A. Survey results indicate that RDHC purchased steam from Rochester Gas & Electric for several months while temporary boilers were being installed. Steam was produced from the temporary boilers pending completion of installation of three new gas-fired boilers scheduled to be operational in March 1987. The system is now operated with 3 management personnel and 11 production and distribution workers. RDHC's 1987 budget projects that all costs will be covered with steam sales of 340,000 Mlbs. at an average rate of $14.20 per Mlbs. compared to Rochester Gas & Electric average price of $16.54 per Mlb. in 1984 and an estimated average cost of $22.00 per Mlb. in 1985.

Q. Who was the purchaser of the St. Paul, Minnesota, system?

A. A non-profit corporation now named District Energy St. Paul, Inc. purchased a steam district heating system from Northern States Power Co. in 1981 and by 1985 had converted it all to circulating hot water. The conversion and expansion was financed with the proceeds of tax-exempt bonds and with government grants. The system is budgeted to cover all expenses in 1987.

V - FREEZE CURRENT RATES

Q. What action should the Commission take regarding KCPL's request for a rate increase in this case?

A. Rates should not be increased at this time. KCPL did not investigate the possible sale of its district heating business. Increasing rates at this time would make sale of the system more difficult. In addition, there are the following reasons for not increasing rates at this time:

- Encourages proposers for purchase of the system,
- Communicates to customers that the district heating business might continue as a viable heating alternative,
- Might retain customers,
- If customers are retained, the value of the system would be higher if sold,
- KCPL has not efficiently and effectively operated the system, and
- KCPL's proposed costs are not representative of the level of cost that would be experienced by a district heating utility that planned on continuing in business.

Q. Why would freezing rates encourage proposers for the purchase of the system?

A. If rates are frozen, proposers for the purchase of the system might believe that the decline in sales volumes would diminish thereby encouraging them to invest in review of the system and preparation of a proposal.

Q. Why would freezing rates communicate to customers that district heating might continue as a viable heating alternative?

A. KCPL has communicated to customers that it intends to increase rates by 22% an-

nually for four years. Faced with such large increases, customers can be expected to consider other heating alternatives and to leave the system if other alternatives are more cost effective than KCPL's rates. If steam rates are frozen at current levels, customers may defer consideration of other alternatives until the future of district heating is clearer. Customers deferring action could, potentially, avoid investment in a boiler.

Q. Why is the KCPL system worth more if customers are retained?

A. If customers are retained, fixed costs are spread over more Mlbs. of steam resulting in lower total cost, lower rates, and higher potential profits for a purchaser of the system.

Q. In what way hasn't KCPL efficiently and effectively operated the district heating system?

A. For successful operation of a district heating system several activities must be successfully implemented:

- Volume must be maintained and, if possible, increased so that fixed cost per Mlb. does not increase and, therefore, increase revenue requirements,
- A long-range plan for the operation of the system must be developed, revised as conditions change and used as a guide to the operation of the system, and
- Responsible maintenance and replacement practices must be developed and utilized to ensure the long-term viability of the system.

KCPL has not effectively accomplished any of these three activities. KCPL has no marketing activity as I previously testified. Instead, KCPL has tried to increase rates by over 100% over four years and has communicated to customers that the district heating is going to be discontinued.

KCPL does not have a long-range plan for the continued operation of the district heating business. KCPL's studies are incomplete investigations of the district heating business as Mr. Fuller testified. None of KCPL's studies of its district heating system is a long-range plan. Even the 1982 study which is entitled "KCPL Long-Range Steam Heat Planning Study" is not a long-range plan. It is, instead, an outline of a few events that KCPL believed were necessary for the continuation of the business. It concludes that one event, securing a single customer, is necessary for the continuation of the business. However, the study recommends discontinuing the business if the customer is not secured.

KCPL's increasing steam loss until 1982, reflects that KCPL ignored the condition of its system. KCPL did not plan for either the replacement of Grand Avenue Station as a steam generation source or for the replacement of distribution piping.

Further, KCPL has increased the cost of operation of the district heating system by administrative and general expense allocations which exceed the administrative and general expense of similar district heating systems, and has permitted district heating to absorb the high O & M costs of a plant (Grand Avenue Station) which is not well matched to the district heating system.

Q. Why hasn't KCPL successfully implemented the activities you described?

A. Although there are many reasons for KCPL's failure to successfully implement these activities, there appear to be two primary reasons:

- management neglect, and
- conflict with electric goals.

Q. In what ways has management neglected the district heating system?

A. The decline in volume without implementation of a marketing program, increasing steam losses between 1970 and 1982 without a response by management, and the lack of a plan to replace the Grand Avenue Station boilers as the source of steam are examples of management neglect.

Q. What are the conflicts between electric utility goals and district heating?

A. In KCPL's studies, KCPL investigated electrode boilers rather than lower total cost natural gas fired boilers at Grand Avenue Station and also concluded that electric heat should be substituted for the district heating system. KCPL also discontinued taking new district heating customers in 1985 while encouraging electric space heat. Further, by the earlier than planned transfer of Grand Avenue Station to district heating, the total costs of the Station were transferred from the electric utility to the district heating system.

Q. How do KCPL's district heating rates compare with those of other district heating systems?

A. KCPL's current rates are comparable to those charged by other district heating systems. KCPL's average 1985 downtown rate was $8.97 per Mlb. compared to an average of $10.93 for the systems we surveyed. KCPL's average 1986 downtown rate was $10.53 per Mlb. compared to an average of $9.73 per Mlb. for the systems we surveyed. However, KCPL's average rates increased in 1986 over 1985 while the average of the other systems decreased. The average rates of the district heating systems we surveyed is shown in Schedule 3.

VI - COMPARISON OF THE COST OF DISTRICT HEATING AND INDIVIDUAL GAS-FIRED BOILERS

Q. To what alternative should the price of district heating be compared?

A. District heating should be compared with the source of heating which would most likely be installed by a building if district heating were not available. For most situations, that alternative would be a natural gas-fired boiler. In the testimony that follows in this section, I will compare the cost of steam from district heating to the cost of steam from individual gas-fired boilers. In "Section VII - KCPL's Plan to Install Electric Boilers", I have compared the cost of steam from district heating with the cost of steam from individual electric boilers.

District Heating Cost of Steam

Q. What is the projected cost of steam from the Kansas City district heating system?

A. The cost of steam from the Kansas City district heating system depends primarily on the following factors:

- Investment made in the system,
- Volume of sales,
- Whether National Starch is retained as a customer,
- O & M expense control,
- A & G expense control, and
- Fuel cost.

There are two basic scenarios for the continued operation of the system. In the first

scenario, the distribution system could be upgraded and the boilers at Grand Avenue Station replaced as Mr. Miller described (long-term rehabilitation alternative). In the second scenario, the investment in distribution and boilers would not be made except as required to continue efficient operation (short-term rehabilitation alternative). This scenario involves risk which could only be assumed by an experienced district heating system operator.

In both scenarios, the volume of sales needs to be increased to control the price of steam. In both scenarios, O & M expense, A & G expense, and fuel cost would be managed to the lowest prudent amounts. In addition, in both scenarios, the presently existing district heating system is considered to be a "sunk cost". Therefore, no return on or depreciation of the investment has been included in the projections.

Q. What is the projected cost of steam for Mr. Miller's long-term rehabilitation alternative?

A. I projected the cost of steam for Mr. Miller's long-term rehabilitation alternative district heating system design for two conditions: with National Starch and without National Starch. I did not, however, assume any volume increases. Volume increases which should be sought by the system operator would reduce these rates.

Based on assumed operation of the system in 1987, the cost of steam with National Starch would be approximately $11.08 per Mlb. and approximately $13.83 per Mlb. without National Starch. As shown graphically in Schedule 4, these prices are projected to increase to $33.58 with National Starch and $40.21 without National Starch in 2006, the twentieth and last year of the projection period. Schedule 5

shows the calculation of the cost of steam for Mr. Miller's long-term rehabilitation alternative.

Q. What is the projected cost of steam for Mr. Miller's short-term rehabilitation alternative?

A. If $2,675,000 in capital cost is expended rather than $12,836,000, over $10,000,000 investment can be avoided. For the condition including National Starch, the cost of steam is projected to be $7.24 in 1987 increasing to $31.68 in 2006, the twentieth and last year of the projection period, as shown graphically in Schedule 6 along with the long-term rehabilitation scenarios. The cost of steam under the short-term rehabilitation alternative would be somewhat lower if the investment in upgrading the high-pressure system is spread over more than the single year assumed in the projections. Schedule 7 shows the calculation of the cost of steam for Mr. Miller's short-term rehabilitation alternative.

Q. What is the range of projected district heating prices?

A. Based on the analyses presented, the range of 1987 steam prices for an efficiently operated district heating system is between $7.24 and $13.83 per Mlb. depending on the following:

- Whether National Starch is retained as a customer,
- The price paid by National Starch for steam, and
- Whether the investment in distribution and steam production facilities is made.

Individual Gas Boiler Cost of Steam

Q. What is the cost of production of steam from individual gas-fired boilers?

A. The cost of steam from individual gas-fired boilers varies depending on the in-

dividual characteristics of the customer and the installation. Based on a capital cost of $620 per boiler horsepower (bhp), the cost of steam in 1987 is approximately $10.56 per Mlb. for a typical (200 bhp) installation. As shown graphically in Schedule 8, these costs are projected to increase to $35.33 in 2006.

Schedule 9 shows the calculation of the cost of steam for a typical 200 bhp installation.

Q. Does your calculation of the cost of steam from individual gas boilers reflect all the economic considerations a building owner would consider in deciding whether to install a gas-fired boiler rather than purchase steam from a district heating system?

A. No. In addition to the steam costs which I have quantified, a building owner would consider:

- Administrative time required to oversee the operation of the boiler, purchase fuel, and supervise maintenance,
- The extent to which costs could be passed through to tenants in leased buildings,
- Whether capital could earn a higher return in another investment,
- Effect of heating system on marketability and value of the building, and
- Reliability of heating source and effect on tenants.

Cost of Steam Comparison

Q. How does the cost of steam for a typical 200 bhp individual gas-fired boiler compare to district heating?

A. The estimated 1987 cost of steam of $10.56 per Mlb. from a typical 200 bhp individual gas-fired boiler is within the range of projected 1987 district heating cost

($7.24 to $13.83 per Mlb.) as shown in Schedule 8.

Based on these projections, district heating in Kansas City could be competitive with natural gas-fired boilers.

Investment Comparison

Q. In your projections of the cost of steam from these alternatives, have you included the capital cost of the heating equipment required?

A. Yes. As is shown in Schedules 5, 7, and 9, the cost of the equipment including its carrying cost is included in the calculation of the cost of steam.

Q. What is the investment required for district heating compared to individual gas-fired boilers?

A. As Mr. Miller testified, the investment required for the district heating system depends on the amount of renovation which the operator decides to undertake.

The cost of the short-term rehabilitation program described by Mr. Miller of $2,675,000 is significantly less than the $8,923,000 required for individual gas-fired boilers. The resulting capital savings are, therefore, over $6,000,000.

However, the cost of completely renovating the system was estimated by Mr. Miller to be $12,836,000 compared to an estimated $8,923,000 for individual gas-fired boilers.

Summary

Q. Should operation of the Kansas City district heating system be discontinued?

A. Based on my analysis of the cost of district heating for an efficiently run system that effectively markets its product and on the success of other district heating systems, the operation of the system should be continued.

However, KCPL may not be able to market steam to downtown Kansas City customers. KCPL has already indicated its lack of interest in remaining in the steam distribution business by its "Downtown Steam System Conversion Study", its filing for abandonment of the system and its communication with customers. In short, KCPL may no longer be a credible steam supplier.

If KCPL is either unwilling or unable to continue the operation of the district heating system, the system should be sold to a qualified operator. Operation of the Kansas City district heating system by a qualified operator would continue to provide the benefits of district heating to downtown Kansas City buildings and to avoid the potentially higher investment for individual building heating systems..

VII - KCPL'S PLAN TO INSTALL ELECTRIC BOILERS

Q. What is the cost of steam using individual electric boilers as proposed by KCPL in its conversion plan?

A. Using the electric rates established in KCPL's last rate case, the cost of production of steam using electric boilers ranges from $19.94 per Mlb. for large (700 bhp) systems to $35.76 for small (50 bhp) systems. This is projected to increase to $39.13 for large systems and $61.74 for small systems in 2006, the last year of the 20 year projection period as shown graphically in Schedule 10.

Schedule 11 shows the calculation of the cost of steam for four different size electric boilers.

Q. How does the cost of production of steam with electric boilers compare with district heating and with individual gas-fired boilers?

A. The cost of steam from electric boilers is higher than the cost of steam from district heating. Compared to district heating costs of between $7.24 and $13.83 per Mlb. in 1987, the cost of steam from electric boilers is greater for boilers of the all the four sizes reviewed ranging from $19.94 per Mlb. to $35.76 per Mlb. in 1987.

Similarly, the cost of steam from individual gas-fired boilers of $10.56 per Mlb. for a typical 200 bhp installation is lower than the cost of steam from electric boilers. Schedule 12 shows that the cost of steam from a typical 200 bhp electric boiler is higher than the cost of steam from both district heating of from individual gas-fired boilers.

Q. Why is the cost of producing steam higher with individual electric boilers than with individual gas-fired boilers or with district heating?

A. There are two basic reasons for the cost of steam from electric boilers exceeding the cost of steam from district heating or steam from individual gas-fired boilers. First, the investment required for electric boilers exceeds the investment for the other alternatives. Second, electricity is a higher cost fuel than natural gas, the input fuel for both the district heating system and for individual gas-fired boilers.

Q. What is the amount of the capital investment required under KCPL's electric boiler conversion plan?

A. KCPL has estimated that the total investment required to convert most of its customers to electric boilers is $23,271,000 which is more than the required investment in district heating of between $2.7 million and $12.9 million and is also more than the capital cost of individual gas-fired boilers of $8.9 million.

Q. Should the Commission approve KCPL's proposal for installing electric boilers?

A. No. The Commission should reject KCPL's proposed plan for installing electric boilers on customers' premises and charging for steam because:

- Electric boilers have the highest total cost of the alternatives reviewed,
- Electric boilers are the highest capital cost alternative,
- Electric boilers have the highest operating cost of the alternatives reviewed, and
- Installing electric boilers simply promotes electric sales.

