STATE OF MISSOURI

PUBLIC SERVICE COMMISSION

Jefferson City

April 23, 1986

CASE NO. EO-85-185 and EO-85-224

Mark English, Counsel, Kansas City Power & Light Company, P.O. Box 679, Kansas City, MO 64141
Jeremiah D. Finnegan, Attorney, 4225 Baltimore, Kansas City, MO 64111
John B. Williams, County Counselor, 415 East 12th Street, Kansas City, MO 64100
Wm. Clark Kelly, Assistant Attorney General, P.O. Box 899, Jefferson City, MO 65102
William Barvick, Attorney, 231 Madison St., Jefferson City, MO 65101
Stuart Conrad and W.H. Bates, Attorneys, 2345 Grand Avenue, Kansas City, MO 64108
Paul W. Phillips, U.S. Department of Energy, Room 6D-033, 1000 Independence Avenue, S.W., Washington, D.C. 20585
Richard N. Ward and Carrol C. Kennett, Attorneys, 2800 City Hall, Kansas City, MO 64106
Willard C. Reine, Attorney, 314 East High Street, Jeferson City, MO 65101
Robert C. Johnson, Attorney 720 Olive Street, 24th Floor, St. Louis, MO 63101
Sam Overfelt, Attorney, 200 Madison Street, Box 1336, Jefferson City, MO 65102
Douglas Brooks and Richard W. French, Office of the Public Counsel, P.O. Box 7800, Jefferson City, MO 65102
James Geers, U.S. Department of Energy, FCM Division, P.O. Box 5400, Albuqeruque, NM 87115
Dick H. Woods, General Counsel, Federal Reserve Bank of Kansas City, 925 Grand Avenue, Kansas City, MO 65198
David M. Claycomb, Assistant General Counsel, Gas Service Company, 2460 Pershing Road Kansas City, MO 64108
John K. Rosenberg, Attorney, Kansas Power & Light Company, 818 Kansas Avenue, Topeka, KS 66601
Gary W. Duffy, Attorney, P.O. Box 456, Jefferson City, MO 65102

Enclosed find certified copy of ORDER in the above-numbered case.

Sincerely,

Harvey G. Hubbs

Harvey G. Hubbs
Secretary

uncertified copy:

Robert M. Fillmore, Assistant General Counsel, Kansas State Corporation Commission, State Office Building, 4th Floor, Topeka, KS 66612
Richard Brownlee, Attorney, P.O. Box 1069, Jefferson City, MO 65102

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the matter of Kansas City Power & Light Company of Kansas City, Missouri, for authority to file tariffs increasing rates for electric service provided to customers in the Missouri service area of the Company, and the determination of in-service criteria for Kansas City Power & Light Company's Wolf Creek Generating Station and Wolf Creek rate base and related issues.	Case No. EO-85-185
In the matter of Kansas City Power & Light Company, a Missouri corporation, for determination of certain rates of depreciation.	Case No. EO-85-224

REPORT AND ORDER

Date Issued: April 23, 1986

Date Effective: May 5, 1986

197.

SUMMARY

On November 26, 1984, Kansas City Power & Light Company submitted to the Commission proposed tariffs requesting an increase of approximately 52 percent, or $194.7 million, in charges for electric service in its Missouri service area. The Company also submitted alternative "rate phase-in" tariff sheets which were designed to produce an approximate increase of 25 percent in 1985, 14 percent in 1986, 8 percent in 1987 and 5 percent in 1988.

The Commission has rejected the Company's proposed rate increase, but has authorized the Company to increase its revenues by $78.2 million to reflect the Wolf Creek Nuclear Generating Station. That equates to a one-time increase of approximately 21.7 percent. To lessen the financial impact upon the customers, the Commission has ordered the Company to phase in the $78.2 million increase over a seven-year period. At the end of the seven-year period, the total increase in revenues will be approximately $120.1 million, or 33.4 percent. Under the Commission's seven-year phase-in, first year rates will increase by approximately 7 percent, second year rates by approximately 5 percent, and the subsequent five years of rates will increase by approximately 3.5 percent annually. The Commission allowed the Company an overall rate of return of 11.75 percent.

The Commission reduced the Company's proposed rate increase by approximately 60 percent. The Commission found that a significant portion of the cost overruns at Wolf Creek resulted from unreasonable or unexplained cost increases and inefficient or imprudent management of the construction project. The Commission disallowed approximately $126 million of the Company's Missouri jurisdictional portion of the plant. That exclusion represents approximately 14 percent of KCPL's Missouri jurisdictional Wolf Creek investment.

The Commission found that approximately 75 percent of the Wolf Creek Generating Facility will be excess capacity and unneeded as of 1990. As a result, the Commission reduced the Company's rate of return on Wolf Creek investment. The Commission found that the Company knew, or should have known, that the proper operation and maintenance of its fossil plants would delay the need for Wolf Creek, and that it was taking the risk of having excess base load capacity. The Commission decided the Company's shareholders and its customers should share the risks associated with excess capacity. Therefore, the Commission determined the Company should receive only one-half of the equity return on 75 percent of the Wolf Creek rate base determined to be excess capacity. The excess capacity adjustment amounts to approximately $33 million annually.

Kansas City Power & Light Company
Case Nos. EO-85-185 and EO-85-224

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APPEARANCES

A. Drue Jennings, Vice President and General Counsel, Mark C. Sholander, Assistant General Counsel, Mark G. English, Attorney, and Warren B. Wood, Attorney, Kansas City Power & Light Company, 1330 Baltimore Avenue, Kansas City, Missouri 64105,

and

James C. Swearengen, Attorney at Law, and Gary W. Duffy, Attorney at Law, Post Office Box 456, Jefferson City, Missouri 65102,

and

Gerald Charnoff, Attorney at Law, John Bryson, Attorney at Law, and Mark Augenblick, Attorney at Law, 1800 M Street, N.W., Washington, D.C. 20036, for Kansas City Power & Light Company.

Paul W. Phillips, Attorney, United States Department of Energy, Room 6D-033, 1000 Independence Avenue, S.W., Washington, D.C. 20585,

and

William L. Rowberry, Attorney, United States Department of Energy, 2000 East 95th Street, Post Office Box 202, Kansas City, Missouri 64141, for the United States Department of Energy.

David M. Claycomb, Assistant General Counsel, Martin J. Bregman, Senior Attorney, and John K. Rosenberg, Attorney, The Kansas Power and Light Company, 2460 Pershing Road, Kansas City, Missouri 64108, for The Gas Service Company and The Kansas Power and Light Company.

Robert C. Johnson, Attorney at Law, and George M. Pond, Attorney at Law, 720 Olive Street, Suite 2400, St. Louis, Missouri 63101, for: A.P. Green Refractories Co., Anheuser-Busch, Inc., Chrysler Corporation, Ford Motor Company, General Motors Corporation, McDonnell Douglas Corporation, Missouri Portland Cement Company, Monsanto Company, Nooter Corporation, PPG Industries, Inc., and St. Joe Minerals Corporation.

Stuart W. Conrad, Attorney at Law, and W.H. Bates, Attorney at Law, 2345 Grand Avenue, Kansas City, Missouri 64108, for Armco Inc., General Mills, Inc., Union Carbide Corporation, Mobay Chemical Corporation and Amoco Pipeline Company.

Willard C. Reine, Attorney at Law, 314 East High Street, Jefferson City, Missouri 65101,

and

Sam Overfelt, Attorney at Law, 200 Madison Street, Jefferson City, Missouri 65101, for Missouri Retailers Association.

Jeremiah D. Finnegan, Attorney at Law, and Hugh F. O'Donnell, III, Attorney at Law, 4225 Baltimore Avenue, Suite 101, Kansas City, Missouri 64111,

and

John B. Williams, County Counselor, 415 East 12th Street, Kansas City, Missouri 64106, for the County of Jackson, Missouri, and the Federal Reserve Bank of Kansas City.

Carrol C. Kennett, Assistant City Attorney, 2800 City Hall, Kansas City, Missouri 64106, for the City of Kansas City, Missouri.

William M. Barvick, Attorney at Law, 231 Madison Street, Jefferson City, Missouri 65101, for the International Brotherhood of Electrical Workers Union, Local 1464.

William Clark Kelly, Assistant Attorney General, Office of the Attorney General, Post Office Box 899, Jefferson City, Missouri 65102, for the State of Missouri.

Douglas M. Brooks, Public Counsel, Richard M. French, First Assistant Public Counsel, and Daniel L. Maher, Assistant Public Counsel, Office of Public Counsel, Post Office Box 7800, Jefferson City, Missouri 65102, for the Office of Public Counsel and the public.

William C. Harrelson, General Counsel, Steven Dottheim, Deputy General Counsel, Mary Ann Young, Deputy General Counsel, A. Scott Cauger, Assistant General Counsel, Martin C. Rothfelder, Assistant General Counsel, Paul H. Gardner, Assistant General Counsel, Michael C. Pendergast, Assistant General Counsel, Douglas C. Walther, Assistant General Counsel, and Linda J. Malinowski, Assistant General Counsel, Missouri Public Service Commission, Post Office Box 360, Jefferson City, Missouri 65102, for the Staff of the Missouri Public Service Commission.

REPORT AND ORDER

Procedural History

On November 26, 1984, Kansas City Power & Light Company (hereinafter KCPL or Company) submitted to the Commission proposed tariffs reflecting an increase of approximately 52 percent, or $194.7 million, in charges for electric service in its Missouri service area. The Company also submitted alternative "rate phase-in" tariff sheets which were designed to produce an approximate increase of 25 percent in 1985, 14 percent in 1986, 8 percent in 1987 and 5 percent in 1988. The tariffs bore an effective date of December 26, 1984. That case was docketed ER-85-128.

On December 17, 1984, the Commission suspended the tariffs until April 25, 1985, and established an intervention deadline. On February 21, 1985, the Commission issued its Order And Schedule Of Proceedings which further suspended the tariffs an additional six months, until October 25, 1985. That order granted intervenor status to all parties in Case No. ER-85-43, as well to all parties who filed timely applications to intervene. Those parties included: Armco Inc.; International Brotherhood of Electrical Workers, Local 1464; Missouri Retailers Association; United States Department of Energy (DOE); Jackson County; State of Missouri; Kansas City, Missouri; A.P. Green Refractories Co.; Anheuser-Busch, Inc.; Chrysler Corporation; General Mills, Inc.; General Motors Corporation; McDonnell Douglas Corporation; Missouri Portland Cement Company; Monsanto Company; Nooter Corporation; PPG Industries, Inc.; St. Joe Minerals Corporation; Union Carbide Corporation; Mobay Chemical Corporation; Amoco Pipeline Company; and Ford Motor Company.

In that order, the Commission stated its intent to use the in-service criteria it had established in the Union Electric rate case unless a party could show good cause why other criteria should be utilized.

The Commission also ordered that an early prehearing conference be held to determine, among other things, a procedural schedule, a test year to be utilized for rate design purposes, and the type of notice that should be sent to the Company's steam heat customers.

As a result of the prehearing conference, the parties filed both joint and separate responses to the issues suggested by the Commission in its previous order. Several different procedural schedules were proposed. The Commission adopted a procedural schedule which segmented the hearing into four phases: Phase I - rate of return, electrical jurisdictional allocations and Wolf Creek in-service; Phase II - class cost of service and rate design; Phase III - traditional accounting issues; and Phase IV - Wolf Creek-related issues, phase-in and steam allocations. The Commission also determined testimony filing deadlines and briefing schedules. Those deadlines were subsequently modified.

In its order, the Commission recognized the procedural schedule it had adopted would preclude the issuance of an order prior to the October 25, 1985, operation of law date. The Commission, therefore, created an additional docket, EO-85-185, for the purpose of receiving the record of ER-85-128 and the refiling of the Company's proposed tariffs.

By order issued March 22, 1985, the Commission modified the procedural schedule to allow certain Wolf Creek-related issues to be tried in Phase III and certain traditional accounting issues in Phase IV. The issues of pensions and payroll were later set for Phase IV also. The order approved the form of notice to be sent by KCPL to its customers.

By order issued April 12, 1985, the Commission granted the late-filed intervention of The Kansas Power and Light Company and The Gas Service Company. The Commission further granted intervenor status to Jackson County, Missouri, as a representative of steam heat customers, and the Federal Reserve Bank of Kansas City, Missouri, in a similar capacity.

The Phase I hearing was convened on April 17, 1985.

On May 3, 1985, Staff filed a Motion To Compel Production Of Documents And Request For Appointment Of Special Master. KCPL filed a response to Staff's motion wherein it agreed to the Staff request for a special master if, among other conditions, it was allowed to choose the person for the position. On May 17, 1985, the

Commission denied the request for a special master, but delegated authority to one of its hearing examiners to conduct an in camera proceeding and make determinations concerning the discoverability of the withheld documents. Several proceedings were held thereafter and orders addressing the withheld documents were issued on June 11, June 13, July 2 and July 8, 1985. On May 20, 1985, KCPL filed an Application For Reconsideration Or Rehearing. The primary argument set forth therein was that the Commission did not have the authority it had delegated to the examiner. The Commission issued its order denying reconsideration on May 23, 1985.

Public hearings were held on May 14, 1985, in Sweet Springs, Missouri, and on May 20 and 21, 1985, in Kansas City, Missouri.

On May 29, 1985, the Commission issued the portion of its Phase I Report And Order which dealt with in-service criteria. The Commission adopted the joint recommendation of KCPL and Staff.

That same day, the Commission convened the Phase II portion of the hearings. All issues, with the exception of the space heating rate, were resolved through a stipulation and agreement which was presented to the Commission.

By order issued May 31, 1985, the Commission consolidated Case No. EO-85-224 with Case Nos. ER-85-128 and EO-85-185. Case No. EO-85-224 is KCPL's depreciation rate case.

On June 7, 1985, Jackson County filed a motion to dismiss Case No. ER-85-128. Said motion was premised upon an alleged violation of Proposition 1 (Section 393.135, R.S.Mo., Supp. 1985) in that KCPL's proposed tariffs reflected an effective date which would make or demand a charge for electrical service which was based on the cost of Wolf Creek prior to its becoming fully operational and used for service. Both Company and Staff filed a response in opposition to said motion.

The Phase III portion of the hearings was convened June 24, 1985. The Phase IV hearings commenced September 3, 1985, continuing on various days through October 22, 1985.

On September 3, 1985, KCPL filed its Notice Of Satisfaction Of In-service Criteria.

KCPL withdrew its proposed tariffs on October 15, 1985, and refiled a new set of tariffs that day. The only difference between the newly filed tariffs and those previously filed was the proposed effective date.

That same day, Jackson County filed a motion to join several political subdivisions to its intervention. The motion stated the reason for the late filing was the subdivisions' inability to afford to intervene individually. The subdivisions agreed to take the case as it was, utilizing Jackson County's attorney and adopting Jackson County's position. KCPL filed an objection to the motion. The Commission denied Jackson County's motion on November 6, 1985.

In that order, the Commission noted that Case No. EO-85-185 had been created for the purpose of receiving the newly-filed tariffs, as well as the record from Case No. ER-85-128. At that time, the Commission dismissed ER-85-128 and incorporated its entire record by reference into Case No. EO-85-185.