If KCPL desires to encourage electric boilers, KCPL could market the use of electric boilers at its electric space heating rate rather than hiding the cost of electric boilers in the steam system.

Q. Why should the the full cost of steam from individual electric boilers be presented to customers?

A. If customers are presented with the full cost of electric space heating rather than an arbitrary steam rate, customers will be in a position to make economic decisions regarding electric heating. As a consequence of good economic decisions by customers, unnecessary and uneconomic investment will not be made.

VIII - SERVICE TERRITORY ABANDONMENT

Q. What is KCPL's position on abandonment of its steam business?

A. On page 3 of its "Downtown Steam System Conversion Study", KCPL stated that,

> "Complete abandonment of the steam business may be a logical financial solution for the Company, but it could be a financial disaster to many of KCPL's steam customers. It may not be physically feasible or financially possible for many of them to switch energy form or supplier. In any case, abandonment would have to be approved by the Missouri Public Service Commission."

Q. Are there any additional problems beyond those recognized by KCPL?

A. Yes. Buildings currently on the district heating system may not have remaining lives that justify the investment in a boiler. This could be the result of either building condition or because a building is expected to be razed to make way for new development.

For a building with a short remaining life, the effective cost of steam from an individual building boiler is higher than the cost of steam presented in Sections VI and VII.

For buildings with very short expected remaining lives, building owners may decide to demolish buildings rather than make the investment required to install a heating system.

Q. What can be done to address the physical feasibility and financial consequences of abandonment?

A. There are two basic approaches to these problems.

- KCPL could compensate building owners for the abandonment of the system,

and

- District heating could be either deregulated or minimally regulated to permit customers to cooperate to provide steam.

Compensation for Abandonment

Q. What form could KCPL compensation of building owners take?

A. KCPL could do any of the following:

- Compensate building owners for leaving the system,
- Purchase replacement boiler equipment of the customers' choice,
- Lend money for boiler purchase, and
- Lend money for boiler purchase at below market interest rates.

Q. Have other district heating systems compensated customers when abandoning a district heating system?

A. Yes. At least six district heating systems have assisted customers when discontinuing service. Those systems include:

- Devils Lake, North Dakota,
- Jamestown, North Dakota,
- Grand Forks, North Dakota,
- Fargo, North Dakota,
- Spokane, Washington, and
- Portland, Oregon.

Q. Please describe the shut down of the Devils Lake system.

A. Otter Tail Power Co. sold steam from a cogeneration plant in Devils Lake to approximately 75 retail businesses. The planned start up of a new, large generating plant in 1975 would have made the generation of power at Devils Lake

uneconomical.

In 1973 Otter Tail filed application to the Public Service Commission of the State of North Dakota for authority to discontinue its steam heating utility service no later than July 1, 1975. The application stated the condition that Otter Tail would provide customers with expert engineering assistance and monetary compensation to convert to other heat. Compensation was at a fixed rate per thousand pounds of steam used by each individual customer during the July 1, 1971 - July 1, 1972 period. On this basis, total compensation was calculated at $350,000.

In addition, Otter Tail offered to convey title to the heating system to the City for $1.00 if they would operate a municipal steam heat system. The North Dakota Commission approved the application. The City committed to operate the system. About one half of the users assigned their compensation to the City and became customers of the municipal system and the other half took direct compensation and installed their own heating plants. The City operated the system until 1978 when it was scheduled to be replaced with a garbage burning facility.

Q. Please describe the shut down of the Jamestown system.

A. Otter Tail Power Co. sold steam to 147 customers from a cogeneration plant at Jamestown. Because of the planned 1975 start up of the same generating plant cited in the Devils Lake description, Otter Tail also filed application in 1973 to discontinue steam heating service to Jamestown. The application contained similar engineering and customer compensation conditions.

Total compensation for Jamestown customers totaled $465,000. Otter Tail also of-

fered to convey the steam plant and distribution system to the City for a municipal steam heating system. The North Dakota Commission approved the application and the City of Jamestown formed a municipal heating utility. Otter Tail paid about $130,000 directly to customers who installed their own heating systems and paid approximately $335,000 to the municipal utility which retained about seventy per cent of the load.

Q. Please describe the shut down of the Grand Forks system?

A. Northern States Power Co. was serving 172 customers from with a 20 megawatt cogeneration plant. The plant provided less than 25 percent of the electric energy for the Grand Forks division and was scheduled to cease generation when a new, large generation facility came on stream in 1971. Both the plant and the steam distribution system were over 50 years old and were badly in need of major renovation. On December 19, 1968 Northern States Power filed application to the Public Service Commission of the State of North Dakota for authority to abandon steam heating utility operations. The application stated that the current net investment in the steam operation was $200,000, but that the cost of necessary renovation of existing equipment would increase the investment to $753,000. If the boilers were replaced this number would have become $1,044,000. A steam rate increase of 148 per cent would have been needed to justify the cost of renovation. The increase would have been 224 per cent to justify replacement of the boilers.

The company offered to reimburse each steam customer two thirds of the amount of the lowest competitive bid for installation of a firm gas-fired boiler plus a fuel subsidy of $8.00 per boiler horsepower per year. In addition, an early conversion bonus of twenty per cent of the cost for conversions made in 1969, and ten per cent for

conversions made in 1970 was also offered. By order dated July 22, 1969, the Public Service Commission authorized Northern States Power to terminate steam heating utility service in Grand Forks in accordance with the terms of the proposed conversion plan.

Q. Please describe the shut down of the Fargo system?

A. Northern States Power was selling steam to customers in downtown Fargo from a 24 megawatt cogeneration peaking plant that was built in 1915. Electricity was generated only ten to fifteen per cent of the time and was scheduled to be stopped altogether when a new, large generation plant was to become operable in 1971.

On December 19, 1968 Northern States Power applied to the North Dakota Public Service Commission for authority to abandon steam heating service. The application cited a current net investment in the plant of $300,000. Necessary renovation of the plant would have raised the investment to $900,000 and would have justified a rate increase of 180 per cent. If the boilers had been replaced, the investment would have become $1,250,000 and a rate increase of 192 per cent would have been needed to return seven per cent on the investment.

Northern States offered to reimburse each steam customer two thirds of the amount of the lowest competitive bid for installation of a firm gas-fired boiler plus a fuel subsidy of $8.00 per boiler horsepower per year. In addition, an early conversion bonus of twenty percent of the cost of conversions done in 1969, and ten per cent of the cost of conversions made in 1970 was also offered. On April 22, 1969 the Public Service Commission ordered that Northern States Power be authorized to terminate its steam heating service in Fargo in accordance with the provisions of the proposed

conversion plan.

Q. Please describe the shutdown of the of the Spokane system.

A. Washington Water Power had both a low and a high-pressure distribution system in Spokane. The high pressure lines were in good condition but the low-pressure lines were in dire need of replacement and revenue from the smaller low-pressure customers would not justify the capital expenditure. Washington Water Power financed boilers (up to $50,000) for five years for low-pressure customers and shut down the low-pressure distribution system in 1984. The remaining high-pressure load to larger buildings was profitable to the company. However, the city center complex, the largest individual customer, used a Federal grant to finance gas boiler installation and left the system. The resulting volume reduction made the system unprofitable and it was closed in December of 1986.

Q. Please describe the shutdown of the Portland system.

A. Pacific Power & Light Co. served over 500 customers from a downtown Portland plant which generated electricity until 1964, when cogeneration ended and the plant was converted from coal to oil and natural gas fuel. In the redevelopment of downtown Portland, natural gas and oil-fired boilers were installed in the new, large buildings. The drastic loss of load resulted in highly inefficient operation of the high-capacity plant. Rate increases were reluctantly approved by the Public Utility Commissioner of Oregon. Although average gross revenue per thousand pounds of steam sold increased from $12.79 in 1981 to $18.28 in 1983 the system was still not producing a satisfactory rate of return.

On May 31, 1984 Pacific Gas & Electric filed revised rate schedules designed to phase out the company's steam heat system by July 1, 1985. The company calculated

that costs to operate the system would exceed revenues by $4,297,000 during the phase-out period and proposed to accept that degree of loss.

A $200,000 grant to the Portland Development Commission to subsidize installation of independent heating plants in selected properties was accepted as part of the loss. The Commissioner negotiated a more practical shut-down date of May 31, 1986. The company calculated the additional loss for the eleven month delay at $2,764,000. By order entered February 1, 1985 the Commissioner granted the company's application to recover the additional $2,764,000 through a rate increase and effectively approved May 31, 1986 abandonment of the system.

Q. What is your recommendation regarding KCPL's compensation of customers for the abandonment of the Kansas City district heating system?

A. If KCPL is permitted to abandon the Kansas City district heating system, I recommend that KCPL prepare a plan for the abandonment of the system. That plan should include KCPL's evaluation of the hardship caused by its abandonment and KCPL's proposal for assisting steam customers in the transition to other sources of heat.

District Heating Regulation

Q. Why is district heating regulation an issue if KCPL abandons its district heating system?

A. District heating regulation is an issue because some building owners may find that purchase of steam from a nearby building might be the most cost-effective approach to heating their buildings.

Gas-fired boilers may not be cost effective for all buildings which may result in either the installation of other types of boilers or in the purchase of steam from another building owner. However, building owners with conditions that would permit the installation of gas-fired boilers may desire to install more boiler capacity than required and sell steam to nearby buildings.

Encouraging building owners to cooperate in the provision of steam might lower the total cost of steam as the result of economies of scale and resolve problems for building owners unable to install gas-fired boilers. Inappropriate regulation of district heating could deter these sound economic decisions.

Q. If KCPL is permitted to abandon its Kansas City district heating system, what changes in steam regulation by the Commission would you recommend?

A. If KCPL is permitted to abandon the district heating system, I recommend that the Commission:

- Permit the entry of new district heating suppliers,
- Permit district heating suppliers and customers to enter into contracts which specify the conditions of service and prices to be paid for heating,
- Review contracts to determine whether the price setting approach is unambiguous, and
- As long as contracts specify the method for setting prices, that the Commission only require that the suppliers file notice of changes in rates.

Q. Would you apply your recommendations regarding regulation of district heating to KCPL?

A. No. KCPL has operated as a monopoly supplier with the protection of a service territory within which it was the only permitted supplier. KCPL has decided to aban-

don its steam customers.

Q. Does this conclude your testimony?

A. Yes. It does.

REGULATORY EXPERIENCE OF DERICK O. DAHLEN

Case No.	Utility	Client
Before the Minnesota Public Utilities Commission:		
E-017/GR-86-244	Otter Tail Power Company	Superwood Corporation, et. al.
E-999/R-80-560	Northern States Power Company	Hennepin Energy Resource Co.
E-002/GR-85-558	Northern States Power Company	Suburban Rate Authority
G-002/GR-85-108	Northern States Power Company	City of St. Paul
E-015/M-84-29	Minnesota Power Company	Conwed Corporation, et. al.
G-007/GR-84-669	Inter-City Gas Corporation	Conwed Corporation
G-007/GR-83-317	Inter-City Gas Corporation	Conwed Corporation
E-017/D-83-2	Otter Tail Power Company	Superwood Corporation, et. al.
P-407/AR-81-700	Continental Telephone Company	City of Mound
E-015/GR-81-250	Minnesota Power Company	Conwed Corporation, et. al.
G-007/GR-81-300	Inter-City Gas Corporation	Conwed Corporation
E-017/GR-81-315	Otter Tail Power Company	Superwood Corporation, et. al.
E-017/GR-80-277	Otter Tail Power Company	Superwood Corporation, et. al.
E-015/GR-80-76	Minnesota Power Company	Conwed Corporation, et. al.
E-001/GR-78-1065*	Interstate Power Company	Office of Consumer Service
G-002/GR-78/1052*	Northern States Power Company	City of St. Paul
Before the Federal Energy Regulatory Commission:		
ER79-616	Northern States Power Company	River Electric Association
Before the Public Utilities Commission of Ohio:		
78-1438-EL-AIR*	Columbus and Southern Ohio Electric Company	Office of Consumers Counsel

* Provided analysis but did not testify

DISTRICT HEATING SYSTEMS SURVEY PARTICIPANTS

ATLANTA, GA - Georgia Power Co. (1)

BALTIMORE, MD - Thermal Resources of Baltimore

BIRMINGHAM, AL - Alabama Power Co.

BOSTON, MA - Boston Edison Co.

CLEVELAND, OH - Cleveland Electric Illuminating Co.

DAYTON, OH - Dayton Power & Light Co.

DENVER,CO - Public Service Co. of Colorado

DETROIT, MI - Detroit Edison Co.

ERIE, PA - Pennsylvania Electric Co (2)

HARTFORD, CT - Hartford Steam Co. (3)

INDIANAPOLIS, IN - Indianapolis Power & Light Co.

MILWAUKEE, WI - Wisconsin Electric Power Co.

MINNEAPOLIS, MN - Minneapolis Energy Center (3)

OMAHA, NE - Energy Systems Co. (3)

PHILADELPHIA, PA - Philadelphia Electric Co.

PORTLAND, OR - Pacific Power & Light Co. (4)

ROCHESTER, NY - Rochester District Heating Corp. (2)

ST. LOUIS, MO - Thermal Resources of St. Louis

ST. PAUL, MN - District Energy St. Paul, Inc.

SAN FRANCISCO, CA - Pacific Gas & Electric Co.

SEATTLE, WA - Seattle Steam Corporation

SPOKANE, WA - Washington Water Power Co. (4)

TOLEDO, OH - Toledo Edison Co. (4)

TULSA, OK - Thermal Systems, Inc. (3)

YOUNGSTOWN, OH - Youngstown Central Steam Service

(1) Not reported in aggregated results because of ongoing implementation of plan to abandon system

(2) Not reported in aggregated results because of incomplete data

(3) Not reported in revenue analysis because of impact of chilled water sales

(4) Not reported in aggregated results. System has been shut down

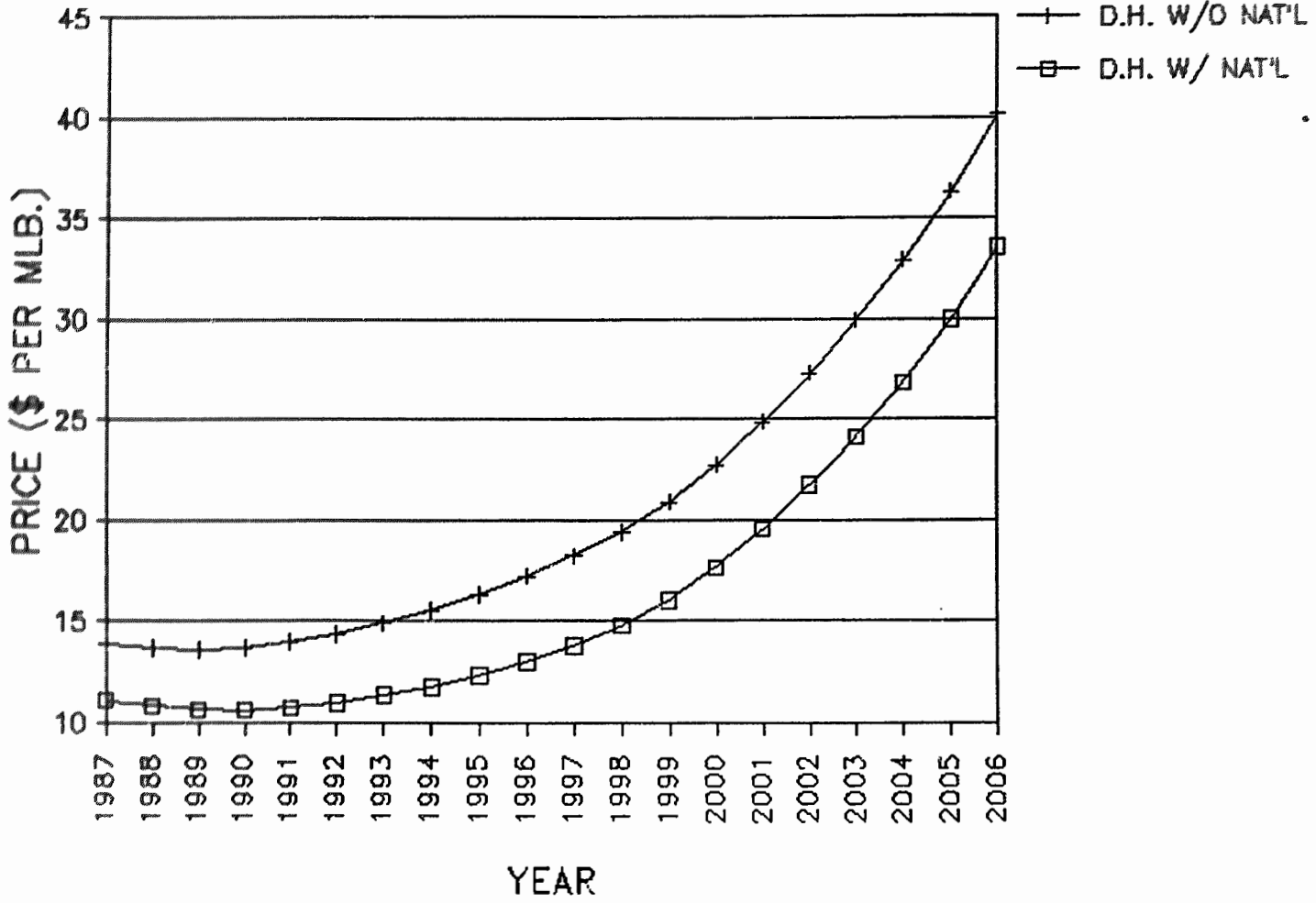
KANSAS CITY POWER & LIGHT COMPANY
CASE NO. HO-86-139
COMPARATIVE STEAM RATES OF OTHER DISTRICT HEATING SYSTEMS
GROSS REVENUE PER MLB. SOLD

SYSTEM	1985	1986
INDEP A	$12.96	12.00
UTIL 1	12.50	11.04
INDEP B	13.59	N/A
UTIL 2	10.32	10.37
UTIL 3	10.50	10.30
UTIL 4	9.44	8.80
UTIL 5	13.22	10.24
UTIL 6	5.93	6.00
UTIL 7	5.98	6.00
INDEP F	16.25	11.90
INDEP G	12.36	12.65
UTIL 8	8.65	7.15
INDEP H	10.37	10.32
AVERAGE	$10.93	9.73

Schedule 3

KCPL CASE NO. HO-86-139

COST OF STEAM WITH LONG-TERM REHABILITATION



Schedule 4

KANSAS CITY POWER & LIGHT COMPANY

2/20/1987

CASE NO. HO-86-139

REHABILITATED SYSTEM INCLUDING SALES TO NATIONAL STARCH

PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH

1987 THROUGH 2006

			1987	1988	1989	1990	1991	1992	1993	1994	1995
SALES:											
DOWNTOWN	458,639	MLB	$4,573,150	4,460,340	4,380,762	4,374,292	4,422,706	4,525,974	4,683,615	4,843,368	5,079,674
NATIONAL STARCH	425,634	MLB	2,766,621	2,749,780	2,764,571	2,838,088	2,957,802	3,123,713	3,334,467	3,578,766	3,857,592
TOTAL	884,273	MLB	7,339,771	7,210,120	7,145,333	7,212,380	7,380,508	7,649,687	8,018,083	8,422,134	8,937,266
EXPENSES:											
FUEL	1,457,328	MMBTU	3,176,975	3,016,669	2,929,229	2,958,376	3,074,962	3,278,988	3,570,454	3,920,212	4,328,264
ELECTRICITY	2,892	MWH	181,965	189,397	194,834	201,630	208,687	215,975	223,523	195,731	206,667
O & M LABOR (INCL FRINGES)			811,400	839,577	868,447	902,994	943,010	988,496	1,038,689	1,094,075	1,155,207
WATER/SEWER	174,508	$	174,508	180,568	186,777	194,207	202,813	212,596	223,391	235,303	248,451
CHEMICAL TREATMENT	190,117	$	190,117	196,719	203,484	211,578	220,954	231,612	243,372	256,350	270,673
MAINTENANCE											
GENERATION			162,400	175,904	181,952	189,190	197,574	207,104	217,620	229,224	242,032
DISTRIBUTION			139,900	144,862	149,843	155,804	162,708	170,556	179,217	188,773	199,321
A & G LABOR	231,000	$	231,000	239,022	247,241	257,076	268,469	281,418	295,708	311,476	328,879
A & G BENEFITS & PENS	92,000	$	92,000	95,195	98,468	102,385	106,923	112,080	117,771	124,051	130,982
MISCELLANEOUS G&A	176,000	$	176,000	182,112	188,374	195,868	204,547	214,414	225,301	237,315	250,575
TOTAL O&M, G&A			5,336,265	5,260,025	5,248,650	5,369,109	5,590,648	5,913,238	6,335,045	6,792,509	7,361,051
DEPRECIATION	12,836,000	30	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867
TOTAL OPERATING EXPENSE AND DEPRECIATION			5,764,131	5,687,892	5,676,516	5,796,975	6,018,514	6,341,105	6,762,912	7,220,375	7,788,918
REQUIRED RETURN			1,337,939	1,292,585	1,247,231	1,201,877	1,156,524	1,111,170	1,065,816	1,020,462	975,108
INCOME TAXES			237,701	229,643	221,585	213,528	205,470	197,412	189,355	181,297	173,239
REVENUE REQUIREMENT			7,339,771	7,210,120	7,145,333	7,212,380	7,380,508	7,649,687	8,018,083	8,422,134	8,937,266
AVERAGE REVENUE REQUIRED PER MLB			9.97	9.73	9.55	9.54	9.64	9.87	10.21	10.56	11.08
GROSS RECEIPTS TAX	11.11%		1.11	1.08	1.06	1.06	1.07	1.10	1.13	1.17	1.23
STEAM COST			11.08	10.81	10.61	10.60	10.71	10.96	11.35	11.73	12.31

Schedule 5-1

KANSAS CITY POWER & LIGHT COMPANY 2/20/1987
CASE NO. HO-86-139
REHABILITATED SYSTEM INCLUDING SALES TO NATIONAL STARCH
PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH
1987 THROUGH 2006

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SALES:											
DOWNTOWN	5,370,111	5,689,554	6,097,159	6,609,617	7,277,945	8,059,795	8,964,248	9,957,687	11,081,812	12,374,660	13,861,183
NATIONAL STARCH	4,179,541	4,527,108	4,942,244	5,436,493	6,046,461	6,741,993	7,530,398	8,388,092	9,345,635	10,430,273	11,660,160
TOTAL	9,549,651	10,216,662	11,039,403	12,046,110	13,324,406	14,801,788	16,494,647	18,345,779	20,427,447	22,804,933	25,521,263
EXPENSES:											
FUEL	4,823,756	5,362,967	6,047,911	6,907,735	8,029,877	9,341,472	10,857,094	12,518,448	14,396,215	16,555,647	19,038,994
ELECTRICITY	218,272	230,621	243,651	257,300	271,580	286,517	302,235	318,807	336,341	354,840	374,356
O & M LABOR (INCL	1,220,077	1,289,101	1,361,934	1,438,227	1,518,052	1,601,546	1,689,401	1,782,034	1,880,046	1,983,448	2,092,538
WATER/SEWER	262,402	277,247	292,911	309,320	326,488	344,445	363,340	383,262	404,342	426,581	450,043
CHEMICAL TREATMENT	285,873	302,046	319,111	336,987	355,691	375,254	395,839	417,544	440,509	464,737	490,297
MAINTENANCE											
GENERATION	255,624	270,085	285,345	301,329	318,054	335,547	353,954	373,362	393,897	415,561	438,417
DISTRIBUTION	210,514	222,423	234,990	248,154	261,927	276,333	291,491	307,474	324,385	342,227	361,049
A & G LABOR	347,348	366,998	387,733	409,453	432,179	455,949	480,961	507,333	535,236	564,674	595,731
A & G BENEFITS & P	138,338	146,164	154,422	163,072	172,123	181,590	191,552	202,055	213,168	224,892	237,261
MISCELLANEOUS G&A	264,646	279,618	295,416	311,965	329,279	347,390	366,446	386,539	407,799	430,228	453,890
TOTAL O&M, G&A	8,026,849	8,747,271	9,623,423	10,683,542	12,015,250	13,546,043	15,292,313	17,196,857	19,331,937	21,762,834	24,532,576
DEPRECIATION	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867
TOTAL OPERATING EXPE	8,454,715	9,175,138	10,051,290	11,111,409	12,443,116	13,973,910	15,720,180	17,624,724	19,759,803	22,190,700	24,960,443
REQUIRED RETURN	929,754	884,400	839,047	793,693	748,339	702,985	657,631	612,277	566,923	521,569	476,216
INCOME TAXES	165,182	157,124	149,066	141,009	132,951	124,894	116,836	108,778	100,721	92,663	84,605
REVENUE REQUIREMENT	9,549,651	10,216,662	11,039,403	12,046,110	13,324,406	14,801,788	16,494,647	18,345,779	20,427,447	22,804,933	25,521,263
AVERAGE REVENUE REQU	11.71	12.41	13.29	14.41	15.87	17.57	19.55	21.71	24.16	26.98	30.22
GROSS RECEIPTS TAX	1.30	1.38	1.48	1.60	1.76	1.95	2.17	2.41	2.68	3.00	3.36
STEAM COST	13.01	13.78	14.77	16.01	17.63	19.53	21.72	24.12	26.85	29.98	33.58

Schedule S-2

KANSAS CITY POWER & LIGHT COMPANY 2/20/1987
CASE NO. HO-86-139
REHABILITATED SYSTEM INCLUDING SALES TO NATIONAL STARCH
PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH
1987 THROUGH 2006
ASSUMPTIONS & CALCULATIONS

			1987	1988	1989	1990	1991	1992	1993	1994	1995
ASSUMPTIONS:											
GNP DEFLATOR	(1982=1)		1.172	1.2127	1.2544	1.3043	1.3621	1.4278	1.5003	1.5803	1.6686
1987 BASE			1	1.034726962	1.070307167	1.112883959	1.162201365	1.218259386	1.280119454	1.348378840	1.423720137
ANNUAL INFL RATE			.0248338580	.0347269625	.0343860806	.0397799745	.0443149582	.0482343440	.0507774198	.0533226688	.0558754667
FUEL COST/MMBTU			2.18	2.07	2.01	2.03	2.11	2.25	2.45	2.69	2.97
PERCENT OF LAST YEAR			.8320610687	.9495412844	.9710144928	1.009950249	1.039408867	1.066350711	1.088888889	1.097959184	1.104089219
ELECTRIC PRICE			62.92	64.39	67.37	69.72	72.16	74.68	77.29	67.68	71.46
N.STARCH FUEL COST			3.114285714	2.957142857	2.871428571	2.9	3.014285714	3.214285714	3.5	3.842857143	4.242857143
N.STARCH OTHER			3.385714286	3.503285359	3.623754266	3.767907118	3.934881765	4.124678206	4.334118723	4.565225500	4.820309605
NATIONAL STARCH PRICE		6.5	6.5	6.460432716	6.495182838	6.667907118	6.949167479	7.338963920	7.834118723	8.408082643	9.063166748
RATE BASE BOP			12,836,000	12,408,133	11,980,267	11,552,400	11,124,533	10,696,667	10,268,800	9,840,933	9,413,067
RATE BASE EOP			12,408,133	11,980,267	11,552,400	11,124,533	10,696,667	10,268,800	9,840,933	9,413,067	8,985,200
RATE BASE AVERAGE			12,622,067	12,194,200	11,766,333	11,338,467	10,910,600	10,482,733	10,054,867	9,627,000	9,199,133
REQUIRED RETURN	10.6%		1,337,939	1,292,585	1,247,231	1,201,877	1,156,524	1,111,170	1,065,816	1,020,462	975,108
INCOME TAXES	34%		237,701	229,643	221,585	213,528	205,470	197,412	189,355	181,297	173,239

Schedule 3-3

KANSAS CITY POWER & LIGHT COMPANY 2/20/1987
CASE NO. HO-86-139
REHABILITATED SYSTEM INCLUDING SALES TO NATIONAL STARCH
PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH
1987 THROUGH 2006
ASSUMPTIONS & CALCULATIONS