On March 11, 1986, the Commission resuspended the Company's proposed tariffs to September 14, 1986. On that same day the Commission issued an Order Directing Revenue Requirement Calculations from the parties. Various requests for clarifications of that order were submitted, as noted on Appendix C. Upon obtaining the responses to those requests, Staff, KCPL, Public Counsel and DOE filed their response to the Order Directing Revenue Requirement Calculations on March 28, 1986, and April 2, 1986. On April 1, 1986, the Commission requested that additional phase-in schedules be submitted. Those schedules were filed April 3, 1986.

Findings of Fact

The Missouri Public Service Commission, having considered all of the competent and substantial evidence upon the whole record, makes the following findings of fact.

PHASE I - IN-SERVICE CRITERIA, JURISDICTIONAL ALLOCATIONS AND RATE OF RETURN

I. In-Service Status of Wolf Creek Generating Unit

In the Commission's Report And Order effective May 29, 1985, the Commission adopted the Joint Recommendation On In-Service Criteria of Staff and Company. On September 5, 1985, Company submitted its Notice Of Satisfaction Of In-Service Criteria (Exhibit 180), which asserted that Wolf Creek Generating Station had satisfied the Commission's in-service criteria as of 1:15 o'clock a.m., September 3, 1985. On October 11, 1985, Staff filed its Evaluation Of In-Service Status Of Wolf Creek Generating Station, Unit 1. Staff concluded in its filing that the Wolf Creek Generating Station had complied with the Commission's in-service criteria.

Based upon the foregoing, the Commission finds the Wolf Creek Generating Station has met the Commission's in-service criteria and was fully operational, in accordance with Section 393.135, R.S.Mo. 1978, at 1:16 a.m. on September 3, 1985.

II. Jurisdictional Allocations

A. Stipulation and Agreement

Staff and KCPL presented a Stipulation and Agreement Regarding Jurisdictional Allocations. The Stipulation and Agreement reflects that Staff and KCPL have resolved all issues regarding Jurisdictional Allocations except for the method to be used for determining production and transmission system demand allocators.

The Commission has reviewed the Stipulation and Agreement Regarding Jurisdictional Allocations and determines that it is a reasonable and just resolution of the issues addressed therein and should be approved. The Stipulation and Agreement which was received into evidence as Exhibit 18, is made a part of this order and attached hereto as Appendix A.

B. Production and Transmission System Demand Allocators

Staff proposes that the one coincidental peak (1CP) methodology be used for purposes of determining system production and transmission demand allocators, while the Company proposes the four coincidental peak (4CP) method. The 1CP method produces production and transmission allocators of 65.10 and 59.81 respectively. The production and transmission allocators resulting from the 4CP method are 65.78 and 59.89 respectively.

In the event the Commission determines the 1CP method to be appropriate, the Company recommends that non-fuel production expenses be classified as demand or energy related and that only demand related non-fuel production expenses be allocated by means of the 1CP allocator.

Staff's 1CP method is based on the premise that sufficient plant capacity must be available to meet system peak and, therefore, the system peak is the primary determinant of plant costs.

Company asserts that 4CP is the appropriate allocation method since it represents a compromise position between what it views as two extremes: the 1CP approach taken by the Missouri Staff and the 12 CP approach taken by the Kansas Corporation Commission Staff. In addition, Company argues that 4CP better reflects the duration of the Company's summer peak load resulting in cost allocation stability. Finally, KCPL asserts that the 4CP method allocates non-fuel production costs without the need to classify those costs as demand or energy related.

KCPL argues that Staff is inconsistent in its allocation methods since it utilized the 12CP method for the last Union Electric rate case. Re: Union Electric Company, 27 Mo. P.S.C. (NS) 183 (1985). Company also argues that Staff uses inconsistent allocation methods for jurisdictional allocations and class allocations.

Staff's 1CP method is based on the peak responsibility theory of cost causation. Staff's time of use (TOU) allocation method, which Staff has advocated in this and other cost of service and rate design proceedings is based on a rejection of

the peak responsibility theory. Staff's TOU method is based on the theory that generation and bulk transmission plant is built to serve loads every hour of the year and not just the peak hour.

The Commission has rejected the theory that new capacity is added solely to meet system peak and peak responsibility allocation methods based on that theory. In rejecting the peak responsibility theory of cost causation, the Commission has accepted Staff's TOU method and its underlying theory of cost causation for the allocation of generation and bulk transmission plant among classes. Re: Arkansas Power & Light Company, 25 Mo. P.S.C. (NS) 101 (1982); Re: Kansas City Power & Light Company, 25 Mo. P.S.C. (N.S.) 605 (1983) and Re: Union Electric Company, 27 Mo. P.S.C. (N.S.) 183 (1985).

In the instant case, the Commission has only two proposals before it and both are peak responsibility methods. The Commission cannot adopt Staff's 1CP method in this case. The Commission stated in this Company's rate design investigation:

> The coincidental peak method is the least equitable of the peak responsibility methods proposed in that it places total dependence on the single hour of system peak demand. Re: Kansas City Power & Light Company, 25 Mo. P.S.C. (N.S.) 605, 614 (1983).

The Commission determines that the 4CP method as proposed by the Company should be used for purposes of this case since the utilization of multiple peaks does recognize some plant usage occurring at times other than the single system peak.

Based on the foregoing the Commission determines that the production and transmission allocators to be used for purposes of this case shall be 65.78 and 59.39 respectively.

III. Rate of Return

The Company, Staff and Department of Energy (DOE) have stipulated to the following capital structure, embedded cost of debt and preferred and preference stock at December 31, 1984:

Capital Component	Capital Ratios	Embedded Cost	Weighted Cost
Long Term Debt	51.75%	9.71%	5.02%
Preferred/Preference	10.87%	10.26%	1.12%
Common Equity	37.38%	———	———
	100.00%		

The Commission determines that the agreed-upon capital structure, embedded cost of debt and preferred and preference stock are reasonable and should be adopted. Therefore, the only rate of return issue which remains is the determination of an appropriate return on equity for KCPL.

KCPL is proposing what could be characterized as both a pre-Wolf Creek in-service (preoperational) and a post-Wolf Creek in-service (operational) return on equity. KCPL's proposed preoperational return on equity is 19 percent, which is then adjusted for costs associated with the issuance of common stock and the demands of market pressure. That adjustment results in a cost of equity to the Company of 20 percent.

KCPL witness Beaudoin prepared KCPL's return on equity recommendations. Mr. Beaudoin's analysis utilized two market-based methodologies, the discounted cash flow (DCF) approach and the risk premium approach.

The DCF analysis has traditionally been accepted by this Commission in utility rate cases. The DCF analysis calculates the return required by investors, or cost of common equity, for a particular company by adding the dividend yield (current dividend per share divided by market price) and the dividend growth rate.

KCPL's common stock yield has varied between 11 percent and 16 percent since January, 1984. That yield on December 31, 1984 was 11.8 percent. In order to avoid the possibility of any stock yield irregularities which might be reflected in a spot price, Mr. Beaudoin calculated the 12-week average KCPL stock yield through December 31, 1984. That 12-week period reflected a 12.1 percent dividend yield.

Beaudoin believes a 12 percent dividend yield is reflective of current investor expectations.

Mr. Beaudoin utilized the 1979 to 1984 time frame to calculate KCPL-specific trended growth rates. Mr. Beaudoin believes it is inappropriate to evaluate dividend growth beyond the past five years as the electric utility industry has changed dramatically in terms of business and financial risks.

During the 1979 to 1984 period, trended growth rates averaged 5.8 - 7.4 percent with 7.4 percent representing the most recent two-year period. The industry average dividend increase ranged from 5.7 - 7.0 percent since 1979. Mr. Beaudoin recommends a 6 - 7 percent growth rate because he maintains investors weigh recent trends more heavily.

Utilizing a 12 percent dividend yield and an estimated dividend growth rate of 6 - 7 percent, KCPL recommends as a DCF required return on equity of 18 - 19 percent.

The risk premium analysis is based on the relationship of risk versus return between bonds and common stock. The difference between the required return for common equity and the required return for bonds is an "equity" risk premium. Mr. Beaudoin notes that common stock has more risk than bonds because stocks, unlike bonds, have no maturity date and no contractually guaranteed return. Adding the equity risk premium to current long term government bond yield reflects the additional investor uncertainty and investor requirements for common equity.

Mr. Beaudoin calculated the average of common stock returns for KCPL during the period 1951 through 1983 at 9.2 percent. He then utilized an Ibbotson and Sinquefield study to determine that the return on U.S. Government Bonds for that period was 3.1 percent. Mr. Beaudoin's calculations resulted in an equity risk premium of 590 basis points. A similar analysis of 20 elective utility stocks arrived at the same results.

Mr. Beaudoin further calculated the equity risk premium for all common stocks represented by the Standard & Poor's Composite Index over the period 1926-1983. Those stocks returned a compounded average rate of 9.6 percent annually. The long term U.S. Government Bonds returned a compounded average of 3.5 percent annually for the same period.

From his analysis, Mr. Beaudoin concluded a reasonable equity risk premium for KCPL to be approximately 600 basis points over long term U.S. Government Bond yields. U.S. Government Bonds averaged 12.5 percent over the 12 months ending December 1984. That yield was 12 percent at the time of Mr. Beaudoin's testimony. He suggests that 12 percent is the appropriate figure to which the 6 percent equity risk premium should be added. This results in a required return on equity of 18 percent.

Although his risk premium approach reflects an 18 percent return on equity, and his DCF analysis determined a range of 18 - 19 percent, Mr. Beaudoin believes investors require a 19 percent return for assuming the risk inherent in investing in a nuclear project without CWIP being included in rate base.

Mr. Beaudoin further recommends the Commission allow a 3 percent adjustment for flotation costs and a 5 percent adjustment for market pressure. Mr. Beaudoin suggests that without flotation and market pressure adjustments KCPL is not able to realize its entire authorized return. Mr. Beaudoin believes that flotation costs remain a cost every year the stock is outstanding, not just in the year of issuance. Hence, the Company is requesting a 19 percent return on equity, which equates to a 20 percent cost of equity to KCPL.

Mr. Beaudoin next addressed the appropriate return on equity for KCPL reflecting the in-service status of the Wolf Creek plant. KCPL is proposing a return on equity of 16.25 percent, assuming the Commission accepts KCPL's proposed one-time increase or alternative phase-in plan.

Although Beaudoin finds the risk of investing in nuclear construction to be predominant prior to a nuclear plant going in service, he determined the degree of regulatory risk is a principal factor monitored by investors once the plant is actually in service. Beaudoin believes KCPL faces greater than average regulatory risk. In Mr. Beaudoin's view, the key is seemingly not the operational status of the plant itself as much as the regulatory treatment given.

Mr. Beaudoin estimated the required returns on equity for 74 electric utility companies. The companies were grouped into various risk categories which were defined by bond ratings and extent of exposure to nuclear risk.

The bond rating group analysis reflected an average required common equity return on double-A (Aa/AA), single-A (A/A), triple-B (Baa/BBB), and below triple-B groups of 15.7 percent, 17.6 percent, 18.4 percent and 19.7 percent, respectively. The analysis of nuclear risk groups involved comparison of companies with no nuclear units in operation or under construction, nuclear units in operation 10-plus years, nuclear units in operation less than 10 years, nuclear units with significant construction, and nuclear units under construction. Those groups reflect a range of required returns of 15.7 - 19.5 percent, with those companies with the least amount of nuclear experience requiring the higher return.

Mr. Beaudoin believes KCPL will remain high on the risk curve until there is a replacement of noncash returns represented by allowance for funds used during construction (AFUDC) with a reasonable expectation of cash returns.

Mr. Beaudoin concluded that the minimum prospective range of required returns on equity for KCPL would be 16.5 - 17.6 percent, contingent upon regulatory treatment. However, KCPL is requesting only 16.25 percent. That is the same return on equity it received in its last rate case, ER-83-49. KCPL purposely chose that figure so that its proposed tariffs would not reflect a greater cost of equity than that which was allowed in its last rate case.

Staff witness Parcell performed both a DCF analysis and a comparable earnings test to determine an appropriate return on KCPL's common equity prior to Wolf Creek being placed in service. His recommended range is 13 - 16.5 percent.

In his DCF analysis, Parcell reviewed the dividend yields and growth rates of KCPL, Moody's 24 Utilities (Moody's) and a group of comparison electrics over the 1980-1984 time frame.

In determining a current dividend yield for KCPL of 11.5 percent, Mr. Parcell placed primary emphasis on the January/February 1985 yields. He deemed that emphasis appropriate, as he believes historic yields are not reflective of current conditions and investor expectations. The January/February 1985 dividend yields for KCPL, Moody's and the comparison companies were 11.5 percent, 10.5 percent, and 12.3 percent, respectively.

Mr. Parcell determined a DCF growth rate of 4 - 5 percent was appropriate for KCPL. To obtain this rate he included the historic growth of dividends per share and the projected growth rate in dividends and book value per share. The projected retention growth rate of 4 percent also falls within his range. However, the range is less than the Company's experienced retention growth rate of 6 percent and greater than its projected earnings per share growth rate. Mr. Parcell utilized a growth rate of 3.5 - 4 percent for Moody's and the comparison companies. Both of these calculations include the earnings retention rate as well as most of the other growth rates examined. Unlike KCPL, both of these groups maintained a retention growth rate that was fairly consistent with their historic growth rate.

The result of Staff's DCF calculations is a return on common equity of 15.5 - 16.5 percent for KCPL, 14 - 14.5 percent for Moody's and 15.8 - 16.3 percent for the comparison companies. Staff does not believe any adjustment need be made for flotation or market pressure as KCPL does not intend to make a public offering of stock in the near future.

Mr. Parcell's comparable earnings analysis compares the risk differentials that exist among various industries and KCPL. He compares risk proxies for KCPL, Moody's and Standard & Poor's 400 Industrials. Mr. Parcell considered the "safety", "beta", financial strength, earnings predictability and price stability of each. Mr. Parcell determined KCPL had greater risk than other average utilities and similar risk to the average industrial. Parcell believes the experience of the unregulated industries over the past five and ten years provides the most accurate basis for comparison with KCPL as it reflects the current competitive marketplace. The industrials have experienced returns of 14 - 14.5 percent over the past five and ten years.

Recognizing an upward trend in the cost of capital since the mid-1970s and the decline in inflation, interest rates and capital costs since 1980, Mr. Parcell adjusts that range to 14.5 - 15 percent for KCPL.

Utilizing both the DCF and comparable earnings approach, Staff recommends a return on equity in the range of 15 - 16.5 percent prior to Wolf Creek being placed in service.

Staff witness Ileo utilizes Mr. Parcell's DCF determined range of 15.5 - 16.5 percent as the departure point for his adjustments in calculating a return on equity once Wolf Creek is placed in service. According to Dr. Ileo that range represents more of the risk associated with nuclear construction than the 14.5 - 15 percent range associated with Mr. Parcell's comparative analysis. Dr. Ileo attempts to quantify the reduced risk perceived by investors once Wolf Creek is in service. Dr. Ileo has chosen an operational cost of equity range of 14.5 - 15.7 percent.