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
ASSUMPTIONS:											
GNP DEFLATOR	1.7623	1.862	1.9672	2.0774	2.1927	2.3133	2.4402	2.574	2.71557	2.86492635	3.022497299
1987 BASE	1.503668942	1.588737201	1.678498294	1.772525597	1.870904437	1.973805461	2.082081911	2.196245734	2.317039249	2.444476408	2.578922610
ANNUAL INFL RATE	.0561548604	.0565737956	.0564983888	.0560187068	.0555020699	.0550006841	.0548566982	.0548315712	.055	.055	.055
FUEL COST/MMBTU	3.31	3.68	4.15	4.74	5.51	6.41	7.45	8.59	9.88	11.36	13.06
PERCENT OF LAST YEAR	1.114478114	1.111782477	1.127717391	1.142168675	1.162447257	1.163339383	1.162246490	1.153020134	1.15	1.15	1.15
ELECTRIC PRICE	75.47	79.74	84.25	88.97	93.91	99.07	104.51	110.24	116.30	122.70	129.45
N.STARCH FUEL COST	4.728571429	5.257142857	5.928571429	6.771428571	7.871428571	9.157142857	10.64285714	12.27142857	14.11214286	16.22896429	18.66330893
N.STARCH OTHER	5.090993418	5.379010239	5.682915651	6.001265236	6.334347879	6.682741346	7.049334471	7.435860556	7.844832886	8.276298695	8.731495123
NATIONAL STARCH PRIC	9.819564846	10.63615310	11.61148708	12.77269381	14.20577645	15.83988420	17.69219161	19.70728913	21.95697574	24.50526298	27.39480405
RATE BASE BOP	8,985,200	8,557,333	8,129,467	7,701,600	7,273,733	6,845,867	6,418,000	5,990,133	5,562,267	5,134,400	4,706,533
RATE BASE EOP	8,557,333	8,129,467	7,701,600	7,273,733	6,845,867	6,418,000	5,990,133	5,562,267	5,134,400	4,706,533	4,278,667
RATE BASE AVERAGE	8,771,267	8,343,400	7,915,533	7,487,667	7,059,800	6,631,933	6,204,067	5,776,200	5,348,333	4,920,467	4,492,600
REQUIRED RETURN	929,754	884,400	839,047	793,693	748,339	702,985	657,631	612,277	566,923	521,569	476,216
INCOME TAXES	165,182	157,124	149,066	141,009	132,951	124,894	116,836	108,778	100,721	92,663	84,605

Schedule 14

KANSAS CITY POWER & LIGHT COMPANY

2/20/1987

CASE NO. HO-86-139

REHABILITATED SYSTEM WITH NO SALES TO NATIONAL STARCH

PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH

1987 THROUGH 2006

			1987	1988	1989	1990	1991	1992	1993	1994	1995
SALES:											
DOWNTOWN	458,639	MLB	$5,707,338	5,639,155	5,604,631	5,649,115	5,755,153	5,922,730	6,150,148	6,402,138	6,721,539
NATIONAL STARCH	0	MLB	0	0	0	0	0	0	0	0	0
TOTAL	458,639	MLB	5,707,338	5,639,155	5,604,631	5,649,115	5,755,153	5,922,730	6,150,148	6,402,138	6,721,539
EXPENSES:											
FUEL	818,430	MMBTU	1,784,177	1,694,150	1,645,044	1,661,413	1,726,887	1,841,468	2,005,154	2,201,577	2,430,737
ELECTRICITY	1,624	MWH	102,182	106,356	109,409	113,225	117,188	121,280	125,519	109,912	116,054
O & M LABOR (INCL FRINGES)			811,400	839,577	868,447	902,994	943,010	988,496	1,038,689	1,094,075	1,155,207
WATER/SEWER	98,003	$	98,003	101,406	104,893	109,066	113,899	119,393	125,456	132,145	139,529
CHEMICAL TREATMENT	106,769	$	106,769	110,477	114,276	118,822	124,087	130,072	136,677	143,965	152,009
MAINTENANCE											
GENERATION			162,400	175,904	181,952	189,190	197,574	207,104	217,620	229,224	242,032
DISTRIBUTION			139,900	144,862	149,843	155,804	162,708	170,556	179,217	188,773	199,321
A & G LABOR	231,000	$	231,000	239,022	247,241	257,076	268,469	281,418	295,708	311,476	328,879
A & G BENEFITS & PENS	92,000	$	92,000	95,195	98,468	102,385	106,923	112,080	117,771	124,051	130,982
MISCELLANEOUS G&A	176,000	$	176,000	182,112	188,374	195,868	204,547	214,414	225,301	237,315	250,575
TOTAL O&M, G&A			3,703,831	3,689,061	3,707,948	3,805,843	3,965,293	4,186,281	4,467,111	4,772,512	5,145,325
DEPRECIATION	12,836,000	30	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867
TOTAL OPERATING EXPENSE AND DEPRECIATION			4,131,698	4,116,927	4,135,815	4,233,709	4,393,159	4,614,147	4,894,977	5,200,379	5,573,192
REQUIRED RETURN			1,337,939	1,292,585	1,247,231	1,201,877	1,156,524	1,111,170	1,065,816	1,020,462	975,108
INCOME TAXES			237,701	229,643	221,585	213,528	205,470	197,412	189,355	181,297	173,239
REVENUE REQUIREMENT			5,707,338	5,639,155	5,604,631	5,649,115	5,755,153	5,922,730	6,150,148	6,402,138	6,721,539
AVERAGE REVENUE REQUIRED PER MLB			12.44	12.30	12.22	12.32	12.55	12.91	13.41	13.96	14.66
GROSS RECEIPTS TAX	11.11%		1.38	1.37	1.36	1.37	1.39	1.43	1.49	1.55	1.63
STEAM COST			13.83	13.66	13.58	13.69	13.94	14.35	14.90	15.51	16.28

Schedule S-5

KANSAS CITY POWER & LIGHT COMPANY 2/20/1987
CASE NO. HO-86-139
REHABILITATED SYSTEM WITH NO SALES TO NATIONAL STARCH
PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH
1987 THROUGH 2006

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SALES:											
DOWNTOWN	7,098,831	7,510,437	8,012,834	8,621,577	9,385,934	10,265,310	11,269,514	12,366,788	13,598,239	15,000,539	16,598,113
NATIONAL STARCH	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7,098,831	7,510,437	8,012,834	8,621,577	9,385,934	10,265,310	11,269,514	12,366,788	13,598,239	15,000,539	16,598,113
EXPENSES:											
FUEL	2,709,003	3,011,822	3,396,485	3,879,358	4,509,549	5,246,136	6,097,304	7,030,314	8,084,861	9,297,590	10,692,228
ELECTRICITY	122,571	129,505	136,822	144,486	152,506	160,894	169,720	179,026	188,872	199,260	210,219
O & M LABOR (INCL	1,220,077	1,289,101	1,361,934	1,438,227	1,518,052	1,601,546	1,689,401	1,782,034	1,880,046	1,983,448	2,092,538
WATER/SEWER	147,364	155,701	164,498	173,713	183,354	193,439	204,050	215,239	227,077	239,566	252,742
CHEMICAL TREATMENT	160,545	169,628	179,212	189,251	199,755	210,741	222,302	234,491	247,388	260,994	275,349
MAINTENANCE											
GENERATION	255,624	270,085	285,345	301,329	318,054	335,547	353,954	373,362	393,897	415,561	438,417
DISTRIBUTION	210,514	222,423	234,990	248,154	261,927	276,333	291,491	307,474	324,385	342,227	361,049
A & G LABOR	347,348	366,998	387,733	409,453	432,179	455,949	480,961	507,333	535,236	564,674	595,731
A & G BENEFITS & P	138,338	146,164	154,422	163,072	172,123	181,590	191,552	202,055	213,168	224,892	237,261
MISCELLANEOUS G&A	264,646	279,618	295,416	311,965	329,279	347,390	366,446	386,539	407,799	430,228	453,890
TOTAL O&M, G&A	5,576,028	6,041,046	6,596,854	7,259,009	8,076,777	9,009,564	10,067,181	11,217,866	12,502,728	13,958,440	15,609,425
DEPRECIATION	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867	427,867
TOTAL OPERATING EXPE	6,003,895	6,468,913	7,024,721	7,686,875	8,504,644	9,437,431	10,495,047	11,645,732	12,930,595	14,386,307	16,037,292
REQUIRED RETURN	929,754	884,400	839,047	793,693	748,339	702,985	657,631	612,277	566,923	521,569	476,216
INCOME TAXES	165,182	157,124	149,066	141,009	132,951	124,894	116,836	108,778	100,721	92,663	84,605
REVENUE REQUIREMENT	7,098,831	7,510,437	8,012,834	8,621,577	9,385,934	10,265,310	11,269,514	12,366,788	13,598,239	15,000,539	16,598,113
AVERAGE REVENUE REQU	15.48	16.38	17.47	18.80	20.46	22.38	24.57	26.96	29.65	32.71	36.19
GROSS RECEIPTS TAX	1.72	1.82	1.94	2.09	2.27	2.49	2.73	3.00	3.29	3.63	4.02
STEAM COST	17.20	18.19	19.41	20.89	22.74	24.87	27.30	29.96	32.94	36.34	40.21

Schedule 5-6

KANSAS CITY POWER & LIGHT COMPANY

2/20/1987

CASE NO. HO-86-139

REHABILITATED SYSTEM WITH NO SALES TO NATIONAL STARCH

PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH

1987 THROUGH 2006

ASSUMPTIONS & CALCULATIONS

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
ASSUMPTIONS:											
GNP DEFLATOR	1.7623	1.862	1.9672	2.0774	2.1927	2.3133	2.4402	2.574	2.71557	2.86492635	3.022497299
1987 BASE	1.503668942	1.588737201	1.678498294	1.772525597	1.870904437	1.973805461	2.082081911	2.196245734	2.317039249	2.444476408	2.578922618
ANNUAL INFL RATE	.0561548604	.0565737956	.0564983888	.0560187068	.0555020699	.0550006841	.0548566982	.0548315712	.055	.055	.055
FUEL COST/MMBTU	3.31	3.68	4.15	4.74	5.51	6.41	7.45	8.59	9.88	11.36	13.06
PERCENT OF LAST YEAR	1.114478114	1.111782477	1.127717391	1.142168675	1.162447257	1.163339383	1.162246490	1.153020134	1.15	1.15	1.15
ELECTRIC PRICE	75.47	79.74	84.25	88.97	93.91	99.07	104.51	110.24	116.30	122.70	129.45
N.STARCH FUEL COST	4.728571429	5.257142857	5.928571429	6.771428571	7.871428571	9.157142857	10.64285714	12.27142857	14.11214286	16.22896429	18.66330893
N.STARCH OTHER	5.090993418	5.379010239	5.682915651	6.001265236	6.334347879	6.682741346	7.049334471	7.435860556	7.844832886	8.276298695	8.731495123
NATIONAL STARCH PRIC	9.819564846	10.63615310	11.61148708	12.77269381	14.20577645	15.83988420	17.69219161	19.70728913	21.95697574	24.50526298	27.39480405
RATE BASE BOP	8,985,200	8,557,333	8,129,467	7,701,600	7,273,733	6,845,867	6,418,000	5,990,133	5,562,267	5,134,400	4,706,533
RATE BASE EOP	8,557,333	8,129,467	7,701,600	7,273,733	6,845,867	6,418,000	5,990,133	5,562,267	5,134,400	4,706,533	4,278,667
RATE BASE AVERAGE	8,771,267	8,343,400	7,915,533	7,487,667	7,059,800	6,631,933	6,204,067	5,776,200	5,348,333	4,920,467	4,492,600
REQUIRED RETURN	929,754	884,400	839,047	793,693	748,339	702,985	657,631	612,277	566,923	521,569	476,216
INCOME TAXES	165,182	157,124	149,066	141,009	132,951	124,894	116,836	108,778	100,721	92,663	84,605

Schedule S-7

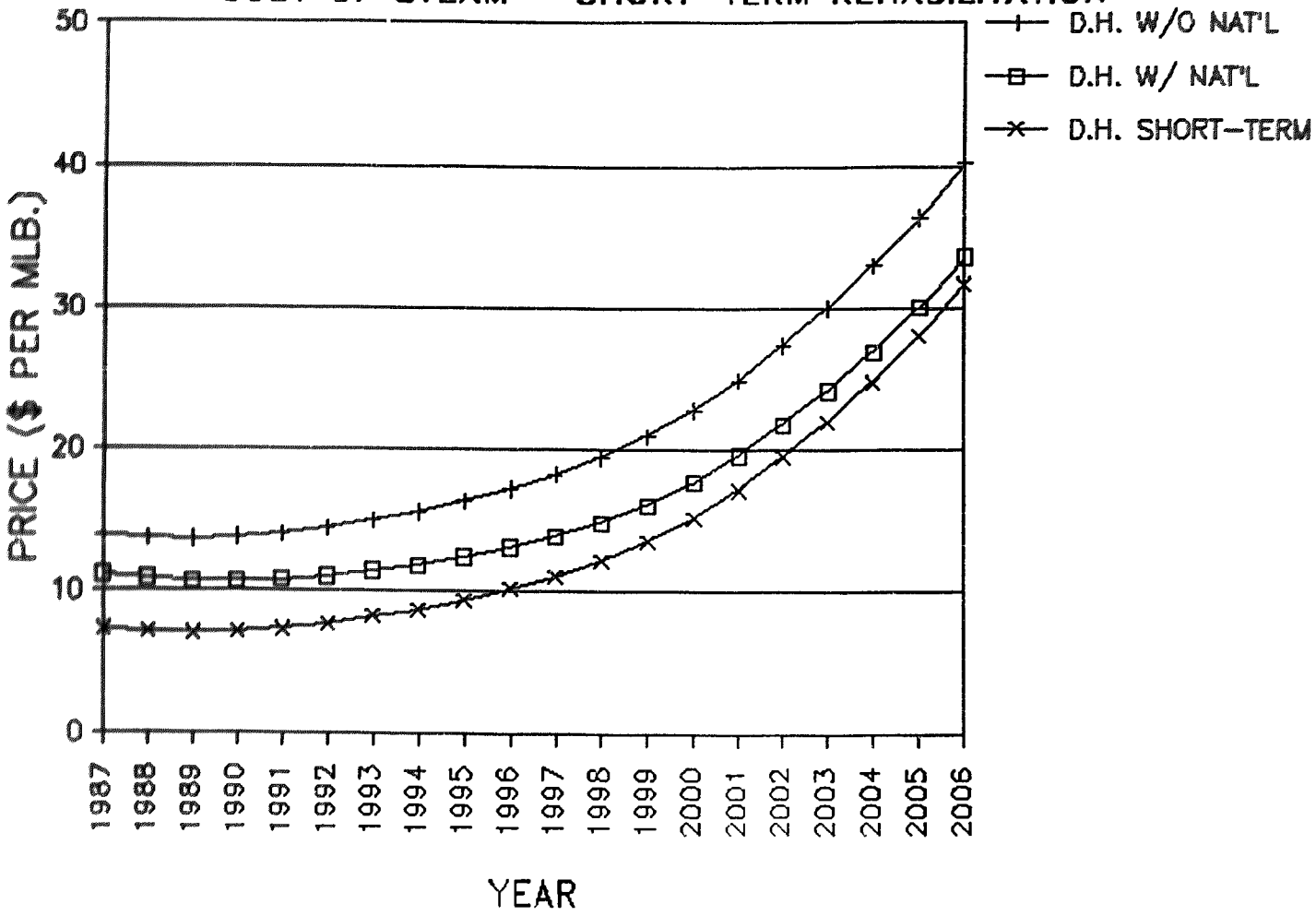
KANSAS CITY POWER & LIGHT COMPANY 2/20/1987
CASE NO. HO-86-139
REHABILITATED SYSTEM WITH NO SALES TO NATIONAL STARCH
PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH
1987 THROUGH 2006
ASSUMPTIONS & CALCULATIONS

			1987	1988	1989	1990	1991	1992	1993	1994	1995
ASSUMPTIONS:											
GNP DEFLATOR	(1982=1)		1.172	1.2127	1.2544	1.3043	1.3621	1.4278	1.5003	1.5803	1.6686
1987 BASE			1	1.034726962	1.070307167	1.112883959	1.162201365	1.218259386	1.280119454	1.348378840	1.423720137
ANNUAL INFL RATE			.0248338580	.0347269625	.0343860806	.0397799745	.0443149582	.0482343440	.0507774198	.0533226688	.0558754667
FUEL COST/MMBTU			2.18	2.07	2.01	2.03	2.11	2.25	2.45	2.69	2.97
PERCENT OF LAST YEAR			.8320610687	.9495412844	.9710144928	1.009950249	1.039408867	1.066350711	1.088888889	1.097959184	1.104089219
ELECTRIC PRICE			62.92	65.49	67.37	69.72	72.16	74.68	77.29	67.68	71.46
N.STARCH FUEL COST			3.114285714	2.957142857	2.871428571	2.9	3.014285714	3.214285714	3.5	3.842857143	4.242857143
N.STARCH OTHER			3.385714286	3.503289859	3.623754266	3.767907118	3.934881765	4.124678206	4.334118723	4.565225500	4.820309605
NATIONAL STARCH PRICE		6.5	6.5	6.460432716	6.495182838	6.667907118	6.949167479	7.338963920	7.834118723	8.408082643	9.063166748
RATE BASE BOP			12,836,000	12,408,133	11,980,267	11,552,400	11,124,533	10,696,667	10,268,800	9,840,933	9,413,067
RATE BASE EOP			12,408,133	11,980,267	11,552,400	11,124,533	10,696,667	10,268,800	9,840,933	9,413,067	8,985,200
RATE BASE AVERAGE			12,622,067	12,194,200	11,766,333	11,338,467	10,910,600	10,482,733	10,054,867	9,627,000	9,199,133
REQUIRED RETURN	10.6%		1,337,939	1,292,585	1,247,231	1,201,877	1,156,524	1,111,170	1,065,816	1,020,462	975,108
INCOME TAXES	34%		237,701	229,643	221,585	213,528	205,470	197,412	189,355	181,297	173,239

Schedule S-8

KCPL CASE NO. HO-86-139

COST OF STEAM - SHORT-TERM REHABILITATION



Schedule 6

KANSAS CITY POWER & LIGHT COMPANY

2/20/1987

CASE NO. HO-86-139

SHORT-TERM REHABILITATED SYSTEM INCLUDING SALES TO NATIONAL STARCH

PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH

1987 THROUGH 2006

			1987	1988	1989	1990	1991	1992	1993	1994	1995
SALES:											
DOWNTOWN	458,639	MLB	$2,987,171	2,916,641	2,879,345	2,915,155	3,005,849	3,151,398	3,351,320	3,553,354	3,831,940
NATIONAL STARCH	425,634	MLB	2,766,621	2,749,780	2,764,571	2,838,088	2,957,802	3,123,713	3,334,467	3,578,766	3,857,592
TOTAL	884,273	MLB	5,753,792	5,666,421	5,643,915	5,753,243	5,963,651	6,275,111	6,685,787	7,132,120	7,689,532
EXPENSES:											
FUEL	1,457,328	MMBTU	3,176,975	3,016,669	2,929,229	2,958,376	3,074,962	3,278,988	3,570,454	3,920,212	4,328,264
ELECTRICITY	2,892	MWH	181,965	189,397	194,834	201,630	208,687	215,975	223,523	195,731	206,667
O & M LABOR (INCL FRINGES)			811,400	839,577	868,447	902,994	943,010	988,496	1,038,689	1,094,075	1,155,287
WATER/SEWER	174,508	$	174,508	180,568	186,777	194,207	202,813	212,596	223,391	235,303	248,491
CHEMICAL TREATMENT	190,117	$	190,117	196,719	203,484	211,578	220,954	231,612	243,372	256,350	270,673
MAINTENANCE											
GENERATION			162,400	175,904	181,952	189,190	197,574	207,104	217,620	229,224	242,032
DISTRIBUTION			139,900	144,862	149,843	155,804	162,708	170,556	179,217	188,773	199,321
A & G LABOR	231,000	$	231,000	239,022	247,241	257,076	268,469	281,418	295,708	311,476	328,879
A & G BENEFITS & PENS	92,000	$	92,000	95,195	98,468	102,385	106,923	112,080	117,771	124,051	130,982
MISCELLANEOUS G&A	176,000	$	176,000	182,112	188,374	195,868	204,547	214,414	225,301	237,315	250,575
TOTAL O&M, G&A			5,336,265	5,260,025	5,248,650	5,369,109	5,590,648	5,913,238	6,335,045	6,792,509	7,361,051
DEPRECIATION	2,675,000	30	89,167	89,167	89,167	89,167	89,167	89,167	89,167	89,167	89,167
TOTAL OPERATING EXPENSE AND DEPRECIATION			5,425,431	5,349,192	5,337,816	5,458,275	5,679,814	6,002,405	6,424,212	6,881,675	7,450,218
REQUIRED RETURN			278,824	269,373	259,921	250,469	241,018	231,566	222,114	212,663	203,211
INCOME TAXES			49,536	47,857	46,178	44,499	42,820	41,140	39,461	37,782	36,103
REVENUE REQUIREMENT			$5,753,792	5,666,421	5,643,915	5,753,243	5,963,651	6,275,111	6,685,787	7,132,120	7,689,532
AVERAGE REVENUE REQUIRED PER MLB			$6.51	6.36	6.28	6.36	6.55	6.87	7.31	7.75	8.36
GROSS RECEIPTS TAX	11.11%		.72	.71	.70	.71	.73	.76	.81	.86	.93
STEAM COST			$7.24	7.07	6.98	7.06	7.28	7.63	8.12	8.61	9.28

Schedule 7-1

KANSAS CITY POWER & LIGHT COMPANY

CASE NO. HO-86-139

SHORT-TERM REHABILITATED SYSTEM INCLUDING SALES TO NATIONAL STARCH

PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH

1987 THROUGH 2006

2/20/1987

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SALES:											
DOWNTOWN	4,164,657	4,526,381	4,976,267	5,531,006	6,241,614	7,065,745	8,012,479	9,048,198	10,214,604	11,549,732	13,078,457
NATIONAL STARCH	4,179,541	4,527,108	4,942,244	5,436,493	6,046,461	6,741,993	7,530,398	8,388,092	9,345,635	10,430,273	11,660,160
TOTAL	8,344,198	9,053,490	9,918,511	10,967,499	12,288,076	13,807,738	15,542,877	17,436,290	19,560,239	21,980,005	24,738,617
EXPENSES:											
FUEL	4,823,756	5,362,967	6,047,911	6,907,735	8,029,877	9,341,472	10,857,094	12,518,448	14,396,215	16,535,647	19,038,994
ELECTRICITY	218,272	230,621	243,651	257,300	271,580	286,517	302,235	318,807	336,341	354,940	374,356
O & M LABOR (INCL	1,220,077	1,289,101	1,361,934	1,438,227	1,518,052	1,601,546	1,689,401	1,782,034	1,880,046	1,983,448	2,092,538
WATER/SEWER	262,402	277,247	292,911	309,320	326,488	344,445	363,340	383,262	404,342	426,581	450,043
CHEMICAL TREATMENT	285,873	302,046	319,111	336,987	355,691	375,254	395,839	417,544	440,509	464,737	490,297
MAINTENANCE											
GENERATION	255,624	270,085	285,345	301,329	318,054	335,547	353,954	373,362	393,897	415,561	438,417
DISTRIBUTION	210,514	222,423	234,990	248,154	261,927	276,333	291,491	307,474	324,385	342,227	361,049
A & G LABOR	347,348	366,998	387,733	409,453	432,179	455,949	480,961	507,333	535,236	564,674	595,731
A & G BENEFITS & P	138,338	146,164	154,422	163,072	172,123	181,590	191,552	202,055	213,166	224,892	237,261
MISCELLANEOUS G&A	264,646	279,618	295,416	311,965	329,279	347,390	366,446	386,539	407,799	430,228	453,890
TOTAL O&M, G&A	8,026,849	8,747,271	9,623,423	10,683,542	12,015,250	13,546,043	15,292,313	17,196,857	19,331,937	21,762,834	24,532,576
DEPRECIATION	89,167	89,167	89,167	89,167	89,167	89,167	89,167	89,167	89,167	89,167	89,167
TOTAL OPERATING EXPE	8,116,015	8,836,438	9,712,590	10,772,709	12,104,416	13,635,210	15,381,480	17,286,024	19,421,103	21,852,000	24,621,743
REQUIRED RETURN	193,759	184,308	174,856	165,404	155,953	146,501	137,049	127,598	118,146	108,694	99,243
INCOME TAXES	34,424	32,744	31,065	29,386	27,707	26,028	24,348	22,669	20,990	19,311	17,632
REVENUE REQUIREMENT	8,344,198	9,053,490	9,918,511	10,967,499	12,288,076	13,807,738	15,542,877	17,436,290	19,560,239	21,980,005	24,738,617
AVERAGE REVENUE REQU	9.08	9.87	10.85	12.06	13.61	15.41	17.47	19.73	22.27	25.18	28.52
GROSS RECEIPTS TAX	1.01	1.10	1.21	1.34	1.51	1.71	1.94	2.19	2.47	2.80	3.17
STEAM COST	10.09	10.97	12.06	13.40	15.12	17.12	19.41	21.92	24.75	27.98	31.68

Schedule 7-2

KANSAS CITY POWER & LIGHT COMPANY 2/20/1987
CASE NO. HO-86-139
SHORT-TERM REHABILITATED SYSTEM INCLUDING SALES TO NATIONAL STARCH
PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH
1987 THROUGH 2006
ASSUMPTIONS & CALCULATIONS

		1987	1988	1989	1990	1991	1992	1993	1994	1995
ASSUMPTIONS:										
GNP DEFLATOR	(1982=1)	1.172	1.2127	1.2544	1.3043	1.3621	1.4278	1.5003	1.5803	1.6686
1987 BASE		1	1.034726962	1.070307167	1.112883959	1.162201365	1.218259386	1.280119454	1.348378840	1.423720137
ANNUAL INFL RATE		.0248338580	.0347269625	.0343860806	.0397799745	.0443149582	.0482343440	.0507774198	.0533226688	.0558754667
FUEL COST/MMBTU		2.18	2.07	2.01	2.03	2.11	2.25	2.45	2.69	2.97
PERCENT OF LAST YEAR		.8320610687	.9495412844	.9710144928	1.009950249	1.039408867	1.066350711	1.088888889	1.097959184	1.104089219
ELECTRIC PRICE		62.92	65.49	67.37	69.72	72.16	74.68	77.29	67.68	71.46
N.STARCH FUEL COST		3.114285714	2.957142857	2.871428571	2.9	3.014285714	3.214285714	3.5	3.842857143	4.242857143
N.STARCH OTHER		3.385714286	3.503289859	3.623754266	3.767907118	3.934881765	4.124678206	4.334118723	4.565225500	4.820309605
NATIONAL STARCH PRICE	6.5	6.5	6.460432716	6.495182838	6.667907118	6.949167479	7.338963920	7.834118723	8.408082643	9.063166748
RATE BASE BOP		2,675,000	2,585,833	2,496,667	2,407,500	2,318,333	2,229,167	2,140,000	2,050,833	1,961,667
RATE BASE EOP		2,585,833	2,496,667	2,407,500	2,318,333	2,229,167	2,140,000	2,050,833	1,961,667	1,872,500
RATE BASE AVERAGE		2,630,417	2,541,250	2,452,083	2,362,917	2,273,750	2,184,583	2,095,417	2,006,250	1,917,083
REQUIRED RETURN	10.6%	278,824	269,373	259,921	250,469	241,018	231,566	222,114	212,663	203,211
INCOME TAXES	34%	49,536	47,857	46,178	44,499	42,820	41,140	39,461	37,782	36,103