Dr. Ileo utilized an estimation/simulation approach to determine the cost of equity to KCPL if Wolf Creek had been in service during the period of 1979-1983 or May/June, 1984. His approach began with a forecast of the operational and financial characteristics of KCPL after Wolf Creek is placed in service, per Staff witness

Skirpan. Dr. Ileo then estimated the cost of equity to companies with characteristics similar to KCPL once Wolf Creek is placed in service. He then incorporated KCPL's financial characteristics into statistical relationships with those other companies in order to simulate a cost of equity for KCPL had Wolf Creek been in service.

Dr. Ileo performed his analysis under two different scenarios: 1) adoption of the Company's proposed phase-in along with cost disallowances of 10 percent, 20 percent, 30 percent and 70 percent; and 2) adoption of a zero current recovery phase-in with cost disallowances of 10 percent, 20 percent, 30 percent and 70 percent. However, no results were given for a 70 percent disallowance as it would produce a negative book value per share and could not be utilized within the DCF framework.

Through a comparison of the actual cost of equity to KCPL with the estimation of the DCF determined cost of equity to KCPL on a May/June 1984 spot K basis and a 1979-1983 five-year K basis, Dr. Ileo concluded that KCPL would probably have encountered a lower cost of equity had Wolf Creek been in service during the periods studied. Those results are reflected in Dr. Ileo's Table 1 in Exhibit 24. He further concluded that the estimations are directly related to the amount of Wolf Creek related costs which are disallowed and the type of phase-in selected. He notes that not all disallowance scenarios would result in a lower cost of equity; some might actually increase that cost. From these findings, Dr. Ileo infers that KCPL's cost of equity will be similarly impacted once Wolf Creek is placed in service.

After estimating the percentage change in KCPL's cost of equity which would result from placing Wolf Creek in service, Dr. Ileo determined the market has already accounted for the possibility of a disallowance of approximately 20 percent. His data reveals the simulated costs of equity to KCPL are similar to the spot and five-year DCF-derived K's with such a disallowance. Therefore, a disallowance of approximately 20 percent serves to offset the reduced risk perceived by investors.

Under his Company phase-in no disallowance scenario, Dr. Ileo applied the estimated percentage changes in KCPL's cost of equity to the upper and lower end of Mr. Parcell's DCF determined return on equity range. The results varied from 11.1 percent to 15.7 percent. Since Dr. Ileo believes spot data is subject to certain "pitfalls", he has given primary consideration to the five-year analysis and has chosen a cost of equity range once Wolf Creek is in service of 14.5 - 15.7 percent, centering on 15.1 percent. Dr. Ileo concludes that the lower half of the range is most applicable to KCPL because KCPL has typically had a higher DCF-based spot K than have other electric utilities with similar construction projects. From that he draws the conclusion that KCPL is perceived as having more risk than those other utilities and will, therefore, realize a greater percentage reduction in cost of equity once Wolf Creek is placed in service.

In attempting to quantify the reduction in risk associated with Wolf Creek being in service and no longer under construction, Dr. Ileo performed a comparative analysis utilizing financial data for 98 electric utilities as reported by Value Line. Those utilities were divided into three groups: 1) utilities without nuclear plants; 2) utilities with nuclear plants in operation and none under construction; and 3) utilities building nuclear plants. Dr. Ileo further segregated Group 3 into Groups 3-A and 3-B. Group 3-B represented utilities that have suspended or greatly reduced dividend payments or the likelihood of such an event occurring appears high. An analysis was not performed for Group 3-B.

A comparison by Dr. Ileo of Groups 1 and 2 reveals the market view that utilities without nuclear plants represent less risk than those with operating nuclear plants. The differential between Groups 2 and 3-A of 131 basis points in the spot K (May/June DCF analysis) and 45 basis points in the five-year K (1979-1983), according to Dr. Ileo, suggest greater risk while a nuclear plant is under construction.

The study also indicated a differential in the May/June spot K expected return of 58 basis points for Group 2 over Group 1. Only the differential between Groups 2 and 3-A proved to be statistically significant at the 95 percent confidence level.

Dr. Ileo's study further indicated a statistically significant difference at the 95 percent confidence level in the five-year K averages only between Groups 1 and 3-A. That comparison resulted in an 87 basis point differential.

A comparison of the market to book ratios demonstrated a statistically significant difference at the 95 percent confidence level exists between all of the groups except 1 and 2.

Although Dr. Ileo concedes that spot K's and market to book ratios are susceptible to market fluctuation, he concludes that five-year K's do not fully reflect the risks associated with nuclear power in the way spot K's and market to book ratios do.

In order to determine to what extent factors other than the association with nuclear power had on his study of market performance measures, Dr. Ileo utilized regression analyses using data set for calendar year 1983 and for May/June, 1984.

Dr. Ileo performed a step-wise linear regression utilizing an R^2 standard of 55 percent or greater for each overall model and a t-test standard of 5 percent or less for each independent variable in each model. Numerous independent variables were identified as having an important impact on market performance measures. Three dependent variables were used: spot K DCF (Y1); 5-year DCF (Y2); and market to book ratio (Y3). The regression was performed for combined Groups 1, 2, and 3-A and individually for Group 2.

The combination regression was utilized to determine if a utility's group designation had an impact on market performance measures. The individual regression was performed to determine which variables have a statistically significant

relationship to the market performance measures in the context of a company which makes a successful transition from construction to operation of a nuclear plant.

The results of Dr. Ileo's regression analysis indicate that no independent variable differed in a statistically significant manner across all three groups. This suggests the groups are similar with the exception of their involvement with nuclear power and certain related characteristics.

The regression models which met both the R^2 standard and t-test were designated model numbers 20, 52, 2, 8 and 11. Those models were utilized by Dr. Ileo to perform the regression model forecasts of the 5-year DCF-derived K and the market to book ratio which would have been experienced by KCPL if Wolf Creek had been placed into operation before May/June, 1984.

Through his analysis, Dr. Ileo determined some aspects of utility operation and structure have an influence on risk perception and resulting market performance. He concluded, however, that the market-perceived risk reduction when a nuclear project makes the transition from construction to successful operation is the significant factor.

DOE witness Stolnitz prepared the DOE recommendation on cost of equity. Dr. Stolnitz utilized a DCF analysis to conclude that KCPL should receive a 15 percent return on equity. Unlike the Company and Staff, DOE did not calculate a pre-Wolf Creek in-service and post-Wolf Creek in-service return on equity. Dr. Stolnitz believes this to be unnecessary as the market itself has already begun to reflect changes due to the anticipation of Wolf Creek becoming operational and being placed in service.

Regarding the dividend yield of his DCF calculation, Dr. Stolnitz notes that KCPL's dividend yield during the 1980's has been consistently higher than that of Moody's. This differs from the 1970s when both had similar yields. Dr. Stolnitz concludes that KCPL's extraordinarily low price earnings ratios throughout 1984

support his belief that the difference in dividend yield patterns is primarily due to uncertainties surrounding Wolf Creek.

Dr. Stolnitz believes that interest rates and dividend yields are more likely to fall than to rise over the next 18 months as well as the next four years. He expects the past market uncertainties which have been holding down KCPL's stock price while pushing dividend yields up will sharply diminish once Wolf Creek is placed in service. Dr. Stolnitz concludes that at that point, the dividend yields of KCPL will converge with that of industry and drop to approximately 10.5 to 11 percent.

Dr. Stolnitz allows for a margin of downward error when he recommends a dividend yield for KCPL of 11.25 percent.

Dr. Stolnitz notes that Value Line reveals the average annual dividend growth rate was 4.5 percent over the past five years and 3.5 percent over the past ten years. He asserts that the Company's need to increase dividends to compensate for investor uncertainty will decrease when Wolf Creek is in service.

Although Value Line estimates the average growth rate for 1987-1989 to be 5 percent, Dr. Stolnitz believes those rates are inflated due to the high rate of dividend increase during 1981-1984. Dr. Stolnitz concludes that the 1984-1985 Value Line estimate of an approximately 1 percent rise in dividends requires a lower estimated growth rate.

Therefore, Dr. Stolnitz recommends a growth rate component of 3.75 percent. That percent is in keeping with the approximately 3 percent average growth rate of KCPL from 1970-1980. Dr. Stolnitz reasons that even if the growth rate is higher than his projection, added price increases to KCPL stock would be encouraged and the dividend yield component would become lower.

Summing Dr. Stolnitz's dividend yield of 11.25 percent and his growth rate of 3.75 percent results in a DCF-derived return on equity of 15 percent. He maintains that 15 percent compares favorably to KCPL's previously authorized cost of

equity prior to the 40 basis point upward adjustment for management efficiency. Dr. Stolnitz does not recommend an adjustment for flotation costs as the Company does not intend to issue stock in the near future. Neither does he recommend an adjustment for market pressure. Stolnitz contends that the market has already allowed for that pressure.

Although Public Counsel presented no witness on this matter, it has taken a position which supports that of Staff witnesses Parcell and Ileo.

Having reviewed the parties' positions, the Commission finds that the DCF analysis is the appropriate method to utilize in determining the preoperational return on equity for KCPL. The Commission believes it is best to determine each of the component parts of the DCF analysis.

Focusing initially upon the dividend yield, the Commission believes that primary weight should be given to Mr. Parcell's January/February 1985 analysis rather than Mr. Beaudoin's 12-week analysis ending December 31, 1984. The Commission finds that financial markets do not recognize a significant reduction in risk until it actually occurs. Thus, the shorter and more current the period utilized in the DCF analysis, the more accurate the reflection of the investor-perceived risk associated with nuclear construction. According to Dr. Ileo, this is particularly true where there have been cost overruns and construction delays. The Commission finds the January/February time period to most accurately reflect current market conditions and investor-perceived risk encountered by KCPL prior to Wolf Creek being placed in service.

Looking next at the dividend growth rate component, the Commission believes that the retention growth rate is not the only factor to consider, nor is it always dispositive. The Commission believes a growth rate of 4 to 5 percent is an appropriate reflection of the Company's actual growth rate.

The Commission recognizes that this range falls below the retention growth rate of KCPL. The Commission further recognizes and relies upon Mr. Parcell's

testimony which reveals that KCPL has increased its dividends in the recent past above those of the electric utility industry as a whole. Therefore, the Commission is unwilling to base the Company's growth rate upon Mr. Beaudoin's calculations and believes the Staff's range to be more reasonable.

The Commission finds that Staff's preoperational DCF-derived return on equity range of 15.5 - 16.5 percent is the most reasonable of the alternatives presented, and that it properly matches the current yield component with current growth expectations. The Commission has not made an adjustment for flotation costs nor market pressure. The Commission disagrees with the Company's assessment that without adjustments for flotation costs and market pressure the Company is unable to realize its entire authorized return. The Commission does not believe the flotation adjustment is necessary, as the Company does not intend to publicly issue common stock in the near future. The Commission agrees with Dr. Stolnitz that the market has already allowed for market pressure.

The next issue to be addressed by the Commission is the appropriate return on equity for KCPL reflecting the in-service status of the Wolf Creek plant.

The Commission finds there is an investor-perceived risk associated with the construction of a nuclear plant; however, once that plant becomes fully operational and in service, the evidence demonstrates that risk should be reduced. Therefore, the Commission determines a downward adjustment need be made to the Staff's preoperational return on equity range to reflect that reduction.

Although none of the proposed methods is flawless, the Commission gives more weight to Dr. Ileo's analysis than that of the other parties, as it represents a more thorough and detailed analysis of the potential effect of Wolf Creek's becoming operational and in service on the Company's return on common equity. Dr. Ileo's analysis also appears to be the most statistically reliable of the three analyses.

The Commission finds Dr. Ileo's 14.5 - 15.7 percent return on equity range is reasonable. The Commission further finds that KCPL has encountered more investor-

perceived risk during the Wolf Creek construction period than other nuclear plants under construction. Therefore, the Company's cost of equity should fall below that of other utilities involved with nuclear construction once Wolf Creek is placed in service. The Commission concludes that the lower half of Dr. Ilec's range best reflects the decreased investor-perceived risk associated with Wolf Creek being placed into service. Therefore, the Commission finds a 13.0 percent return on common equity is appropriate in this instance. This results in an overall rate of return of 11.75 percent. The Commission notes that its return on common equity comports with that proposed by DOE.

In the Company's last rate case, ER-83-49, the Commission awarded the Company a 40 basis point upward adjustment to its return on common equity for its efforts in improving management efficiency. In the event the Commission decides to continue this practice, Staff, Company and Local 1464 of the International Brotherhood of Electrical Workers (IBEW) have presented testimony on the matter.

The Commission has reevaluated its prior order and determined it is not necessary nor appropriate to upwardly adjust the return on equity which has been found to be reasonable "to encourage the provision of energy on the most efficient and economical basis possible." Adequate encouragement is given through the recovery of all prudently incurred costs.

Since the Commission no longer intends to continue this practice, it is unnecessary to address the positions of the parties. The Commission notes that the safety issue that was litigated by the Company and the IBEW was merely representative of the IBEW's allegation of mismanagement and no actual determination of that issue was sought.

PHASE II - COST OF SERVICE/RATE DESIGN

I. Rate Design Stipulation

As originally presented, this phase of the proceedings presented the issues of the proper cost of service method to assign the total revenue requirement allowed KCPL to the various customer classes and the rate design for assigning those costs within the classes. The parties presented a Rate Design Stipulation which sets out how the total revenue allowed by the Commission will be allocated among the customer classes and how each class's allocation shall be recovered within each class. The stipulation establishes five customer groups of service on KCPL's system. The stipulation sets out the rate design for the KCPL system for three years and agrees to establish another docket involving rate design in the third year. The allocation for each group is set at a fixed percentage. The rates to be charged are set for percentage increases and it has been agreed that the actual rates will be set based upon the relationships in the stipulation. Since the total revenue requirement had not been determined at the time the stipulation was entered into by the parties, the actual dollar amounts and rates could not be determined.

The Commission has reviewed the Rate Design Stipulation and has determined it is a reasonable and just resolution of the cost of service and rate design issues. The Commission will adopt the stipulation as agreed to by the parties and it is made a part of this order and attached as Appendix B.

II. Space Heating Rate

The only issue left for resolution by the Commission is the separately metered space heating rate. This is the rate to be charged by KCPL for those customers who utilize some type of electric heating system during the winter months. This rate affects the Residential and General Service Secondary customer groups. The rates discussed in the record by the parties were based upon a 52 percent rate increase. Any final rate will be based upon the final total revenue requirement granted.

KCPL currently has five separately metered space heating rates ranging from 3.47¢/kwh to 4.31¢/kwh. KCPL proposed in this proceeding to have a single rate set at 3.25¢. As can be seen, this is a reduction from the current rates. KCPL justifies this reduction based upon the competitive market for space heating service. KCPL developed this rate by calculating the costs of adding 50 MW of capacity over the entire winter season, as well as making the rate competitive with natural gas.

KCPL asserts that the goal of utility pricing is to minimize prices to customers. By allowing it to reduce its space heating rate, KCPL asserts it will increase its sales of electricity, thus benefiting the overall system. This will occur, KCPL asserts, as long as the price for space heating is above incremental costs. Five percent of KCPL's customers use some form of electric space heating. KCPL predicts if the 3.25¢/kwh rate is allowed, this percentage will increase to 15 percent by 1995.