Schedule 7-3

KANSAS CITY POWER & LIGHT COMPANY

CASE NO. HO-86-139

SHORT-TERM REHABILITATED SYSTEM INCLUDING SALES TO NATIONAL STARCH

PROJECTED COST OF STEAM PER MLB. USING REVENUE REQUIREMENTS APPROACH

1987 THROUGH 2006

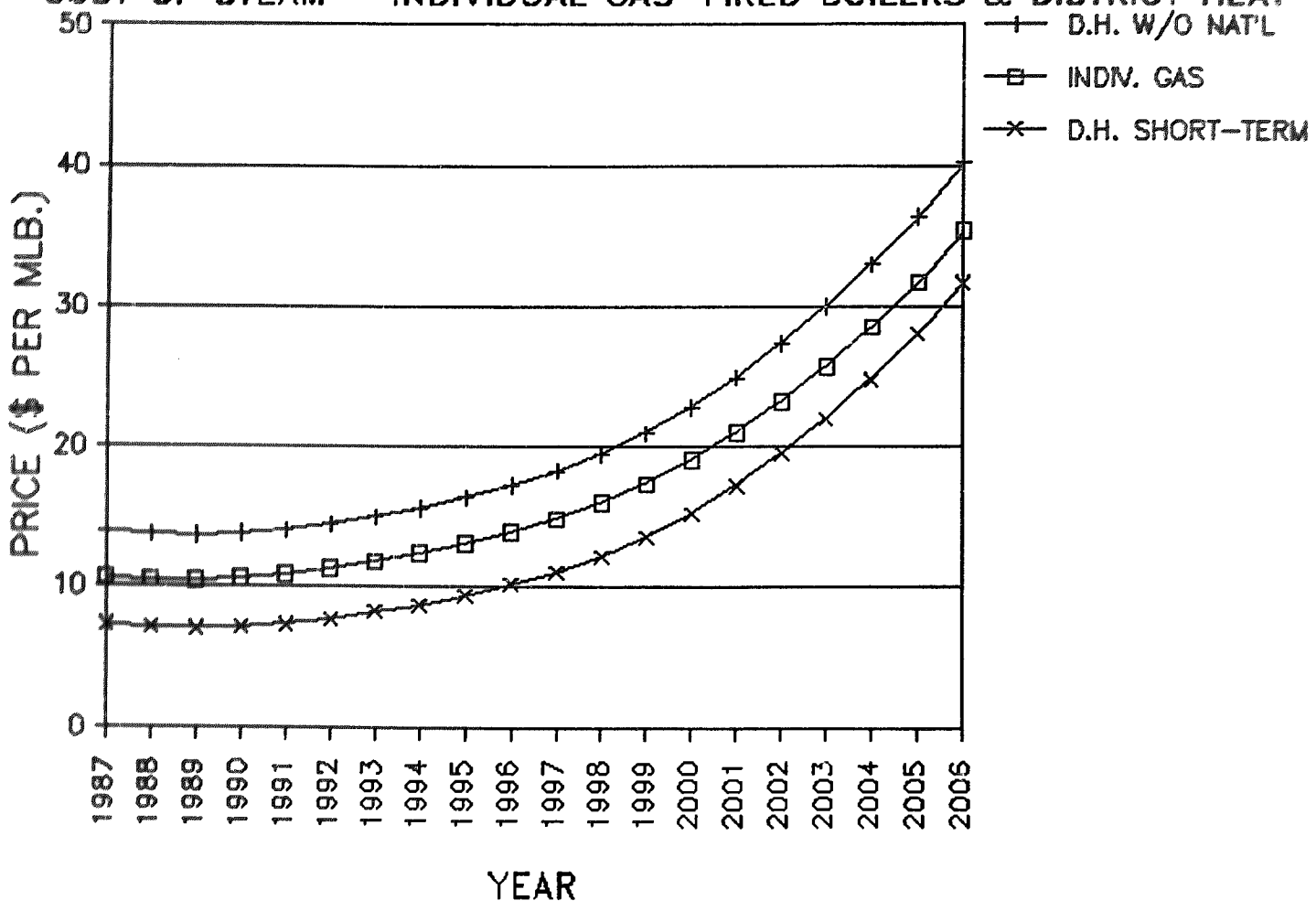
ASSUMPTIONS & CALCULATIONS

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
ASSUMPTIONS:											
GNP DEFLATOR	1.7623	1.862	1.9672	2.0774	2.1927	2.3133	2.4402	2.574	2.71557	2.86492635	3.022497299
1987 BASE	1.503668942	1.588737201	1.67848294	1.772525597	1.870904437	1.973805461	2.082081911	2.196245734	2.317039249	2.444476408	2.578922618
ANNUAL INFL RATE	.0561548604	.0565737956	.0564983888	.0560187068	.0555020699	.0550006341	.0548566982	.0548315712	.055	.055	.055
FUEL COST/MMBTU	3.31	3.68	4.15	4.74	5.51	6.41	7.45	8.59	9.88	11.36	13.06
PERCENT OF LAST YEAR	1.114478114	1.111782477	1.127717391	1.142168675	1.162447257	1.163339383	1.162246490	1.153020134	1.15	1.15	1.15
ELECTRIC PRICE	75.47	79.74	84.25	88.97	93.91	99.07	104.51	110.24	116.30	122.70	129.45
N.STARCH FUEL COST	4.728571429	5.257142857	5.928571429	6.771428571	7.871428571	9.157142857	10.64285714	12.27142857	14.11214286	16.22896429	18.66330893
N.STARCH OTHER	5.090993418	5.379010239	5.682915651	6.001265236	6.334347879	6.682741346	7.049334471	7.435860556	7.844832886	8.276298695	8.731495123
NATIONAL STARCH PRIC	9.819564846	10.63615310	11.61148708	12.77269381	14.20577645	15.83988420	17.69219161	19.70728913	21.95697574	24.50526298	27.39480405
RATE BASE BOP	1,872,500	1,783,333	1,694,167	1,605,000	1,515,833	1,426,667	1,337,500	1,248,333	1,159,167	1,070,000	980,833
RATE BASE EOP	1,783,333	1,694,167	1,605,000	1,515,833	1,426,667	1,337,500	1,248,333	1,159,167	1,070,000	980,833	891,667
RATE BASE AVERAGE	1,827,917	1,738,750	1,649,583	1,560,417	1,471,250	1,382,083	1,292,917	1,203,750	1,114,583	1,025,417	936,250
REQUIRED RETURN	193,759	184,308	174,856	165,404	155,953	146,501	137,049	127,598	118,146	108,694	99,243
INCOME TAXES	34,424	32,744	31,065	29,386	27,707	26,028	24,348	22,669	20,990	19,311	17,632

Schedule 7-4

KCPL CASE NO. HO-86-139

COST OF STEAM – INDIVIDUAL GAS-FIRED BOILERS & DISTRICT HEAT



KANSAS CITY POWER & LIGHT COMPANY
CASE NO. HO-86-139
PROJECTED STEAM COST PER MLB.
200 BHP GAS-FIRED INDIVIDUAL BOILER
1987 THROUGH 2006

2/20/87

MLB	5,519										
OPERATING LABOR	3,000										
FLOOR SPACE	600										
INSTALL COST	124,000	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
FUEL	8,243	$25,340	24,083	23,406	23,599	24,470	26,017	28,145	30,660	33,658	37,237
ELECTRICITY	9,934	1,084	1,128	1,160	1,201	1,243	1,286	1,331	1,166	1,231	1,300
WATER/SEWER	.0266ccf/MLB	160	166	171	178	186	195	205	216	228	241
CHEMICAL TREATMENT	.0426	235	243	252	262	273	286	301	317	335	354
BASIC BOILER INSURANCE	200	200	207	214	223	232	244	256	270	285	301
FLOOR SPACE	5.75	3,450	3,570	3,693	3,839	4,010	4,203	4,416	4,652	4,912	5,188
REAL ESTATE TAX	15.19	1,884	1,949	2,016	2,096	2,189	2,295	2,411	2,540	2,682	2,832
OPERATING LABOR		3,000	3,104	3,211	3,339	3,487	3,655	3,840	4,045	4,271	4,511
MAINTENANCE	.025	3,100	3,208	3,318	3,450	3,603	3,777	3,968	4,180	4,414	4,661
RETURN, DEBT SVC, TAXES	15%,20 YEARS	19,810	19,810	19,810	19,810	19,810	19,810	19,810	19,810	19,810	19,810
TOTAL COST		$58,263	57,468	57,251	57,997	59,503	61,768	64,685	67,855	71,825	76,434
COST PER MLB		$10.56	10.41	10.37	10.51	10.78	11.19	11.72	12.29	13.01	13.85
GNP DEFLATOR	(1982=1)	1.172	1.2127	1.2544	1.3043	1.3621	1.4278	1.5003	1.5803	1.6686	1.7623
1987 BASE		1	1.0347270	1.0703072	1.1128840	1.1622014	1.2182594	1.2801195	1.3483788	1.4237201	1.5036689
ANNUAL INFL RATE			.02483386	.03472696	.03438608	.03977997	.04431496	.04823434	.05077742	.05332267	.05587547	.05615486
FUEL COST/MMBTU		2.62	2.49	2.42	2.44	2.53	2.69	2.91	3.17	3.48	3.85
FUEL COST/MMBTU INCLUDING GRT & SALES		3.074177	2.9216415	2.839507	2.862974	2.9685755	3.1563115	3.4144485	3.7195195	4.083258	4.5173975
PERCENT OF LAST YEAR		.83206107	.94954128	.97101449	1.0099502	1.0394089	1.0663507	1.0888889	1.0979592	1.1040892	1.1144781
ELECTRIC PRICE		.09297187	.09676959	.09954338	.10302169	.10661799	.11034228	.11415516	.10000078	.10558837	.11151767
ELECTRIC PRICE INCLUDING GRT & SALES		.10908854	.11354460	.11679922	.12088050	.12510022	.12947011	.13394396	.11733592	.12389211	.13084926

(GRT & SALES TAXES = 17.335 %)

Schedule 9-1

KANSAS CITY POWER & LIGHT COMPANY 2/20/87
CASE NO. HO-86-139
PROJECTED STEAM COST PER MLB.
200 BHP GAS-FIRED INDIVIDUAL BOILER
1987 THROUGH 2006

MLB
OPERATING LABOR
FLOOR SPACE

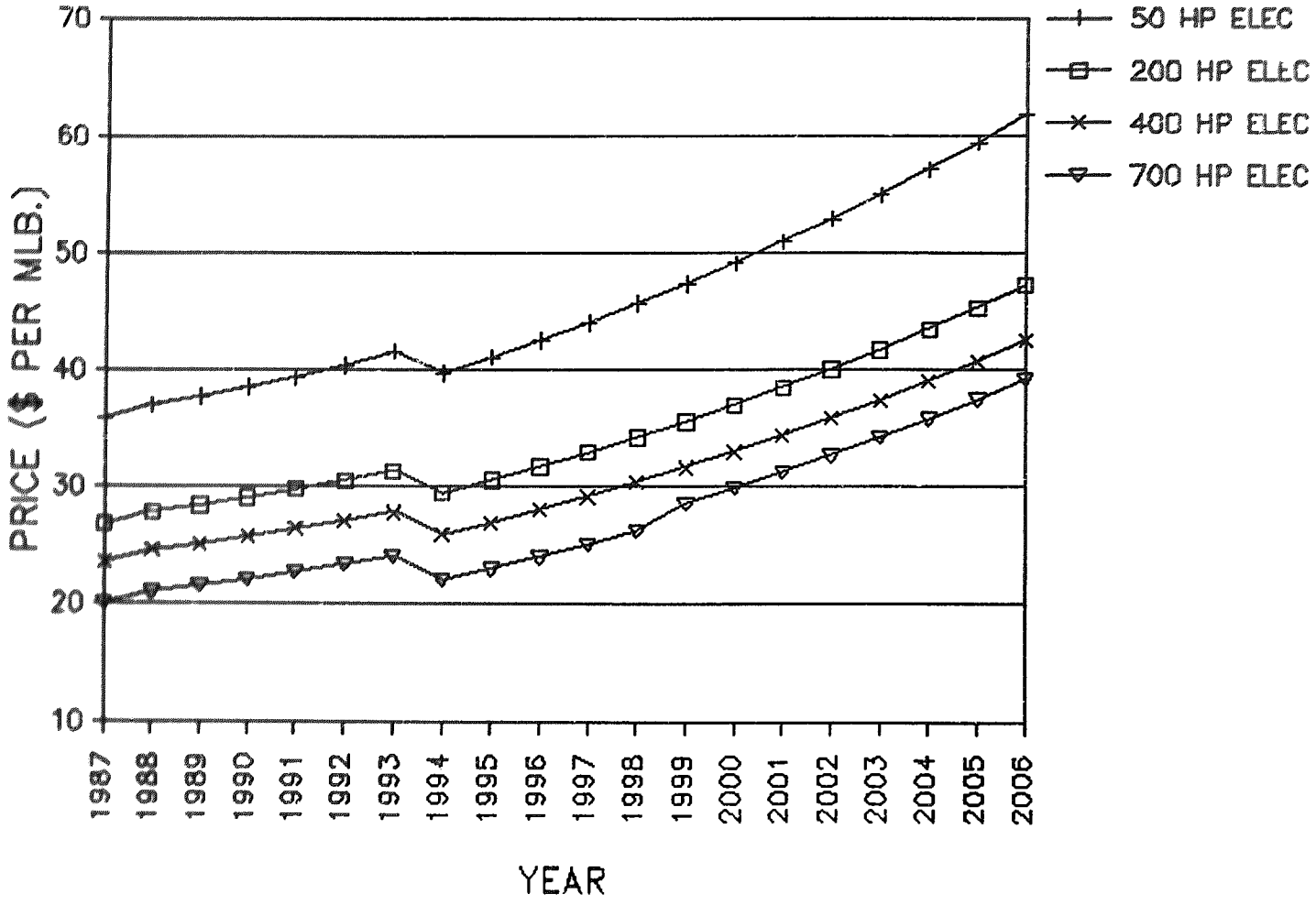
INSTALL COST	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
FUEL	41,299	46,329	52,519	60,643	70,218	81,244	93,334	107,334	123,434	141,949
ELECTRICITY	1,373	1,451	1,532	1,617	1,706	1,800	1,899	2,003	2,113	2,229
WATER/SEWER	254	269	284	299	316	333	351	371	391	413
CHEMICAL TREATMENT	374	395	417	440	464	490	516	545	575	606
BASIC BOILER INSURANCE	318	336	355	374	395	416	439	463	489	516
FLOOR SPACE	5,481	5,791	6,115	6,455	6,810	7,183	7,577	7,994	8,433	8,897
REAL ESTATE TAX	2,992	3,162	3,339	3,524	3,718	3,922	4,137	4,364	4,604	4,858
OPERATING LABOR	4,766	5,035	5,318	5,613	5,921	6,246	6,589	6,951	7,333	7,737
MAINTENANCE	4,925	5,203	5,495	5,800	6,119	6,454	6,808	7,183	7,578	7,995
RETURN, DEBT SVC, TAXES	19,810	19,810	19,810	19,810	19,810	19,810	19,810	19,810	19,810	19,810
TOTAL COST	81,593	87,780	95,182	104,575	115,477	127,899	141,461	157,019	174,762	195,010
COST PER MLB	14.78	15.91	17.25	18.95	20.92	23.17	25.63	28.45	31.67	35.33
GNP DEFLATOR	1.862	1.9672	2.0774	2.1927	2.3133	2.4402	2.574	2.71557	2.8649264	3.0224973
1987 BASE	1.5887372	1.6784983	1.7725256	1.8709044	1.9738055	2.0820819	2.1962457	2.3170392	2.4444764	2.5789226
ANNUAL INFL RATE	.05657380	.05649839	.05601871	.05550207	.05500068	.05485670	.05483157	.055	.055	.055
FUEL COST/MMBTU	4.27	4.79	5.43	6.27	7.26	8.4	9.65	11.0975	12.762125	14.676444
FUEL COST/MMBTU INCLUDING	5.0102045	5.6203465	6.3712905	7.3569045	8.518521	9.85614	11.322828	13.021252	14.974439	17.220605
PERCENT OF LAST YEAR	1.1117825	1.1277174	1.1421687	1.1624473	1.1633394	1.1622465	1.1530201	1.15	1.15	1.15
ELECTRIC PRICE	.11782665	.12448366	.13145708	.13875322	.14638474	.15441492	.16288174	.17184023	.18129144	.19126247
ELECTRIC PRICE INCLUDING	.13825190	.14606291	.15424516	.16280609	.17176053	.18118275	.19111729	.20162874	.21271832	.22441782

(ORT & SALES TAXES = 17.335 %)

Schedule 9-2

KCPL CASE NO. HO-86-139

COST OF STEAM - ELECTRIC BOILERS



KANSAS CITY POWER & LIGHT COMPANY
CASE NO. HO-86-139
PROJECTED STEAM COST PER MLB.
50 BHP ELECTRIC BOILER
1987 THROUGH 2006

2/20/87

MLB	1,191										
OPERATING LABOR	3,000										
FLOOR SPACE	100										
INSTALL COST	115,000	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
FUEL	372,307	$15,809	16,875	17,430	18,037	18,666	19,317	19,990	17,504	18,483	19,520
ELECTRICITY	715	30	32	33	35	36	37	38	34	35	37
WATER/SEWER	.0266ccf/MLB	35	36	37	38	40	42	44	47	49	52
CHEMICAL TREATMENT	.0426	51	52	54	56	59	62	65	68	72	76
BASIC BOILER INSURANCE	100	100	103	107	111	116	122	128	135	142	150
FLOOR SPACE	5.75	575	595	615	640	668	700	736	775	819	865
REAL ESTATE TAX	15.19	1,747	1,808	1,870	1,944	2,030	2,128	2,236	2,355	2,487	2,627
OPERATING LABOR		3,000	3,104	3,211	3,339	3,487	3,655	3,840	4,045	4,271	4,511
MAINTENANCE	.025	2,875	2,975	3,077	3,200	3,341	3,502	3,680	3,877	4,093	4,323
RETURN, DEBT SVC, TAXES	15%,20 YEARS	18,373	18,373	18,373	18,373	18,373	18,373	18,373	18,373	18,373	18,373
		$42,595	43,954	44,808	45,773	46,817	47,939	49,131	47,213	48,824	50,534
COST PER MLB		$35.76	36.90	37.62	38.43	39.31	40.25	41.25	39.64	40.99	42.43
GNP DEFLATOR	(1982=1)	1.172	1.2127	1.2544	1.3043	1.3621	1.4278	1.5003	1.5803	1.6686	1.7623
1987 BASE		1	1.0347270	1.0703072	1.1128840	1.1622014	1.2182594	1.2801195	1.3483788	1.4237201	1.5036689
ANNUAL INFL RATE			.02483386	.03438608	.03977997	.04431496	.04823434	.05077742	.05332267	.05587547	.05615486
FUEL COST/KWH (ELECTRIC)		.03619	.03863	.0399	.04129	.04273	.04422	.04576	.04007	.04230893	.04468478
FUEL COST/MMBTU INCLUDING GRT & SALES		.04246354	.04532651	.04681667	.04844762	.05013725	.05188554	.05369250	.04701613	.04964318	.05243089
ELECTRIC PRICE		.03619	.03863	.0399	.04129	.04273	.04422	.04576	.04007	.04230893	.04468478
		.04246354	.04532651	.04681667	.04844762	.05013725	.05188554	.05369250	.04701613	.04964318	.05243089

Schedule MJ-1

KANSAS CITY POWER & LIGHT COMPANY

2/20/87

CASE NO. HO-86-139

PROJECTED STEAM COST PER MLB.

50 BHP ELECTRIC BOILER

1987 THROUGH 2006

MLB
OPERATING LABOR
FLOOR SPACE
INSTALL COST

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
FUEL	20,625	21,790	23,011	24,288	25,624	27,029	28,511	30,079	31,734	33,479
ELECTRICITY	40	42	44	47	49	52	55	58	61	64
WATER/SEWER	55	58	61	65	68	72	76	80	84	89
CHEMICAL TREATMENT	81	85	90	95	100	106	111	118	124	131
BASIC BOILER INSURANCE	159	168	177	187	197	208	220	232	244	258
FLOOR SPACE	914	965	1,019	1,076	1,135	1,197	1,263	1,332	1,406	1,483
REAL ESTATE TAX	2,775	2,932	3,096	3,268	3,448	3,637	3,837	4,048	4,270	4,505
OPERATING LABOR	4,766	5,035	5,318	5,613	5,921	6,246	6,589	6,951	7,333	7,737
MAINTENANCE	4,568	4,826	5,096	5,379	5,675	5,986	6,314	6,661	7,028	7,414
RETURN, DEBT SVC, TAXES	18,373	18,373	18,373	18,373	18,373	18,373	18,373	18,373	18,373	18,373
	52,354	54,274	56,285	58,389	60,590	62,906	65,348	67,931	70,657	73,533
COST PER MLB	43.96	45.57	47.26	49.03	50.87	52.82	54.87	57.04	59.33	61.74
GNP DEFLATOR	1.862	1.9672	2.0774	2.1927	2.3133	2.4402	2.574	2.71557	2.8649264	3.0224973
1987 BASE	1.5887372	1.6784983	1.7725256	1.8709044	1.9738055	2.0820819	2.1962457	2.3170392	2.4444764	2.5789226
ANNUAL INFL RATE	.05657380	.05649839	.05601871	.05550207	.05500068	.05485670	.05483157	.055	.055	.055
FUEL COST/KWH (ELECTRIC)	.04721277	.04988022	.05267444	.05559798	.05865591	.06187358	.06526620	.06885584	.07264292	.07663828
FUEL COST/MMBTU INCLUDING	.05539710	.05852695	.06180555	.06523589	.06882391	.07259936	.07658010	.08079200	.08523556	.08992352
ELECTRIC PRICE	.04721277	.04988022	.05267444	.05559798	.05865591	.06187358	.06526620	.06885584	.07264292	.07663828
	.05539710	.05852695	.06180555	.06523589	.06882391	.07259936	.07658010	.08079200	.08523556	.08992352

Schedule 11-2

KANSAS CITY POWER & LIGHT COMPANY
CASE NO. HO-86-139
PROJECTED COST OF STEAM PER MLB.
200 BHP ELECTRIC BOILER
1987 THROUGH 2006

2/20/87

		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MLB	5,519										
OPERATING LABOR	3,000										
FLOOR SPACE	400										
INSTALL COST	340,000										
FUEL	1,725,239	$73,260	78,199	80,770	83,584	86,499	89,515	92,632	81,114	85,646	90,456
ELECTRICITY	3,311	141	150	155	160	166	172	178	156	164	174
WATER/SEWER	.0266ccf/MLB	160	166	171	178	186	195	205	216	228	241
CHEMICAL TREATMENT	.0426	235	243	252	262	273	286	301	317	335	354
BASIC BOILER INSURANCE	200	200	207	214	223	232	244	256	270	285	301
FLOOR SPACE	5.75	2,300	2,380	2,462	2,560	2,673	2,802	2,944	3,101	3,275	3,458
REAL ESTATE TAX	15.19	5,165	5,344	5,528	5,748	6,002	6,292	6,611	6,964	7,353	7,766
OPERATING LABOR		3,000	3,104	3,211	3,339	3,487	3,655	3,840	4,045	4,271	4,511
MAINTENANCE	.025	8,500	8,795	9,098	9,460	9,879	10,355	10,881	11,461	12,102	12,781
RETURN, DEBT SVC, TAXES	15%,20 YEARS	54,319	54,319	54,319	54,319	54,319	54,319	54,319	54,319	54,319	54,319
		$147,279	152,907	156,179	159,831	163,716	167,834	172,168	161,963	167,977	174,360
COST PER MLB		$26.69	27.71	28.30	28.96	29.66	30.41	31.20	29.35	30.44	31.59
GNP DEFLATOR	(1982=1)	1.172	1.2127	1.2544	1.3043	1.3621	1.4278	1.5057	1.5803	1.6686	1.7623
1987 BASE		1	1.0347270	1.0703072	1.1128840	1.1622014	1.2182594	1.2847153	1.3483788	1.4237201	1.5036689
ANNUAL INFL RATE		.02483386	.03472696	.03438608	.03977997	.04431496	.04823434	.05077742	.05332267	.05587547	.05615486
FUEL COST/KWH (ELECTRIC)		.03619	.03863	.0399	.04129	.04273	.04422	.04576	.04007	.04230893	.04468678
FUEL COST/MMBTU INCLUDING GRT & SALES		.04246354	.04532651	.04681667	.04844762	.05013725	.05188554	.05369250	.04701613	.04964318	.05243089
ELECTRIC PRICE		.03619	.03863	.0399	.04129	.04273	.04422	.04576	.04007	.04230893	.04468678
		.04246354	.04532651	.04681667	.04844762	.05013725	.05188554	.05369250	.04701613	.04964318	.05243089

Schedule HC-3

KANSAS CITY POWER & LIGHT COMPANY 2/20/87
CASE NO. HO-86-139
PROJECTED COST OF STEAM PER MLB.
200 BHP ELECTRIC BOILER
1987 THROUGH 2006

MLB
OPERATING LABOR
FLOOR SPACE
INSTALL COST

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
FUEL	95,573	100,973	106,629	112,548	118,738	125,251	132,119	139,386	147,052	155,140
ELECTRICITY	183	194	205	216	228	240	254	268	282	298
WATER/SEWER	254	269	284	299	316	333	351	371	391	413
CHEMICAL TREATMENT	374	395	417	440	464	490	516	545	575	606
BASIC BOILER INSURANCE	318	336	355	374	395	416	439	463	489	516
FLOOR SPACE	3,654	3,861	4,077	4,303	4,540	4,789	5,051	5,329	5,622	5,932
REAL ESTATE TAX	8,205	8,669	9,154	9,662	10,194	10,753	11,343	11,967	12,625	13,319
OPERATING LABOR	4,766	5,035	5,318	5,613	5,921	6,246	6,589	6,951	7,333	7,737
MAINTENANCE	13,504	14,267	15,066	15,903	16,777	17,698	18,668	19,695	20,778	21,921
RETURN, DEBT SVC, TAXES	54,319	54,319	54,319	54,319	54,319	54,319	54,319	54,319	54,319	54,319
	181,151	188,317	195,823	203,677	211,892	220,535	229,649	239,293	249,466	260,199
COST PER MLB	32.82	34.12	35.48	36.90	38.39	39.96	41.61	43.36	45.20	47.15
GNP DEFLATOR	1.862	1.9672	2.0774	2.1927	2.3133	2.4402	2.574	2.71557	2.8649264	3.0224973
1987 BASE	1.5887372	1.6784983	1.7725256	1.8709044	1.9738055	2.0820819	2.1962457	2.3170392	2.4444764	2.5789226
ANNUAL INFL RATE	.05657380	.05649839	.05601871	.05550207	.05500068	.05485670	.05483157	.055	.055	.055
FUEL COST/KWH (ELECTRIC)	.04721277	.04988022	.05267444	.05559798	.05865591	.06187358	.06526620	.06885584	.07264292	.07663828
FUEL COST/MMBTU INCLUDING	.05539710	.05852695	.06180555	.06523589	.06882391	.07259936	.07658010	.08079200	.08523556	.08992352
ELECTRIC PRICE	.04721277	.04988022	.05267444	.05559798	.05865591	.06187358	.06526620	.06885584	.07264292	.07663828
	.05539710	.05852695	.06180555	.06523589	.06882391	.07259936	.07658010	.08079200	.08523556	.08992352

Schedule 11-A

KANSAS CITY POWER & LIGHT COMPANY
CASE NO. HO-86-139
PROJECTED COST OF STEAM PER MLB.
400 BHP ELECTRIC BOILER
1987 THROUGH 2006