Normally, rates are set by using the full allocation of embedded costs. Since electric space heating must compete with natural gas for customers, the assertion is that electric space heating should be priced to compete. This means it should be priced at incremental cost. KCPL states the incremental cost of providing space heating is approximately 2¢/kwh and with other incidental costs added, a 3.25¢/kwh rate will allow 1¢/kwh to go toward the company's fixed costs.

KCPL determined the 2¢/kwh incremental cost based upon its position that space heating customers add no additional distribution and transmission costs since space heating is used offpeak. KCPL states 90 percent of its customers have air conditioning and these customers are already paying for distribution and transmission systems for the air conditioning and other basic services. Space heating, since it is used during the winter, utilizes the system without additional costs to the company. KCPL asserts the lowest cost to be charged for space heating should be the incremental cost, while the ceiling should be the competitive price. KCPL calculated the competitive price to be 3.25¢/kwh.

KCPL states its system which is established to meet basic electric service and air conditioning service can handle the increase in winter usage. KCPL contends charging space heating customers for distribution and transmission costs is discriminatory since the customer has already been charged for these systems through the summer rate for air conditioning and the basic service rate. KCPL is proposing a flat space heating rate because it asserts there are no justifications for the existing differentials.

Staff used three criteria in developing its allocation of production and transmission costs and rate design. Those criteria are equity, efficiency and customer impact. To determine the rate for space heating under equity considerations, Staff used its time of use (TOU) method to allocate embedded costs. The TOU method allocates costs and sets rates based upon capacity utilization. The TOU method allocates cost to each customer based upon that customer's usage for each hour throughout the year. Using this method, Staff calculated the equity rate for space heating to be 5.156¢/kwh.

Since space heating is in a competitive market Staff supports an efficiency rate that equals marginal cost. Marginal costs, or incremental costs, are those additional costs of producing one additional unit of electricity. Staff calculated this rate based upon the cost of producing the top one percent of loads during the winter period. This rate includes recovery of some fixed generation and transmission costs. The rate calculated was 3.759¢/kwh.

For the customer impact rate Staff calculated the percentage change in class revenue contribution. This rate was 5.758¢/kwh.

Balancing the three criteria, Staff developed a target rate for space heating of 5.156¢/kwh and proposed the Commission set the rate between 3.759¢/kwh and 5.758¢/kwh. A rate within this range will recover the incremental costs and make a contribution to the fixed costs of the system. The closer the price is to marginal costs, the more fixed costs other customers must absorb.

Public Counsel did not propose a separate rate for space heating. To recover the full embedded cost associated with providing service to the space heating customer, Public Counsel asserts the space heating rate should be the same as the winter tail block in the Residential General Rates. Public Counsel's position is that for the space heating rate to be truly competitive with gas service, it would have to be set below 3.25¢/kwh. Public Counsel contends KCPL's calculations of the 3.25¢/kwh rate as competitive with the current price of natural gas are inaccurate. These inaccuracies cause KCPL's calculations to be unreliable when determining what rate would be competitive.

Public Counsel does not believe KCPL can actually compete with gas service for the space heating market unless the rate is lower than 3.25¢. Any lower rate, Public Counsel asserts, would provide little benefit to KCPL's overall system and would hurt the competing gas company. Public Counsel contends that charging 3.25¢/kwh for space heating would mean that space heating customers would be paying less than their fair share with no benefit accruing to other KCPL customers.

Kansas Power and Light/Gas Service (KPL/Gas Service) is the gas company which competes directly with KCPL for space heating customers. KPL/Gas Service's position is that increased electric space heating usage will erode the gas service market, thus causing an increase in price for gas customers. KPL/Gas Service asserts that the benefits to be derived from pricing electric space heat at 3.25¢/kwh are minimal. KPL/Gas Service believes the space heating rate should be the same as the winter tail block rate for Residential General Rates.

Since the parties have stipulated to the cost of service allocations and all of rate design but this issue, the Commission must decide what the space heating rate should be without any reference to an overall rate design method. The Commission, then, is presented with two basic positions and then three different rates based upon those positions. KCPL and Staff concur in the position that since the space heating market is competitive, the rate should be priced based upon some

calculation of marginal/incremental costs. Public Counsel and KPL/Gas Service concur in the position that the space heating rate should be based upon fully allocated costs. KCPL and Staff calculated different rates using different methods for calculating marginal/incremental costs. Public Counsel and KPL/Gas Service agree that the space heating rate should be the same as the Residential General Rates' winter tail block.

The Commission must first reject KCPL's approach to the pricing of the space heating rate. Without any other argument, the Commission can find no support for a reduction in the space heating rate while KCPL is asking for an overall increase of 52 percent. The Commission can find no justification for sending a price signal to space heating customers that it will now cost less to supply them with electric service even though other electric service customers receive an increase in rates.

The Commission further rejects KCPL's 3.25¢/kwh rate because it is based upon a coincident peak view of capacity addition. KCPL's arguments concerning why the system is built, and how offpeak customers add no additional costs to the system are based upon the theory that new capacity is added to the KCPL system to meet system peak. This theory was rejected by the Commission in the KCPL rate design case, Case No. EO-78-161, the Arkansas Power & Light Company rate design case, Case No. ER-81-364, and the last Union Electric Company rate case, Case Nos. EO-85-17 and ER-85-160.

In those cases the Commission found that new capacity is built to meet the year-round system needs. This finding was based upon Staff's evidence supporting its TOU method of allocating costs. The Commission still supports the findings in those cases.

The Commission finds, finally, that the 3.25¢/kwh rate is not supported by the evidence on its own merits. The Commission believes Staff's calculation of marginal costs is more realistic based on the TOU theory of capacity utilization.

Staff's use of the top one percent load for calculating marginal cost more realistically reflects the cost of producing the additional electricity to be utilized by the space heating customer. The Commission finds that the space heating rate should recover more of the fixed costs of providing service than would be recovered through rates based upon marginal cost calculations.

Although Staff has presented the TOU method of allocating costs, its witness stated that as an economist, he believes that rates in a competitive market should be close to marginal costs. Staff has presented a range for the space heating rates to enable the Commission to evaluate the importance of the various factors utilized by Staff. The Commission finds that Staff's position that some production and transmission costs and overhead costs should be borne by the space heating customer is reasonable. Even if the lines for basic service and air conditioning are in place, there are still costs associated with providing space heating service which should be recovered in the space heating rate.

The Commission does not believe, in this case, that the space heating rate should be abolished as Public Counsel and KPL/Gas Service propose. KCPL has a space heating rate in its tariffs and the Commission, without the benefit of a full proceeding on allocating costs and a review of KCPL's entire rate design, will not eliminate one of KCPL's rate classifications. A move to the Residential General Rates' winter tail block would, in effect, eliminate a separate space heating rate for KCPL.

The Commission finds the evidence is clear that KCPL's expansion into the space heating market will be very limited and slow. KCPL projected a movement from 5 percent to 15 percent over a ten-year period. This movement represents estimated new construction and the replacement market and is premised on a rate of 3.25¢/kwh. Although this may mean that KPL/Gas Service will not obtain some new customers or may lose some sales due to add-on heat pumps, this loss seems minor. KCPL has had separate space heating rates for some time. As indicated by the small number of

customers taking service under the rate, these separate space heating rates have had little effect on KPL/Gas Service. The potential harm to KPL/Gas Service does not warrant an elimination of the space heating rate.

The parties have agreed that a rate design proceeding will be conducted in the third year of the stipulated rates. The Commission can, at that time, review the space heating rates set in this order to determine any detrimental effect the rate has on the gas company.

The Commission has weighed the factors for determining a space heating rate. The Commission has considered the argument that in a truly competitive market prices should be set at incremental costs. Public utilities do not exist in a truly competitive market, though, and even the space heating market is not truly competitive.

The Commission has determined in its recent rate design decisions that Staff's TOU method is the proper method for allocating costs and the proper basis from which to design rates. The Commission finds that the TOU method is still the appropriate method for designing rates. The TOU method allows recovery of production and transmission costs associated with usage of the system throughout the year. The Commission finds that the recovery of those costs is appropriate in setting the space heating rate.

Staff has presented three rates and suggested a range of rates for space heating. The Commission finds Staff's equity rate ,which is based upon Staff's TOU calculations, is the rate which most correctly reflects the cost of providing service to space heating customers. By adopting the Staff's proposed equity rate, the Commission will be allocating to space heating rates a lower percentage increase than received by the residential and general service secondary classes as a whole. Based upon the revenue requirement found herein, the space heating rate in the first year of the phase-in will be 3.691¢/kwh.

PHASE III - TRADITIONAL ACCOUNTING AND SELECTED WOLF CREEK ISSUES

I. Electric Rate Base

A. Edison Credit Union Land Sale

Staff proposes that the gain on the sale of land to the Edison Credit Union be treated above the line and thus inure to the benefit of the Company's ratepayers. Staff recommends that the gain be used to offset the allowable cost related to the March, 1984 ice storm or in the alternative that rate base be reduced in a manner similar to the way salvage is treated on sales of other assets. KCPL proposes to treat the gain below the line benefiting the Company's shareholders.

In an order issued September 5, 1984, in Case No. EM-84-238, this Commission approved the sale of a two-acre tract of unimproved land for the sum of $100,000. The land had been included in the Company's rate base since December, 1963. The gain realized on the sale is $83,919 on a total Company basis.

In support of its position, Company cites Re: Kansas City Power and Light, 21 Mo. P.S.C. (N.S.) 543 (1977), where the Commission rejected Staff's proposed above the line treatment of the gain realized on the sale of certain distribution property. The Commission's rationale was based on the theory that ratepayers have no property interest in the Company's assets and, therefore, are not entitled to benefit from gains nor required to absorb losses from the disposition of Company property. The Company also asserts that Staff's treatment amounts to a deprivation of its property without due process.

In support of its position Staff cites Democratic Central Committee of the District of Columbia v. Washington Metropolitan Area Transit Commission, 485 F.2d 786 (D.C. Cir. 1973), cert. denied sub. nom. Transit System, Inc. v. Central Democratic Commission, 415 U.S. 935 (1974) (hereinafter referred to as DCC). In the DCC case the Court rejected a traditional property right theory of shareholder entitlement to gain on utility property and concluded that the treatment of appreciation in value of utility assets while in operating status depends on two principles: (1) the right to

capital gains on utility assets is tied to the risk of capital losses ("gain follows loss") and (2) the one who bears the financial burden of a particular utility activity should also reap the resulting benefit ("benefit follows burden"). Based on an analysis of these principles, the Court concluded that the ratepayers of the Washington Metropolitan Area Transit Commission were entitled to benefit from the gain realized by the sale of certain appreciable assets. In reaching its decision the Court relied heavily on the fact that the property in question was tied to an upgrade program which was heavily burdening the ratepayers.

Staff argues that as a matter of ratemaking principle it is inappropriate to allow profit from the sale of utility assets to accrue to its investors. Staff contends that such a profit represents a realization of capital over and above what the shareholder invested and expected to recover and thus the profit is equivalent to a contribution of capital.

With respect to the "gain follows loss" test, Staff contends that significant risks associated with assets are imposed upon ratepayers. Staff points out that utility assets are susceptible to loss or damage and such casualty risks are generally flowed through as a cost of service.

With respect to the "benefit follows burden" test, Staff points out that the ratepayer has borne the expenses of operation, maintenance and property taxes on the land and at the same time paid a return on the property while it was included in the Company's rate base.

In addition, Staff argues that below the line treatment would be inequitable in this case since decommissioning costs are included in the cost of service. Under the Company's approach the recovery of decommissioning costs shifts to the ratepayer the burden of preparing the Wolf Creek land for sale while the shareholders would realize any gain on the sale at some future date when the land is sold.

The Commission has reviewed Company and Staff's arguments and cases cited in support of their respective positions. Although it is true as the Company argues that the ratepayers have no property interest in the utility assets, this fact alone does not dictate below the line accounting treatment for a gain on utility assets.

As the Staff points out a utility company has a reasonable expectation to recover its original investment and a return on its investment. In the case of depreciable property the return of the investment is recovered from ratepayers through depreciation and a return on investment is recovered from ratepayers through the return on rate base.

In the case of nondepreciable property, ratepayers do not provide a return of the investment. The ratepayers provide a return on the investment through the return component built into the rates. A return of the investment upon disposition of the asset is recovered through the sales price.

In either case, the gain on a sale of property represents a windfall since it exceeds the shareholder's expected return of capital. The Commission believes that the accounting treatment should be based on equitable considerations given the facts and circumstances existing in the particular case.

Traditionally the Commission has treated gains on the sale of utility assets below the line. In Re: Missouri Cities Water, 26 Mo. P.S.C. (N.S.) 1 (1983) and Re: Associated Natural Gas, 26 Mo. P.S.C. (N.S.) 237 (1983), the Commission treated the gain on depreciable utility property below the line. However, in those cases the Commission did not base its decision on a shareholder property right theory as the Commission did in Re: Kansas City Power and Light, supra. The Commission stated in both cases that below the line treatment did not indicate a general policy. In both cases the Commission considered the arguments advanced by Staff in the instant case and considered the reasoning of the District Court of Appeals in the DCC case. In Re: Missouri Cities, the Commission suggested that the gain need not

necessarily be treated below the line and discussed methods whereby a sharing of the gain might be accomplished.

In the instant case, the property in question is nondepreciable property. The argument for passing through the profit to the ratepayer is less persuasive in the case of nondepreciable property, since the shareholder has not received a multiple recovery of the investment through depreciation and again through the sale of the property.

Although it is true utility assets are susceptible to damages or casualty risks which are generally flowed through to the ratepayer, no such losses have been alleged with respect to the property in question. Also because of the traditional accounting treatment of disposition of assets, any losses on the sale of utility assets have not been passed through to the ratepayer.

In the Commission's opinion the mere fact that rates recover property taxes and property insurance does not amount to a burden with respect to the property in question which dictates the pass through of the entire gain on the sale of the asset. Such an approach would require a pass through of the profit on utility assets in each and every case regardless of the equities involved.

Finally, the inclusion of decommissioning costs in the cost of service is not a persuasive argument in favor of passing through the gain on the Edison Credit Union land sale. Accepting the Company's accounting treatment with regard to this particular sale does not preclude a sharing of any realized gain with respect to the sale of Wolf Creek land at some future date, as no cost to improve or prepare for future use (i.e.: decommissioning) on this parcel of land has been recovered from ratepayers.

Based on the foregoing, the Commission determines that the gain on the Edison Credit Union land sale shall be treated below the line as proposed by the Company.

B. Cash Working Capital

Staff proposes a negative cash working capital requirement of $15,352,000 (Exhibit 130) on a total Company basis. Staff's proposal is based on the results of a lead/lag study. KCPL proposes a zero cash working capital requirement. DOE supports the Staff. In support of its proposal the Company cites the uncertainty of the average payment plan on the revenue lag and a recent FERC proposed rulemaking. The Company specifically opposes Staff's lead/lag study because it omits deferred debits associated with the following items: (1) March, 1984 ice storm expenditures; (2) 1982 station outage; (3) a 1982 wind storm expenditures; and (4) pre-1974 vacation liability. In addition, the Company opposes the inclusion of accrued interest in the Staff's lead/lag study.