2/20/87

MLB	11,038										
OPERATING LABOR	3,000										
FLOOR SPACE	700										
INSTALL COST	520,000	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
FUEL	3,450,479	$146,520	156,398	161,540	167,168	172,998	179,030	185,265	162,228	171,293	180,912
ELECTRICITY	6,623	281	300	310	321	332	344	356	311	329	347
WATER/SEWER	.0266ccf/MLB*1.	320	331	343	356	372	390	410	432	456	481
CHEMICAL TREATMENT	.0426	470	487	503	523	546	573	602	634	669	707
BASIC BOILER INSURANCE	300	300	310	321	334	349	365	384	405	427	451
FLOOR SPACE	5.75	4,025	4,165	4,308	4,479	4,678	4,903	5,152	5,427	5,730	6,052
REAL ESTATE TAX	15.19	7,899	8,173	8,454	8,790	9,180	9,623	10,111	10,651	11,246	11,877
OPERATING LABOR		3,000	3,104	3,211	3,339	3,487	3,655	3,840	4,045	4,271	4,511
MAINTENANCE	.025	13,000	13,451	13,914	14,467	15,109	15,837	16,642	17,529	18,508	19,548
RETURN, DEBT SVC, TAXES	15%,20 YEARS	83,076	83,076	83,076	83,076	83,076	83,076	83,076	83,076	83,076	83,076
		$258,891	269,796	275,980	282,854	290,126	297,796	305,838	284,737	296,005	307,962
COST PER MLB		$23.45	24.44	25.00	25.63	26.28	26.98	27.71	25.80	26.82	27.90
GNP DEFLATOR	(1982=1)	1.172	1.2127	1.2544	1.3043	1.3621	1.4278	1.5003	1.5803	1.6686	1.7623
1987 BASE		1	1.0347270	1.0703072	1.1128840	1.1622014	1.2182594	1.2801195	1.3483788	1.4237201	1.5036689
ANNUAL INFL RATE		.02483386	.03472696	.03438608	.03977997	.04431496	.04823434	.05077742	.05332267	.05587547	.05615486
FUEL COST/KWH (ELECTRIC)		.03619	.03863	.0399	.04129	.04273	.04422	.04576	.04007	.04230893	.04468478
FUEL COST/MMBTU INCLUDING GRT & SALES TA		.04246354	.04532651	.04681667	.04844762	.05013725	.05188554	.05369250	.04701613	.04964318	.05243089
ELECTRIC PRICE		.03619	.03863	.0399	.04129	.04273	.04422	.04576	.04007	.04230893	.04468478
		.04246354	.04532651	.04681667	.04844762	.05013725	.05188554	.05369250	.04701613	.04964318	.05243089

Schedule 11-5

KANSAS CITY POWER & LIGHT COMPANY 2/20/87
CASE NO. HO-86-139
PROJECTED COST OF STEAM PER MLB.
400 BHP ELECTRIC BOILER
1987 THROUGH 2006

MLB
OPERATING LABOR
FLOOR SPACE
INSTALL COST

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
FUEL	191,147	201,946	213,259	225,095	237,475	250,503	264,238	278,771	294,104	310,279
ELECTRICITY	367	388	409	432	456	481	507	535	565	596
WATER/SEWER	508	537	567	599	632	666	703	742	782	825
CHEMICAL TREATMENT	747	789	833	880	928	979	1,033	1,090	1,149	1,213
BASIC BOILER INSURANCE	477	504	532	561	592	625	659	695	733	774
FLOOR SPACE	6,395	6,756	7,134	7,530	7,945	8,380	8,840	9,326	9,839	10,380
REAL ESTATE TAX	12,549	13,258	14,001	14,778	15,591	16,446	17,348	18,302	19,308	20,370
OPERATING LABOR	4,766	5,035	5,318	5,613	5,921	6,246	6,589	6,951	7,333	7,737
MAINTENANCE	20,654	21,820	23,043	24,322	25,659	27,067	28,551	30,122	31,778	33,526
RETURN, DEBT SVC, TAXES	83,076	83,076	83,076	83,076	83,076	83,076	83,076	83,076	83,076	83,076
	320,685	334,110	348,172	362,886	378,275	394,469	411,543	429,609	448,668	468,776
COST PER MLB	29.05	30.27	31.54	32.88	34.27	35.74	37.28	38.92	40.65	42.47
GNP DEFLATOR	1.862	1.9672	2.0774	2.1927	2.3133	2.4402	2.574	2.71557	2.8649264	3.0224973
1987 BASE	1.5887372	1.6784983	1.7725256	1.8709044	1.9738055	2.0820819	2.1962457	2.3170392	2.4444764	2.5789226
ANNUAL INFL RATE	.05657380	.05649839	.05601871	.05550207	.05500068	.05485670	.05483157	.055	.055	.055
FUEL COST/KWH (ELECTRIC)	.04721277	.04988022	.05267444	.05559798	.05865591	.06187358	.06526620	.06885584	.07264292	.07663828
FUEL COST/MMBTU INCLUDING	.05539710	.05852695	.06180555	.06523589	.06882391	.07259936	.07658010	.08079200	.08523556	.08992352
ELECTRIC PRICE	.04721277	.04988022	.05267444	.05559798	.05865591	.06187358	.06526620	.06885584	.07264292	.07663828
	.05539710	.05852695	.06180555	.06523589	.06882391	.07259936	.07658010	.08079200	.08523556	.08992352

Schedule 9-1

KANSAS CITY POWER & LIGHT COMPANY 2/20/87
CASE NO. HO-86-139
INDIVIDUAL BUILDING HEATING SYSTEMS
700 BHP SYSTEM

MLB	28,908										
OPERATING LABOR	3,000										
FLOOR SPACE	800										
INSTALL COST	910,000	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
FUEL	9,036,641	$383,728	409,599	423,065	437,804	453,072	468,871	485,200	424,868	448,608	473,799
ELECTRICITY	17,345	737	786	812	840	870	900	931	815	861	909
WATER/SEWER	.0266ccf/MLB*1.	838	867	897	933	974	1,021	1,073	1,130	1,193	1,260
CHEMICAL TREATMENT	.0426	1,231	1,274	1,318	1,370	1,431	1,500	1,576	1,661	1,753	1,852
BASIC BOILER INSURANCE	400	400	414	428	445	465	487	512	539	569	601
FLOOR SPACE	5.75	4,600	4,760	4,923	5,119	5,346	5,604	5,889	6,203	6,549	6,917
REAL ESTATE TAX	15.19	13,823	14,303	14,795	15,383	16,065	16,840	17,695	18,639	19,680	20,785
OPERATING LABOR		3,000	3,104	3,211	3,339	3,487	3,655	3,840	4,045	4,271	4,511
MAINTENANCE	.025	22,750	23,540	24,349	25,318	26,440	27,715	29,123	30,676	32,390	34,208
RETURN, DEBT SVC, TAXES	15%,20 YEARS	145,383	145,383	145,383	145,383	145,383	145,383	145,383	145,383	145,383	145,383
		$576,490	604,031	619,182	635,935	653,533	671,977	691,222	633,958	661,258	690,226
COST PER MLB		$19.94	20.89	21.42	22.00	22.61	23.25	23.91	21.93	22.87	23.88
GNP DEFLATOR	(1982=1)	1.172	1.2127	1.2544	1.3043	1.3621	1.4278	1.5003	1.5803	1.6686	1.7623
1987 BASE		1	1.0347270	1.0703072	1.1128840	1.1622014	1.2182594	1.2801195	1.3483788	1.4237201	1.5036689
ANNUAL INFL RATE			.02483386	.03472696	.03438608	.03977997	.04431496	.04823434	.05077742	.05332267	.05587547	.05615486
FUEL COST/KWH (ELECTRIC)			.03619	.03863	.0399	.04129	.04273	.04422	.04576	.04007	.04230893	.04468478
FUEL COST/MMBTU INCLUDING GRT & SALES TA			.04246354	.04532651	.04681667	.04844762	.05013725	.05188554	.05369250	.04701613	.04964318	.05243089
ELECTRIC PRICE			.03619	.03863	.0399	.04129	.04273	.04422	.04576	.04007	.04230893	.04468478
			.04246354	.04532651	.04681667	.04844762	.05013725	.05188554	.05369250	.04701613	.04964318	.05243089

Schedule 11-7

KANSAS CITY POWER & LIGHT COMPANY 2/20/1987
CASE NO. HO-86-139
INDIVIDUAL BUILDING HEATING SYSTEMS
700 BHP SYSTEM

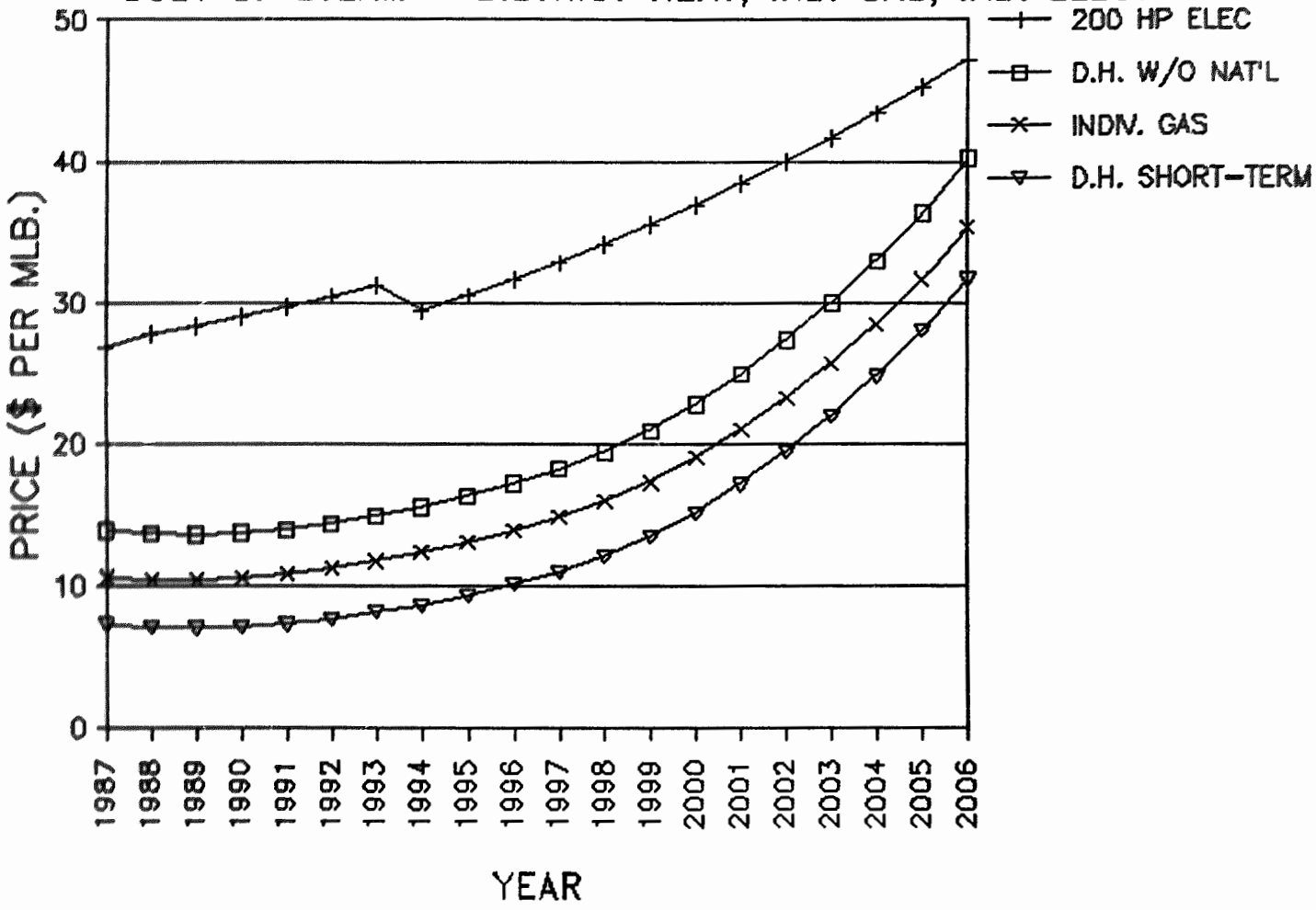
MLB
OPERATING LABOR
FLOOR SPACE

INSTALL COST	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
FUEL	500,604	528,887	558,515	589,513	621,937	656,054	692,027	730,088	770,243	812,607
ELECTRICITY	961	1,015	1,072	1,132	1,194	1,259	1,328	1,401	1,478	1,560
WATER/SEWER	1,332	1,407	1,486	1,568	1,654	1,745	1,841	1,942	2,049	2,162
CHEMICAL TREATMENT	1,956	2,067	2,183	2,304	2,431	2,564	2,705	2,853	3,010	3,176
BASIC BOILER INSURANCE	635	671	709	748	790	833	878	927	978	1,032
FLOOR SPACE	7,308	7,721	8,154	8,606	9,080	9,578	10,103	10,658	11,245	11,863
REAL ESTATE TAX	21,961	23,202	24,501	25,861	27,284	28,780	30,358	32,028	33,790	35,648
OPERATING LABOR	4,766	5,035	5,318	5,613	5,921	6,246	6,589	6,951	7,333	7,737
MAINTENANCE	36,144	38,186	40,325	42,563	44,904	47,367	49,965	52,713	55,612	58,670
RETURN, DEBT SVC, TAXES	145,383	145,383	145,383	145,383	145,383	145,383	145,383	145,383	145,383	145,383
	721,050	753,575	787,645	823,292	860,577	899,810	941,177	984,945	1,031,121	1,079,837
COST PER MLB	24.94	26.07	27.25	28.48	29.77	31.13	32.56	34.07	35.67	37.35
GNP DEFLATOR	1.862	1.9672	2.0774	2.1927	2.3133	2.4402	2.574	2.71557	2.86492635	3.02249730
1987 BASE	1.5887372	1.6784983	1.7725256	1.8709044	1.9738055	2.0820819	2.1962457	2.3170392	2.44447641	2.57892261
ANNUAL INFL RATE	.05657380	.05649839	.05601871	.05550207	.05500068	.05485670	.05483157	.055	.055	.055
FUEL COST/KWH (ELECTRIC)	.04721277	.04988022	.05267444	.05559798	.05865591	.06187358	.06526620	.06885584	.072642915	.076638276
FUEL COST/MMBTU INCLUDING	.05539710	.05852695	.06180555	.06523589	.06882391	.07259936	.07658010	.08079200	.085235565	.089923521
ELECTRIC PRICE	.04721277	.04988022	.05267444	.05559798	.05865591	.06187358	.06526620	.06885584	.072642915	.076638276
	.05539710	.05852695	.06180555	.06523589	.06882391	.07259936	.07658010	.08079200	.085235565	.089923521

Schedule MJM-4

KCPL CASE NO. HO-86-139

COST OF STEAM - DISTRICT HEAT, IND. GAS, IND. ELECTRIC



Schedule 12