The Commission has accepted the wisdom of using a lead/lag study to calculate the cash working capital requirement in all major rate cases since Re: Missouri Public Service Company, 22 Mo. P.S.C. (N.S.) 193 (1978). The Company's arguments in favor of a zero cash working capital are not persuasive. If the average payment plan affects the cash working capital requirement, then the Company could have produced evidence quantifying the effect of the plan on cash working capital. Presently it is not known whether the plan will have a positive or negative effect on the cash working capital requirement. Therefore, the Company's arguments are purely speculative.

Although the Commission is not bound by FERC, the Commission notes that FERC's proposed rulemaking provides for a zero cash working capital requirement unless a reliable lead/lag study is performed in support of another position. Thus, even the FERC proposal accepts the reliability of a lead/lag study.

The Commission determines that it is not appropriate to include the unamortized balance of deferred debits in the cash working capital calculation as proposed by the Company. These items represent extraordinary nonrecurring expenditures and are, therefore, not related to day-to-day cash requirements. In

addition, the Commission accepts Staff's argument that it is appropriate to amortize an extraordinary expense with no rate base treatment of the amortized balance. This approach allows a sharing of the extraordinary nonrecurring expense between the ratepayer and the shareholder.

Finally, it has been the Commission's practice to allow accrued interest on bonds in the cash working capital calculation since Re: Missouri Public Service Company, 24 Mo. P.S.C. (N.S.) 1 (1980). The Commission reiterates the position it took in that case that accrued interest on bonds should be used as an offset to the cash working capital requirement. While in possession of the Company these ratepayer-provided funds are a source of cost free cash the Company may use until it makes payment to the bondholders. Neither Company nor its shareholders have any ownership interest in these funds.

Based on the foregoing, the Commission concludes that Staff's cash working capital requirement shall be adopted.

C. Deferred Taxes Offset To Rate Base

Staff proposes an offset to rate base in the amount of $154,971,142 as the amount of deferred income tax reserve allocated to Missouri. Staff's allocation is based on a historical allocator. Company's deferred tax rate base offset is based on the current allocator.

The Company argues that the deferred tax rate base offset has been based on a current allocator since Re: Kansas City Power & Light, 24 Mo. P.S.C. (N.S.) 387 (1981). The Company states that Staff used a historic allocator in the Company's last rate case Re: Kansas City Power & Light, 26 Mo. P.S.C. (N.S.) 105 (1983). However, the Company was unaware of Staff's treatment until after the hearing and during the reconciliation of the case. It was not until January, 1985, that Company became aware of Staff's change of positions regarding the use of the historical allocator.

The Company has used the current plant allocator in both Missouri and Kansas since 1981. The Company argues that if the allocation is changed in this case, $6 million of the Company's rate base will not be recovered by either the Kansas or the Missouri jurisdiction.

Staff argues that the use of the historical allocator is appropriate since it assigns the deferred tax reserve to the Missouri and Kansas jurisdiction based upon the time periods in which taxes were provided and, thus, the jurisdiction that provided the taxes are the recipient of the rate base offset.

The Commission determines that the current allocator shall be used for the purposes of this case. Since the current allocator represents the past practice of this Commission and since the change in allocation method would be detrimental to the Company because of jurisdictional differences, the Commission believes that a shift from the current to the historical allocator should be addressed in the Company's next rate case.

D. Tree Trimming Deferred Debit

The Public Counsel proposes that the unamortized balance of the Company's 1982 three-year tree trimming program be removed from rate base on the ground that any recovery associated with this program constitutes unlawful retroactive ratemaking.

Based on the conclusions set forth below in Phase III, section II, G, Tree Trimming, the Commission determines that Public Counsel's proposal should be rejected.

II. Electric Operating Income

A. EEI Dues

Edison Electric Institute (EEI) is a trade association of investor-owned electric utilities. EEI acts as spokesman and representative of the investor-owned electric industry.

The Staff proposes to disallow $162,839 (total Company) in EEI dues from operating expense. Staff contends EEI's overriding function is to lobby on behalf of the electric utility industry without regard for ratepayer interests, and maintains EEI dues are 100 percent allocable to the Company's shareholders. Staff asserts that all benefits set forth by the Company are derived from membership in EEI working committees whose costs are recovered through registration fees paid by member companies.

The Company set forth an extensive list of industry-wide benefits resulting from membership in EEI. The Company attempted to quantify the benefits and savings specific to the Company which resulted from EEI membership by polling employees of various working committees. Company claims there was $5 million in direct operating cost savings from EEI participation. The Company presented testimony that only 18 percent of EEI's resources are devoted to legislative activities and only 2 percent are devoted to lobbying activities as defined by federal law.

Historically, the Commission has disallowed EEI dues from rate case expense on the basis of EEI's involvement in lobbying. In 1981, the Commission adopted a benefit standard which would allow EEI dues if a direct benefit to the ratepayers could be shown.

> The rule has always been that dues to organizations may be allowed as operating expenses where a direct benefit can be shown to accrue to the ratepayers of the company. Conversely, where that sort of benefit does not appear, disallowance of the dues is required. It follows that the mere fact that an activity might fall within the very broad general definition of lobbying as used by Public Counsel should not necessarily mean that it is an improper expense for ratemaking purposes. The question is one of benefit or lack of benefit to the ratepayers.

Re: Kansas City Power & Light Company, 24 Mo. P.S.C. (N.S.) 386, 400 (1981). The Commission has since refined that standard to include not only a direct quantifiable benefit to the ratepayer, but also a method of allocating the expenses between the shareholders and the ratepayers once the benefits have been quantified. See Re: Kansas City Power & Light Company, 25 Mo. P.S.C. (N.S.) 229, 245 (1982).

In the instant case, there is conflicting testimony on the amount of EEI resources devoted to lobbying. The Commission does not find it necessary to discuss whether or not EEI is devoted primarily to lobbying. The actual percentage of lobbying is not the controlling factor here. The question is whether the Company has quantified the EEI-derived benefits and allocated them between the shareholders and ratepayers. The Commission believes the Company has attempted to quantify EEI benefits, but has failed to separate benefits accruing from committee meetings from those derived outside of committee meetings. The Company has also failed to allocate those benefits between the shareholders and the ratepayers. The argument that allocation is not necessary if the benefits lessen the cost of service to the ratepayers by more than the cost of the dues, misses the point.

It is not determinative that the quantification of benefits to the ratepayer is greater than the EEI dues themselves. The determining factor is what proportion of those benefits should be allocated to the ratepayer as opposed to the shareholder. It is obvious that the interests of the electric industry are not consistently the same as those of the ratepayers. The ratepayers should not be required to pay the entire amount of EEI dues if there is benefit accruing to the shareholders from EEI membership as well. The Commission finds this to be the case. The Company has been informed in prior rate cases that it must allocate its quantified benefits from membership in EEI. That has not been done herein. Therefore, no portion of EEI dues will be allowed in this case.

B. EPRI Assessment Allocation

Electric Power Research Institute (EPRI) plans and manages research and development on behalf of the nation's electric utility industry and the public. It is supported by nearly 500 members, including investor-owned companies, municipal and regional government utilities, and rural electric cooperatives. EPRI's objective is to advance capabilities in electric power generation, delivery and use.

There is no dispute concerning the inclusion in rates of the assessment to the Company by EPRI. Only the allocation of those costs is at issue.

The Company intends to allocate EPRI costs to Missouri and Kansas retail customers only. Public Counsel believes those costs should be allocated to wholesale customers as well as retail customers. Public Counsel asserts there has been no evidence presented which suggests that EPRI activities benefit only retail customers. Instead, Public Counsel maintains that EPRI activities generally benefit the entire electric industry.

The Company opposes Public Counsel's proposal. KCPL asserts the basis for the calculations of EPRI support, as invoiced, is the dollar revenue from the kilowatt hour sales of electric energy to ultimate consumers. The invoiced amount is calculated on Missouri and Kansas retail sales and booked accordingly. The booked amount is the basis for the allocation herein. The Company has in the past attempted to allocate to wholesale customers, but the FERC disallowed such allocations since they were calculated solely on the basis of retail sales.

The case law presented by Company, which was not refuted by Public Counsel, demonstrates that the FERC has found the EPRI assessment to be tied to retail sales and, therefore, does not allow it to be allocated to wholesale customers. See Connecticut Light and Power Company, 5 F.E.R.C. ¶61,140 (Order On Rehearing issued November 22, 1978).

Although not bound by the FERC's decision, a decision to the contrary could subject member wholesale companies to double assessments, one for KCPL's membership in EPRI and one from the wholesalers' own membership in EPRI. The Commission finds that Public Counsel's proposal would force the shareholders to pay the amount allocated to the wholesalers. Since the Company did not include wholesale kwh sales in its EPRI assessment calculations, the Commission finds it is proper for the assessment to be allocated only among the retail customers. The Commission does not believe a cost/benefit analysis is appropriate in the instant case.

C. Dues, Donations and Employee Benefits

Public Counsel and Staff jointly sponsored a disallowance from cost of service of the dues, donations and/or payments to 108 different organizations. The proposed disallowance totals $209,500 (total Company). Public Counsel and Staff contend these payments should be disallowed because they are:

(1) involuntary ratepayer contributions of a charitable nature;

(2) supportive of activities which are duplicative of those performed by other organizations to which the Company belongs or pays dues;

(3) active lobbying activities which have not been demonstrated to provide any direct benefit to the ratepayers; or,

(4) costs of other activities that provide no benefit or increased service quality to the ratepayer.

Jointly-sponsored witness Menefee testified the decision to exclude individual organizations was based upon information supplied by the Company detailing vendor name, the function to which the organization was booked and/or a description and purpose of the organization. Company believes payments to all of the organizations should be allowed, since they are business-related and provide benefits to the ratepayers.

The Company provided examples of the functions of several of the organizations proposed to be excluded to demonstrate the reasonableness of their expenditures. Of the examples, the Commission believes all but two are excludable, as they fall within one of the four categories mentioned by Public Counsel and Staff. The Commission takes exception to the proposed disallowances of: Consumers United for Rail Equity (CURE) and the Western Coal Traffic League (WCTL), which also includes the Western Coal Transportation Association (WCTA). The total of these two proposed disallowances is $55,058. Although the primary function of both organizations is lobbying, both appear to lobby only for legislation that is directly beneficial to the ratepayers.

CURE lobbies to assure rail rate and service equity. Any reduction or stabilization of rail rates is directly beneficial to the ratepayers. The Commission notes that CURE introduced and lobbied for the Consumer Rail Equity Act of 1985, which the Commission itself supported as being beneficial to the ratepayers.

In most circumstances involving dues and donations, it is necessary to quantify a benefit that has actually come to fruition. In this instance, the Commission determines the Company's evidence is sufficient to demonstrate that CURE's activities are in the best interests of the ratepayers.

The WCTL was formed to address matters of common concern to all shippers of western coal. The WCTL also lobbies against increased rail rates. The WCTA provides a forum for utilities, coal producers and railroads to discuss issues of common interest, including transportation issues and contract negotiations. WCTA has also worked with railroads to solve various problems regarding tariff items. The testimony evidenced that WCTA's settlement of the frozen coal item saves the Company over $400,000 a year. The Commission finds the direct benefit to the ratepayer from WCTL and WCTA's efforts has been adequately quantified. The Commission finds these organizations to be distinguishable from EEI in that their interests and those of the ratepayers appear to be one and the same. Public Counsel and Staff did not come forth with any evidence to convince the Commission otherwise.

After having reviewed the additional items proposed to be disallowed, the Commission finds that all of the other organizations listed by Public Counsel and Staff are properly excluded from cost of service, and notes that payments to such representative places as Paradise Point Golf Course, K.C. Soccerdome, Jerry's Sport Shop, Showcase Magic and Novelty, and various area restaurants are obviously improper to charge to the ratepayers. The Commission hopes the Company will be more discriminating as to the payments it chooses to include in its cost of service in the future.

D. Rate Case Expense

As a portion of its rate case expense proposal, Public Counsel recommends a normalization of rate case expense. As an alternative to adoption of its position on that issue, Staff and Public Counsel propose to disallow expenses for certain outside consultants, as well as certain costs representing out-of-period expenses. Public Counsel further proposes a sharing of rate case expense. The Commission will first focus on the issue of normalization, since an adoption of Public Counsel's position would negate any need to discuss the alternative proposed disallowances.

1. Normalization

Public Counsel recommends the Commission allow a more normal level for rate case expense than that experienced by the Company in 1984. Public Counsel witness Dawson utilized a simple average of rate case expense incurred from 1979 to 1983. That amount was then adjusted to 1984 dollars. His calculation resulted in a recommended expense level of $435,132. (This expense is allocated 100 percent to Missouri.) He contends that the present rate case expense represents extraordinary expense, the level of which should not be reached again.

The Company argues it is impossible to accurately normalize rate case expense if one does not include 1984, the year the Company incurred its highest expenses. This type of analysis purposely and unjustly lowers the rate case expense level allowed. Company contends there is no way to know if rate case expense will decrease. It depends on party interests, number of data requests submitted, etc.

The Commission does not believe it is unfair to use a five-year average which does not include 1984. The Commission finds it is logical to assume that the first Company rate case involving a nuclear unit will encompass more effort and expense than will subsequent rate cases. The Commission is cognizant of the fact that exclusion of 1984 expense causes a lower level of rate case expense to result, but finds that to be a reasonable form of sharing of rate case expense between the ratepayer and the shareholder. Normalization will allow a reasonable level of

expense to be recovered annually by the Company whether it actually files a rate case or not. This type of normalization is in the best interests of both the shareholders and the ratepayers.

While it is true that Company is, by statute, forced into the regulatory arena to increase its rates, it is also true that not only intervenors fan the flame of rate case expense once a case is filed. The record indicates occasions where Company has been less than cooperative with various parties; for example, by not fully responding to data requests or producing documents in a timely fashion. The Commission is of the opinion Public Counsel's position on normalization is a reasonable one and is hereby adopted. No determination need be made of Staff and Public Counsel's alternative disallowances since the normalization proposal has been accepted.

2. Sharing

Public Counsel contends that rate case expense should be shared between the ratepayers and the shareholders, as both derive benefits therefrom. The shareholders benefit by receipt of increased revenues to the Company, and the ratepayers benefit by use of a viable utility which can provide safe and adequate service.

The Company believes that rate case expenses are best characterized as normal operating expenses, since it is not by choice that the Company litigates its rate increases. The Commission touched upon this issue under the Public Counsel's normalization proposal. While the Commission believes Public Counsel's arguments have some merit, the Commission notes that its adoption of the Public Counsel's normalization provision is a type of sharing of rate case expense. The Commission will continue to evaluate the concept of sharing of rate case expense in the future. In this case, the Commission is rejecting Public Counsel's equal sharing proposal, as it has previously adopted his normalization proposal.

E. Outside Consultants

Staff and Public Counsel are jointly sponsoring a disallowance of $65,000 (total Company) in fees paid to Environmental Consultants, Inc. (ECI), an outside

consultant, for its study and proposal of the Company's line clearance program. Joint witness Menefee's testimony indicated the basis for the proposed disallowance is the Company's failure to follow its own policy for hiring, which includes the solicitation of bids from prospective consultants. That policy allows the hiring of firms with unique qualifications without obtaining bids.

The Company asserts it did not violate its internal hiring policy because ECI is the only consultant of its type. Therefore, it was uniquely qualified to perform the required tasks and bids were not necessary.

Ms. Menefee testified to the fact that ECI has unique qualifications. Her argument is premised upon her belief that the Company did not know of those unique qualifications at the time it hired ECI. Her belief is derived primarily from the answer to a data request submitted to the Company. Upon being asked how it came to know of ECI, the Company responded that ECI was known through contact with other electric companies. No specific question was asked as to whether the Company believed ECI to exhibit unique or one-of-a-kind characteristics.

The Commission believes the evidence is insufficient to support the proposed disallowance. An inference drawn from an answer to a broadly worded data request is not substantial or competent evidence upon which to base a disallowance.

F. Property Insurance

Public Counsel recommends the Commission disallow one-half of the cost of property insurance to the Company. That results in a $391,862 disallowance from the Company's test year cost of service. Public Counsel maintains that sharing is appropriate because insurance is purchased to cover the risk of loss of the Company's assets. Both the shareholders and the ratepayers benefit from this type of coverage.

Company contends there is no evidence to support an equal sharing concept. It is Company's further contention that to the extent shareholders pay property insurance premiums, the shareholders are entitled, pro rata, to the insurance proceeds. Any replacement of damaged plant the shareholders would make would be

placed into rate base and a return earned thereon. That would not be the case if the insurance premiums were fully reflected in operating expenses. Thus, in the long run the ratepayers would be paying more if a sharing concept were adopted.

The Commission agrees with the Company that the end result of a sharing concept for property insurance would inure to the detriment of the ratepayer and must be rejected.

G. Tree Trimming

The Company proposes to include in its cost of service $6,784,995 on a total Company basis for tree trimming expense. Staff proposes to include $5,083,987. IBEW, Local 1464 and DOE support the Staff.

Public Counsel opposes the recovery of the amortized portion of the Company's 1982 to 1984 tree trimming program on the ground that such recovery constitutes retroactive ratemaking. Public Counsel also proposes that the unamortized balance associated with the Company's 1982 to 1984 tree trimming program be removed from rate base.

In the Company's 1982 rate case, the Company and the Staff agreed to amortize over a five-year period the cost of an accelerated tree trimming program. The five-year amortization was built into the rates approved by this Commission in Re: Kansas City Power & Light Company, 25 Mo. P.S.C. (N.S.) 229 (1982). The 1982 three-year tree trimming program was designed to accelerate tree trimming so that the Company could maintain a three-year trimming cycle at the end of the three-year period. At the time the program was proposed it was estimated to cost $1 million annually above the normal tree trimming level. The Company represented that at the end of the three-year period tree trimming expense would be reduced by $1 million per year.

The program began in January, 1982. However, in September, 1982, the Company decided to reduce the level of tree trimming. Company states that it believes funding was inadequate to complete the task within the three-year period.

From October, 1982 until March, 1984, the Company reduced large overhang and large tree removals, concentrating on clearance trimming. In March, 1984, the Company's service area experienced a severe ice storm. Subsequent to the ice storm, the Company resumed overhang and large tree removals.

The Company has engaged a consultant, Environmental Consultants, Inc., (ECI). ECI recommends a three-year tree trimming program at an estimated cost of $6.2 million per year for the purpose of getting the Company on a normal three-year tree trimming cycle.

The Commission determines that the ratepayers should not be required to fund the Company's second tree trimming program. The Commission is not persuaded that the Company received inadequate funds for the 1982 three-year tree trimming program. The Commission notes that the Company reduced its tree trimming efforts in September 1982, only two months after the rate order approving rates funding the program. The Commission finds it disturbing that after it has allowed funds to be recovered from ratepayers for a specific program, the Company has chosen not to expend such funds for that purpose. The Company did not request additional funding in subsequent rate cases and the Company has not requested funding for the second three-year program in Kansas.

The Commission expects the Company to proceed with the three-year tree trimming program recommended by ECI in order to reach a normal three-year tree trimming cycle as promptly as possible. Any delay on the part of the Company in implementing the program could affect recovery of any future storm-related damages.

Finally, although the Commission will not fund a second three-year accelerated tree trimming program, neither is it persuaded by Public Counsel's arguments. The Commission determines that Public Counsel's position should be rejected for two reasons: (1) the amortization of the 1982 three-year tree trimming program was approved by this Commission in the Company's 1982 rate case. Thus, Public Counsel as a party to that case, had the opportunity to challenge Staff and

Company's agreement with respect to the amortization; (2) the amortization of this extraordinary tree trimming expense does not constitute retroactive ratemaking. When approved, the program was designed to improve safe and adequate service in the future and not to recover past expenses or losses due to the imperfect matching of rates with expenses.

Based on the foregoing the Commission determines that Staff's position should be accepted and, therefore, only the test year level for tree trimming expenses will be allowed.

H. 1984 Ice Storm Expense

The Company and the Staff agree to a five-year amortization of expenses associated with the March, 1984 ice storm. Staff, however, recommends that one-half of the ice storm expense be disallowed because of the Company's failure to pursue its 1982 three-year tree trimming program. The annualized amount from the five-year amortization is $530,943 under Staff's recommendation and $1,061,886 under the Company's recommendation.

Public Counsel opposes any recovery of ice storm expense on the ground that such recovery constitutes retroactive ratemaking. Public Counsel cites 393.140(5)and Section 393.140(5), RSMo 1978, for the proposition that ratemaking be prospective as opposed to retroactive.

The Commission agrees that retroactive ratemaking is prohibited and the Supreme Court of Missouri has so found. State ex rel. Util. Consumers Council, etc. v. P.S.C., 585, S.W.2d 41 (Mo. banc 1979) (hereinafter UCCM). The UCCM Court found a fuel adjustment clause to be unlawful and in rejecting Public Counsel's request to remand to the Commission to order a refund of the excess amounts collected under the fuel adjustment clause the court stated:

> [17] However, to direct the commission to determine what a reasonable rate would have been and to require a credit or refund of any amount collected in excess of this amount would be retroactive ratemaking. The commission has the authority to determine the rate to be charged, § 393.270. In so determining it may consider past excess recovery insofar as this is relevant

to its determination of what rate is necessary to provide a just and reasonable return in the future, and so avoid further excess recovery, see State ex rel. General Telephone Co. of the Midwest v. Public Service Comm'n, 537 S.W.2d 655 (Mo.App.1976). It may not, however, redetermine rates already established and paid without depriving the utility (or the consumer if the rates were originally too low) of his property without due process. See Arizona Grocery Co. v. Atchison, Topeka & Santa Fe R. Co., 284 U.S. 370, 389-90, 52 S.Ct. 183, 76 L.Ed. 348 (1932); Board of Public Utility Commissioners v. New York Telephone Co., 271 U.S. 23, 31, 46 S.Ct. 363, 70 L.Ed 808 (1926); Lightfoot v. City of Springfield, 361 Mo. 659, 236 S.W.2d 348, 353 (1951). UCCM supra at 58.

In finding the fuel surcharge unlawful the court stated:

[19,20] The utilities take the risk that rates filed by them will be inadequate, or excessive, each time they seek rate approval. To permit them to collect additional amounts simply because they had additional past expenses not covered by either clause is retroactive rate making, i.e., the setting of rates which permit a utility to recover past losses or which require it to refund past excess profits collected under a rate that did not perfectly match expenses plus rate-of-return with the rate actually established, Board of Public Utility Commissioners v. New York Telephone Co., 271 U.S. at 31, 46 S.Ct. 363; Lightfoot vs. Springfield, 236 S.W.2d at 353. UCCM at 59.

Public Counsel cites Narragansett Electric Co. v. Burke, 415 A.2d 177 (R.I. 1980) for an explanation of the policy concerns underlying the prohibition against retroactive ratemaking.

> The rule against retroactive ratemaking serves two basic functions. Initially, it protects the public by ensuring that present consumers will not be required to pay for past deficits of the company in their future payments....
>
> . . . .
>
> The rule also prevents the company from employing future rates as a means of ensuring the investments of its stockholder. Georgia Ry. & Power Co. v. Railroad Commission of Georgia, 278 F. 242 (D.C.Ga. 1922). If a utility's income were guaranteed, the company would lose all incentive to operate in an efficient, cost-effective manner, thereby leading to higher operating costs and eventual rate increase. Id. at 179-180. (emphasis added).

What Public Counsel does not mention in his argument is the fact that the Narragansett Court specifically considered ice storm expenses in light of the rule against retroactive ratemaking and concluded that the rule did not apply. The Rhode Island Supreme Court said at pp. 179-180:

[2] The application of the rule against retroactive ratemaking to prevent the company from recovering the extraordinary cost of the ice storm would serve neither of the policies expressed above. Because of the unpredictable and severe nature of the storm, it is unlikely the company officials, in planning their operational expenses, could take into account the cost of repairing the widespread damage that occurred on January 14, 1978. The existing rates, moreover, as the commission indicated in its decision, were "not in any fashion [based on] the extraordinary expenses of restoration of service after the ice storm." Since the company incurred highly extraordinary expenses not covered by existing rates in combating this freakish storm, it is difficult to perceive how the future efficiency of the utility would be furthered by the application of the rule in this instance.

We have also noted that the rule serves to protect present customers from paying for a utility's past operating deficits. This aspect of the rule must be weighed against the interest of providing immediate service to customers when a destructive, unexpected storm occurs. On such an occasion the public interest in quickly restoring heat and electricity to the homes of customers must prevail.

. . . .

The next time a storm of this magnitude occurs, the company would have no incentive to hire outside line and tree crews to restore service efficiently and swiftly to customers if no reimbursement for extraordinary expenses would be forthcoming. Thus, application of the rule to expenses related to such an emergency situation so inextricably related to the public health and safety would serve to thwart the goal of effective customer service.

The plethora of cases from other jurisdictions permitting a utility to recover the extraordinary costs associated with an unusually severe storm indicate that the rule against retroactive ratemaking does not come into play in such instances. [citations omitted]

The Narragansett holding was cited with approval by this Commission in KCPL's last rate case as support for the recovery and amortization of the cost associated with the Company's Hawthorn 5 outage. See Re: Kansas City Power & Light Company 26 Mo. P.S.C. (N.S.) 104, 120 (1983).

Considering the foregoing, the Commission determines that the rule against retroactive ratemaking does not apply to expenses incurred which are associated with extraordinary events. Such expenses are not associated with "imperfectly matching of rates with expenses" or a "redetermination of rates already established and paid".

In contrast to underrecovery of fuel expenses established in previous rates which was the subject of the UCCM case, ice storm expenses do not involve the question of underrecovery since the previously established rates do not include expenses associated with extraordinary events.

In the Commission's opinion it has the discretion to recognize extraordinary events and allow for amortization of the expenses on a prospective basis over a reasonable period of time.

Finally, the Commission determines that Staff's position should be rejected. Although it is true and the Company admits a correlation exists between large limb overhangs and ice storm damage, the extent of the correlation has not been shown in this record. Thus, the Commission is unable to find that the reduction of overhead tree trimming for one-half of the three-year tree trimming program warrants a disallowance of one-half of ice storm related expenses. The Commission believes that the netting of ice storm expenses against capacity sales as discussed in Phase IV, Section IV-H below eliminates the inequities raised by the Staff in this matter.

I. Advertising and Related Expenditures

1. New York Rule

The Commission has traditionally applied the "New York Rule" to gas and electric utilities to determine whether costs of advertising and promotional practices should be included in rates. "As applied by this Commission, the rule first excludes all political and promotional advertising and then allows all other advertising, including good will advertising, up to an amount equal to one-tenth of one percent of the utility's revenues." Re: Union Electric Company, 25 Mo. P.S.C. (N.S.) 194, 200 (1982).

Staff, Public Counsel and Company are all recommending elimination of the New York Rule as it has been applied by this Commission. Staff asserts the rule is deficient because it allows institutional advertising which does not benefit the ratepayers, it arbitrarily excludes promotional advertising regardless of benefit to

the ratepayers, and it does not serve its original purpose of saving Staff resources by not requiring an advertisement by advertisement evaluation.

Staff recommends that four categories of advertising be adopted by the Commission:

(1) general - informational advertising that is useful in the provision of adequate service;

(2) safety - advertising which conveys the ways to safely use electricity and to avoid accidents;

(3) promotional - advertising used to encourage or promote the use of electricity;

(4) institutional - advertising used to improve the company's public image.

Staff proposes to allow the costs of all general advertising and reasonable amounts of safety advertising, and the costs associated with promotional advertising if the benefits derived therefrom were shown to exceed the costs. It is Staff's further proposal to disallow costs associated with institutional advertising.

Public Counsel basically agrees with Staff's recommendation, but is concerned that Staff's recommendation would allow the Company free rein over advertising expenditures if the Commission does not institute and maintain a strict policy that requires proven benefits to the ratepayers. Public Counsel is further concerned that the Company may inundate the public with institutional advertising if it is allowed and no "cap" is applied.

The Company reasons that the New York Rule should be eliminated because the original rationale for its institution by the New York Public Service Commission is not applicable to Company. Originally, the rule was instituted to prevent promotional advertising from increasing off-peak load and requiring additional oil-fired generation at a time when dependence upon foreign oil was at its peak. Statement of Policy on Advertising and Promotional Practices of Public Utilities, N.Y.P.S.C.

(February 25, 1977). Company points out that is different from the instant case, where it utilizes coal and nuclear power to provide electricity.

Company further reasons that promotional advertising is not necessarily negative. It helps to build off-peak load and improve system load factor. It also plays an important role in the Company's marketing of its space heating. The Company recommends that the Commission allow recovery of all its advertising expense unless incurred for purely political reasons.

The Commission agrees with the parties that it is no longer necessary to utilize the New York Rule. It appears that disagreement between the parties as to the proper categorizations of certain advertisements negates one of the Commission's original purposes for applying the New York Rule, to alleviate the need for an "ad-by-ad" review. In addition, the Commission determines on this record that the ratepayers should not bear the costs of institutional or good will advertising. The Commission cannot conclude herein that institutional advertising is beneficial to ratepayers. If the Company desires to improve its public image, that is management's business, but the costs will not be borne by the ratepayers under the rates established in this case. The Commission does believe that promotional advertising can be beneficial to the ratepayers and should not be arbitrarily disallowed, but any benefit must be cost-justified. The benefits from those expenditures must be demonstrated to exceed the costs of the promotional advertising itself.

The Commission determines a fifth category should be added to Staff's list of recommended categories. The fifth category would be that of political advertising. Political advertising does not benefit the ratepayers and is not properly charged to them. There is no argument as to the disallowance of this type of advertising in the instant case.

Thus, the Commission is discontinuing its application of the New York Rule and is adopting Staff's recommended categories of advertising expense, as well as adding a fifth category for political advertising.

2. Specific Disallowances

a. Promotional

Staff has classified the following advertisements and related expenditures as promotional.

i. Heat Pump and Winter Heat Sale Advertisements

Staff maintains that heat pump advertisements are promotional because they are designed to encourage selection and use of the utility's services. Similarly, winter heat sale advertisements are designed to encourage use of electricity for heating. Staff maintains both are similar to advertising by retailers to encourage purchases.

The Company disagrees with Staff's classification of these advertisements as promotional. Although the Company concedes that one of the purposes of the advertisements is to encourage off-peak usage, the primary purpose of the advertisements was to supply information as to the efficiencies of the heat pump and the separately-metered space heating rate, which benefits the public. Use of both enables customers to save on their heating and air conditioning bills.

The Commission believes the advertisements are properly classified as promotional under Staff's definition. The primary purpose for both types of advertisements appears to be to encourage usage of electricity and/or services of the Company. The Commission believes the dissemination of energy efficiency information is merely secondary. This is particularly true of the winter heat sale advertisements. The term "sale" itself denotes promotion of a product.

ii. Home Tour Advertisements

The Staff maintains these advertisements are essentially heat pump advertisements, as they promote the heat pump as an appliance the public should consider when buying a new home.

The Company contends the purpose of the advertisements is to inform the public about the energy efficiency aspects of new homes. The Company claims this is

informational, not promotional, advertising. A further function of the advertisements is to make the public aware of energy efficiency standards.

The Commission is of the opinion the primary purpose of the advertisements is to promote the sale and use of the heat pump and, in turn, electricity. For the reasons previously stated, these advertisements are properly classified as promotional.

iii. Christmas Lighting Contest and Commercial Lighting Advertisements

This contest is for the best decorated house. The contest includes a monetary reward for the winner, as well as a $4.00 contribution from the Company to the Optimists Youth Fund for every home entered. Staff asserts the contest, the advertisements and the monetary reward encourage the use of Christmas lights and therefore the use of electricity. For the same reasons, Staff recommends disallowance of commercial lighting advertisements. Staff also contends that the Optimists contribution from the Christmas lighting contest should be disallowed as a charitable donation.

It is Company's assertion that customers would use outdoor Christmas lights without the contest. The Company maintains that although the commercial lighting market is already fully developed, the advertisements are still necessary to disseminate information to the public as to electric lighting equipment so that they can receive greater benefit from their energy dollars.

The Commission finds there is no question that these advertisements are promotional in nature, as is the monetary reward. The Commission does not fault the Company for the Christmas lighting contest; however, the Commission finds that it encourages use of the Company's services. Therefore, the costs of the program are promotional. The Commission determines the charitable donations should be disallowed.

iv. Flower, Lawn and Garden and 1984 Home Shows

Staff proposes to disallow the expenditures associated with both the Flower, Lawn and Garden Show and the 1984 Home Show because both promote the use of electricity through use of the heat pump and/or electric versus gas post lights.

Company argues that these are not advertising costs: they are direct costs incurred from participation in both shows. Company agrees that the shows do have the effect of increasing off-peak consumption, but the primary purpose is to inform the public of electrical equipment efficiency and energy conservation.

The Commission recognizes that the Company places personnel at the booths who answer questions from the public, but the Commission believes the foremost reason for their presence is to promote the use of various electrical equipment and, in turn, electricity. For these reasons and the reasons the Commission stated for the heat pump and winter heat sale advertisements, the Commission finds that these expenditures should be classified as promotional in nature.

v. Travis, Walz & Associates, Inc.

Travis, Walz & Associates, Inc. (Agency) is an advertising agency. Staff developed a ratio of the number of promotional advertisements to the number of nonpromotional advertisements the Agency had worked on and applied it to the Company's fee to obtain its recommended disallowance of $13,115.

Company believes Staff's method of apportionment is improper since the Agency received all but $16,832 of its $48,000 fee from standard media commissions paid by the various media. Company maintains the remaining fee paid the Agency by the Company covered work on various other activities such as market planning, safety and informational booklets.

The Commission has no way of ascertaining what proportion of the additional activities performed by the Agency constituted activities of a promotional nature. The term "informational booklets", if used in the Company's vernacular, could be anywhere from zero to one hundred percent promotional in nature under the Staff's

definition. Therefore, the Commission finds it is reasonable for Staff to apportion those expenses. The Commission finds Staff's method of apportionment is appropriate.

vi. FERC Account 916, Miscellaneous Sales Expense

There is no dispute that this account represents direct expenses incurred from sales promotional activity.

vii. Cost Justification

Having determined the Staff's proposed disallowances are properly classified as promotional advertisements or expenditures, the Commission must determine whether any of those costs are sufficiently justified to allow their inclusion in rates. The Company's primary evidence of cost justification is in the form of its Marketing Dimensions Report-Heating (Marketing Report). The purpose of the Marketing Report was to determine long term marketing strategies for development of the space heating market.

Staff suggests the Marketing Report is unable to justify the Company's promotional program for several reasons. The promotional practices rule constitutes a major barrier to the marketing program developed. The costs of follow-up research are not included and would negate the resulting positive cash flow. The program is unreliable because it extends through 1995, which necessarily means use of many assumptions.

Public Counsel contends the Marketing Report's bottom line analysis cannot be readily accepted due to several questionable or "wrong" assumptions. Those assumptions begin with the Company's belief that the space heating campaign will capture 50 percent of the potential market in 1995. Another assumption is that 12,000 conversions will be available each year through 1995. That figure was based upon the replacement of air conditioners with an average life of 12 years. Public Counsel notes that Company testified in Phase II that the average life of an air conditioning unit was 15 years. That 15 year figure would lower the replacement rate to approximately 6,700 replacements annually. Finally, Public Counsel notes that the

study did not utilize actual space heating rates. It used rates lower than actually charged in 1983 to 1985 and higher than proposed in 1987 to 1989. Therefore, the true results are unknown.

The Company maintains it is necessary to utilize assumptions in a study such as this, and the question is whether those assumptions are reasonable. The Company asserts there are no measurable increases in the cost of follow-up surveys to the program, since the Company has performed various follow-up communications surveys since 1976 and simply adds questions involving space heating to those surveys. It is the Company's contention that a change in the average life span of air conditioners to 15 years would not necessarily render the cost/benefit analysis inaccurate, because the Company could increase the study from 13 years to 16 years to cover the increased life span. The Company anticipates the results would be similar. Finally, Company argues that the space heating rates used from 1983 to 1985 tended to make electric space heating less competitive with natural gas, yet in 1983 and 1984 a larger number of additional electric heating units were installed than had been projected.

The Commission finds that the longer the period of the projection, the less reliable a study becomes, yet the Commission is cognizant of the necessity for a sufficiently long time frame to allow for market reaction. According to the Company, a projection through 1998 may be required to correct its study to properly account for the 15 year average life span of an air conditioning unit. The Commission has been shown no evidence that a lengthened study period would deliver similar results. If the Company did not increase its study period, there could be more than a 40 percent decrease in the annual available conversion market. This would substantially affect the Company's bottom line analysis, whether it has made a conservative estimate or not.

The Commission, like Public Counsel, is also uncertain why the Company has assumed a realization of 50 percent of the potential space heating market by 1995.

This is an important portion of the Company's analysis, yet insufficient evidence was provided to demonstrate to the Commission the probability of reaching that level. As a result of the promotional practices rule in Missouri, a portion of the Company's program is precluded. Therefore, it may well be difficult for the Company to actually obtain that percentage of the market. Since the Company anticipates a positive discounted cash flow of only $25,825 by 1995, the Commission believes it is reasonable to require sufficient support, at least in the form of backup reasoning, for that market percentage. The Commission finds the Company's study to be too speculative and unreliable to provide justification of the Company's promotion.

The Company also attempts to draw a comparison between the increased number of living units connected to the Company's promotion of space heating. The Commission is unable to determine which of these connections were actually due to the promotion and which were due to other outside factors. Based upon the foregoing, the Commission finds the Company's evidence insufficient cost justification to support its promotional advertising. Therefore, the costs of all of the above discussed advertisements and related expenditures are properly disallowed.

b. Institutional Advertising

Staff proposes to disallow all institutional advertising on the basis that it is not needed in the provision of safe and adequate service. Staff further proposes to disallow two types of expenditures relating to institutional advertising.

i. Fleishman-Hillard

Fleishman-Hillard is a public relations consulting firm that was hired to help address the negative "communications environment identified by media coverage of KCPL and energy issues in general." Fleishman-Hillard provided various communications and polling services to assist in developing a more positive image of Wolf Creek and the Company in the opinion of public officials, the media, customers and shareholders. Staff maintains this is an institutional advertising related expenditure and should be disallowed.

It is the Company's contention that these are not advertising expenditures. They are similar to the communications expenditures of the Company's own communications staff and Fleishman-Hillard was, in fact, hired to complement that staff. Thus, the costs should be allowed.

ii. Corporate Speakers Bureau

According to Staff, the Corporate Speakers Bureau's purpose is to enhance the image of the Company, change attitudes and influence the public. Therefore, it should be disallowed.

The Company argues that the Bureau's purpose is to disseminate information to the public. The Company contends the presentations are short and leave time for questions from the audience. Although recently many of the presentations have involved Wolf Creek, the Company contends many other topics are discussed.

iii. Various Advertisements and "Keeping Current" Articles

The Staff proposes to disallow these costs because their primary purpose is to enhance the Company's image and not to disseminate information. The Company disagrees and argues the purpose of the various advertisements and articles is to disseminate information to the public.

Having reviewed the arguments of the parties, the Commission is of the opinion that all of the proposed exclusions represent institutional advertising which is properly excludable from the Company's cost of service, as previously discussed.

III. Wolf Creek Related Issues

A. Wolf Creek Decommissioning

Since a nuclear power plant contains radioactive material, it requires special procedures for guarding against any contamination once the plant is no longer in service. The decommissioning process associated with the safeguarding of the plant is expensive and uncertain. The cost of decommissioning far exceeds any salvage value the plant might have. As part of the rates the ratepayers pay during the operation of the plant, the Company will collect funds for the decommissioning of

the plant. Decommissioning costs for the Wolf Creek Generating Station have been stipulated to by Staff and Company as $103,330,000. The issue left for determination is how those costs should be funded.

The Company proposes to fund Wolf Creek decommissioning by using a negative net salvage approach. The Company would collect the funds in a manner similar to depreciation. Depreciation is designed to recover the cost of the asset less its net salvage value. The net salvage value of the asset is equal to its value at retirement less the cost of removal. Since the cost of removal of a nuclear plant will greatly exceed the value of the plant at retirement, the net salvage value will be negative. Use of the negative net salvage method would allow Company use of the funds internally for various purposes. Then, at the time of decommissioning, Company would borrow the necessary funds.

Staff proposes the use of an external fund for the decommissioning moneys collected over the life of the plant. Staff's proposal requires the hiring of a trustee to administer the trust. The funds accumulated in the trust would be invested by the trustee and unavailable for Company use until the plant is decommissioned.

Staff and Company evaluated their choices in light of similar criteria. Company chose the negative net salvage approach primarily due to its low cost and available cash flow over the projected life of the plant. Staff chose the external fund primarily to ensure the moneys would be available at the time of decommissioning.

While it is true that Company's proposal would cost less than Staff's, the Commission believes the overwhelming concern is that of financial assurance. The Commission finds this is best accounted for in Staff's proposal. The Commission must ensure that the moneys paid by ratepayers over the life of the plant will be available when it comes time for decommissioning. Therefore, the Commission is directing the Company to utilize an external fund for the purpose of decommissioning. This is

consistent with the Commission's decision in the Union Electric case, where similar arguments were set forth by Union Electric and Staff.

Staff has further proposed that the Commission direct the Company to do the following:

* Design the fund so that it can take maximum advantage of The 1984 Tax Reform Act regarding deductions;
* Select a responsible person to act as trustee from at least five (5) potential trustees, including at least one brokerage firm and preferably from a cross-section of financial institutions;
* Select an interim trustee to hold the fund until the permanent trustee is selected;
* Make its selection of the interim trustee known, along with all associated terms and agreements, on or by October 28, or the end of the case proceedings according to the procedural schedule;
* Require the Interim and Permanent Trustee to follow the requirements of all pertinent sections of the Internal Revenue Code and Regulations in making investments for the fund;
* Provide copies of proposals for permanent trustee, along with Company's recommendation of trustee of the fund, to the Commission for its review prior to execution of the agreement establishing a permanent decommissioning fund;
* Provide copies of the final negotiated draft of the decommissioning trust agreement to the Commission for its review prior to execution of said agreement;
* Direct the trustee to submit annual reports to the Commission and to Company that include information about the trust's receipt of funds, the fund's investment income and rate of return, and the fund balance. In addition, copies of all documents the Company or trustee is

required to file with any other state or federal agency, including tax returns, should be filed with the Commission. These reporting requirements are essentially the same as those that the Commission determined that the trustee for the Callaway external fund should include in its annual report to the Commission;

* Seek a ruling from the IRS concerning the ruling amount.

The Commission has reviewed the Staff's recommendations for establishing the fund and is adopting them, with one modification. The Commission notes that Company has requested 90 days from the date of this order to make its selection of an interim trustee. The Commission finds that to be a reasonable request and will modify Staff's recommendation in that manner. The Commission is further directing the Company to select a permanent trustee in accordance with the Internal Revenue Tax Code.

B. Nuclear Fuel

This issue is discussed under Phase IV, Section V.B., Fuel Issues.

IV. Income Taxes - Interest Expense

Staff and DOE have calculated the amount of interest expense to use as an income tax deduction in computing test year taxable income by applying a total Company pretax weighted cost of debt, using a capital structure not including investment tax credits to the Company's Missouri jurisdictional rate base.

Company originally opposed Staff and DOE's interest synchronization approach. However, Company states in its brief that its greatest concern regarding this issue was the legality of the method under the provisions of the Internal Revenue Code. That concern has been largely alleviated by a recent proposed regulation issued by the Internal Revenue Service contained in Exhibit 128. As a result, for the purposes of this case, the Company stipulates to the Staff's method for the calculation of interest synchronization.

Based on the foregoing, the Commission determines that Gulf's valuation of interest synchronization shall be used for purposes of this case.

PHASE IV - WOLF CREEK NUCLEAR UNIT AND RELATED ISSUES

I. Wolf Creek Investment - Rate Base

A. Standard

In this rate case, KCPL proposes to include in rate base the costs associated with the construction of the Wolf Creek nuclear plant (Wolf Creek). At the time of the hearings the total cost of the Wolf Creek plant was estimated at $2,984,249,000. Exhibit 622 shows that under the Company's proposal, KCPL's share of Wolf Creek is $1,366,496,000 of which $924,812,000 is applicable to Missouri operations. This figure represents Wolf Creek investment prior to any disallowances.

The definitive estimate for Wolf Creek was $1,033,834,000. Thus, cost overruns amount to approximately $1,951,406,000. In the Commission's opinion the definitive estimate is the proper starting point for an investigation of cost overruns and a determination as to whether costs incurred on the project are reasonable.

Under the Public Service Commission law, the Commission has the duty to set just and reasonable rates. A public utility must furnish and provide such service instrumentalities and facilities as shall be safe and adequate and in all respects just and reasonable. Every unjust or unreasonable charge is prohibited. Section 393.130(1), RSMo 1978.

At any hearing involving a rate sought to be increased, the burden of proof to show that the increased rate or proposed increased rate is just and reasonable shall be upon the public utility. Section 393.150(2), RSMo 1978.

The Commission has the power to ascertain the value of the property of a public utility and every fact which in its judgment may or does have any bearing upon such value. Section 393.230(1), RSMo 1978.

In determining the price to be charged, the Commission may consider all facts which in its judgment have any bearing upon a proper determination of the question with due regard, among other things, to a reasonable average return upon

capital actually expended and to the necessity of making reservations out of income for surplus and contingencies. Section 393.270(4), RSMo 1978.

The Legislature has granted the Commission broad discretion to set just and reasonable rates. State ex rel. Utility Consumers Council of Missouri, Inc. v. Public Service Commission, 585 S.W.2d, 41 (1979). In the setting of just and reasonable rates, the Commission must balance investor and consumer interests. This principle was enunciated by the United States Supreme Court in Federal Power Commission v. Hope Natural Gas Company, 130 U.S. 591 (1944).

The United States Supreme Court established as far back as 1898 that a utility is entitled to ask a fair return upon the value of that which it employs for the public convenience. Smyth v. Ames, 169 U.S. 466 (1898).

In determing the reasonableness of rate base inclusion, the Commission determines that a utility is entitled to a fair return on its prudent investment in property devoted to public service. This principle has been developed from early United States Supreme Court cases, including Smyth, Hope, and State ex rel. Southwestern Bell Telephone Company v. Missouri Public Service Commission, 262 U.S. 276 (1923).

Based on the foregoing considerations, the Commission determines that KCPL has the burden of proving the reasonableness of the costs associated with Wolf Creek. The Commission further determines that reasonableness should be judged using the standard of prudence. However, prudence requires further elucidation.

It is sometimes contended that management prudence is presumed. With respect to the question of the presumption of management prudence, the Commission agrees with the following conclusions of the Washington D.C. Circuit Court of Appeals:

> [11-13] The Federal Power Act imposes on the Company the "burden of proof to show that the increased rate or charge is just and reasonable." 16 U.S.C. §824d(e). Edison relies on Supreme Court precedent for the proposition that a utility's costs are presumed to be prudently incurred. See Missouri ex rel. Southwestern Bell Telephone Co. v. Missouri Pub. Serv. Comm., 262 U.S. 276, 289 N.1

(1923). However, the presumption does not survive "a showing of inefficiency or improvidence." West Ohio Gas Co. v. Public Utilities Comm., 294 U.S. 63, 55 S.Ct. 316, 79 L.Ed. 761 (1935); see 1 A.L.G. Priest, Principles of Public Utility Regulation 50-51 (1969). As the Commission has explained, "utilities seeking a rate increase are not required to demonstrate in their cases-in-chief that all expenditures were prudent.... However, where some other participant in the proceeding creates a serious doubt as to the prudence of an expenditure, then the applicant has the burden of dispelling these doubts and proving the questioned expenditure to have been prudent." Opinion No. 86, Minnesota Power & Light Co. Opinion and Order on Rate Increase Filing, Docket No. ER76-827, at 14, 20 Fed. Power Service, 5-874, 5-887 (June 24, 1980) (footnotes omitted). Anaheim, Riverside, etc. v. F.E.R.C., 669 F2d 779 (D.C. Cir.1981).

In the Commission's opinion, the existence of almost $2 billion in cost overruns raises doubts as to prudence in this case. Therefore, KCPL has the burden of proof regarding prudence.

The Commission reiterates its position set out in Re: Union Electric Company, 27 Mo. P.S.C. (N.S.) 183 (1985). Industry comparisons do not establish a standard of prudence. General statements regarding regulatory changes do not explain cost overruns. Finally, general statements regarding the complexity of the project with respect to design evolution and fast track construction do not explain cost overruns.

The proper questions to ask are, "Did KCPL properly manage this complex project? Did KCPL properly manage matters within its control?"

The Commission determines that the appropriate standard to be used in this case was enunciated by the New York Public Service Commission in Re: Consolidated Edison Company of New York, Inc., 45 P.U.R., 4th, 1982. In that case at page 331, the New York Commission rejected an earlier "rational basis" standard in favor of a reasonable care-standard:

> More recently, and in cases more directly on point, we have articulated the standard against which a utility's conduct in circumstances such as these should be measured as follows:
>
> "...The company's conduct should be judged by asking whether the conduct was reasonable at the time, under all the circumstances, considering that the company had to solve its problem prospectively rather than in reliance on hindsight. In effect, our responsibility

> is to determine how reasonable people would have performed the tasks that confronted the company. Case 27123, Re: Consolidated Edison Company of New York Inc., Opinion 79-1, January 16, 1979"

In reviewing KCPL's management of the Wolf Creek project, the Commission will not rely on hindsight. The Commission will assess management decisions at the time they are made and ask the question, "Given all the surrounding circumstances existing at the time, did management use due diligence to address all relevant factors and information known or available to it when it assessed the situation?"

In accepting a reasonable care standard, the Commission does not adopt a standard of perfection. Perfection relies on hindsight. Under a reasonableness standard relevant factors to consider are the manner and timeliness in which problems were recognized and addressed. Perfection would require a trouble-free project.

Public utility regulation is based on the theory that a public utility is a natural monopoly, since only one firm can efficiently serve a given market. To avoid monopoly pricing the state regulates the public utility to ensure reasonable rates. Thus, regulation is intended to serve as a surrogate for competition. The public utility is given a franchise to serve within a given area as a state-sanctioned monopoly and in return accepts the duty to serve all customers.

Because of the grave financial consequences which could accrue to captive monopoly ratepayers if a utility's investments were to prove uneconomic, the Commission determines that a standard of reasonable care requiring due diligence is appropriate for determining whether KCPL's actions during the course of the project were prudent.

The Commission has carefully considered the voluminous record in this case and all arguments of counsel pertaining thereto. The Commission has applied the standard set forth above in arriving at the reasonable amount of investment to be included in rate base. A discussion of the various issues regarding Wolf Creek rate base is set forth below.

Finally, the Commission determines that consistent with the reasoning set forth in section IV-G - Hawthorn 5, Wolf Creek cost overruns herein disallowed will not be relitigated in a future KCPL rate case.

B. Overall Project Management

1. Early History

In the late 1960s and early 1970s, KCPL anticipated a need for increased capacity in 1979. In 1971, KCPL and Kansas Gas and Electric Company (KG&E) held mutual discussions regarding the possibility of joint construction and ownership of an 800 to 1000 megawatt nuclear installation at the John Redmond Reservoir in Kansas.

In 1972 the Atomic Energy Commission, AEC, (predecessor of the Nuclear Regulatory Commission, NRC) adopted a policy encouraging the standardization of nuclear plant design, in order to streamline the licensing process. Several midwestern utilities began to explore the concept of multiple unit/multiple company organization of design and licensing which could offer savings to all members in design and licensing costs. A formal agreement was executed in 1973 forming the standardized nuclear unit power plant system or SNUPPS, comprised of Northern States Power Company, Rochester Gas and Electric Company, Union Electric Company, KG&E and KCPL. Both Northern States Power and Rochester Gas and Electric had experience in nuclear power generation. KCPL and KG&E believed the experience of those two utilities and the design and licensing cost savings offered by the SNUPPS concept were the necessary ingredients enabling them to enter into a nuclear project. Absent the standardized concept, and the KG&E partnership, it would not have been practicable for KCPL to construct a nuclear plant because the amount of money and the technical expertise required for such a project would be excessive.

In 1972, KCPL had committed to the LaCygne 2 coal plant scheduled for completion in 1977. In 1973, the Iatan coal plant was planned for operation in 1979 and seven combustion turbines were planned to begin operating in the 1975 to 1978

time period. In 1973, KCPL AND KG&E jointly announced their intention to construct the Wolf Creek plant.

The SNUPPS participants agreed to select an 1150 megawatt plant for the standard design. With respect to the Wolf Creek project, it was contemplated by KCPL and KG&E that 200 megawatts would be sold to other participants. In 1976, when KCPL and KG&E signed a settlement agreement to sell a share of Wolf Creek to Kansas Electric Cooperative (KEC) it was assumed that KEC and later the Kansas Electric Power Cooperative, Inc. (KEPCO) would purchase 17 percent or 195.5 megawatts of Wolf Creek capacity. In the fall of 1981, KEPCO reduced its interest in the plant to six percent. Northern States Power and Rochester Gas and Electric Company withdrew from SNUPPS in July, 1979 and January, 1980, respectively.

Under the SNUPPS agreement the shared activities were as follows: (1) the design of the standardized portion of the plants, known as the power block; (2) procurement of the nuclear steam supply system (NSSS); (3) procurement of the turbine generators; (4) procurement of all other equipment and materials for the power block other than bulk materials; and (5) procurement of the first fuel loading. Activities which were not shared were: (1) design of nonstandardized facilities outside of the power block; (2) construction of both standardized and nonstandardized facilities; and (3) procurement of certain power block materials such as cement aggregate and other materials.

The five owner utilities entered into individual contracts with four contractors to purchase the materials and service for the shared activities as follows: (1) Bechtel Power Corporation to provide architect engineering (A/E) services for the power block; (2) Westinghouse to supply the NSSS and the first fuel loadings; (3) General Electric to furnish the turbine generators; and (4) Nuclear Projects, Inc., to provide project management services and to furnish the technical and administrative staff to represent the utility owners and to engage consulting services and contractors as required.

The SNUPPS executive director, appointed by the management committee, and the SNUPPS staff, had the responsibility to act for the management committee and the utilities in the day-to-day administration of work under the power block A/E contract. The executive director and the SNUPPS staff were part of one organization, Nuclear Projects, Inc. (NPI).

With respect to site specific activities, the owners of Wolf Creek selected Sargent and Lundy (S&L) as the site A/E and Daniel International Corporation (DIC or Daniel) as the site constructor. KG&E was the lead managing partner of the project. Initially the project was managed by Daniel with limited owner involvement. Later the owners took a more active management role.

Throughout the planning and construction period of Wolf Creek project cost estimates increased and the schedule was delayed. The following chart illustrates the change in the budget and schedule forecast by year:

WOLF CREEK BUDGET FORECAST BY YEAR
(000's)

	Construction Permit	Fuel Load	No. Of Months	Commercial Operation	No. of Months	Budget Estimates Construction	AFUDC	Total
Order of Magnitude Dec., 1973		-	-	April, 1981	-	$ 635,600.0	$ 147,900.0	$ 783,500.0
Preliminary Estimate I Nov., 1974		-	-	April, 1982	-	775,600.0	172,700.0	948,300.0
Preliminary Estimate II Jan., 1976		-	-	April, 1982	-	773,100.0	177,900.0	951,000.0
Definitive Estimate	May, 1977	3-82	58	April, 1983	71	800,643.3	233,191.1	1,033,834.4
1980	May, 1977	10-82	65	April, 1983	71	1,308,561.2	2,319.8	1,310,881.0
1981	May, 1977	10-83	77	April, 1984	83	1,119,159.1	540,513.7	1,659,672.8
1982	May, 1977	12-83	79	May, 1984	84	1,343,430.4	583,821.7	1,927,252.2
1983	May, 1977	10-84	89	April, 1985	95	1,627,613.1	792,342.8	2,419,955.9
1984	May, 1977	8-84	87	Feb., 1985	93	1,818,441.1	854,317.2	2,672,758.3
1985	May, 1977	12-84	91	April, 1985	95	1,963,427.9	900,968.0	2,864,396.9
Actual	May, 1977	3-85	94	Sept., 1985	98	-	-	2,984,249.0

2. Owner/Management of the Project

Company contends that the Wolf Creek management performance was exemplary and, therefore, the Company is entitled to the inclusion of all Wolf Creek investment costs in rate base.

In support of its claim of good management, Company offers a survey of comparable plants conducted by Charles Huston and a multi-regression analysis conducted by Booz, Allen & Hamilton, Inc., as corroboration to Huston's qualitative analysis of Wolf Creek management which is contained in a document entitled

Management Performance Evaluation (Exhibit 314). In response to Staff's data request, KCPL provided reconciliation packages (Rec Pacs) quantifying cost increases over the definitive estimate. Based upon the above-described company evidence, Company claims that the project was well managed and all cost overruns were beyond the Company's control and are essentially caused by design evolution and regulatory requirements.

Staff's evidence is comprised of specific disallowances primarily related to an estimate of a reasonable level of direct labor man-hours for the project, as well as adjustments related to start up and other specific cost areas. In addition, Staff proposes disallowances related to the alleged failure of the Company to adequately explain the cost overruns from the definitive estimate.

Like Company, Staff also performs a qualitative analysis of overall project management which is not related to any specific adjustment or disallowance. Industry comparisons, regulatory change and the Rec Pac effort are discussed in Section I-B4 and I-C6 below. The assessment of owner/management discussed herein focuses on Company's and Staff's qualitative studies.

The civil stage of construction at Wolf Creek began with initial site mobilization and excavation in June of 1977. The mechanical stage commenced in February of 1980, when the reactor and NSSS equipment were set.

Staff's deposition of Jesse O. Arterburn, Nuclear Project Coordinator from January, 1973 to September, 1978, demonstrates that serious problems were emerging during the civil phase and that the owners made little attempt to exercise control over DIC during this period.

Arterburn informed owner/management at quarterly management meetings of perceived problems with DIC with regard to low productivity, and DIC's lack of conformance to schedule and budget. Arterburn testified that the predominate atmosphere at the quarterly management meetings was one of silence on the part of owner/management.

Arterburn's testimony shows that he had the responsibility but not the authority to manage DIC. In May of 1979, Arterburn submitted his resignation citing DIC's lack of management and recommending that the owners remove Daniel, demand changes in Daniel personnel, or take over the management of Daniel.

In September of 1979, KG&E appointed Gary Fouts as construction manager. In July of 1980, KCPL employee Vince Palermo was appointed assistant construction manager. Palermo had extensive experience with DIC as construction manager of the LaCygne and Iatan generating units, both DIC projects.

As early as 1977, quantity tracking discrepancies were identified. In 1979 discrepancies were found between: (1) quantities reported in DIC's quantity tracking system (component control system, CCS) which was used to determine the status of all major commodities; (2) the labor cost status report (LCSR) which tracked man-hours; and (3) manual records.

In 1980, Company's memos continued to document problems in the quantity tracking area. Lack of quantity tracking inhibits the ability to forecast the project with respect to cost and schedule.

Problems with the quantity tracking system continued through the mechanical stage. In January of 1982 Company documents reflect continuing problems with quantity tracking as the owners were questioning the accuracy of the remaining quantities. This deficiency was still being reflected in Company documents in the summer of 1982. Quantity tracking problems were still discussed in the Company's memos well into the start-up phase.

In November of 1980, Fouts recommended that Mr. Hitt, DIC's project manager, be removed no later than December 31, 1980. Both Huston and Palermo had recognized in the early fall of 1980 that the project was in serious trouble due to DIC poor management.

At the February, 1981, executive management meeting, DIC's poor performance was discussed at length. Subsequently, Luther Warrick replaced Hitt as DIC construction manager effective March, 1981.

At the October 30, 1981, executive management meeting Fouts informed the owner/utility management that attention to real problems by DIC was inadequate. Fouts expressed doubt that DIC as it existed could complete the project anywhere close to 1983 or $2 billion.

At the October, 1981, executive management meeting an evaluation was made of Daniel management on a department by department basis. The evaluation was based on a scale of 1 to 10 with a score of 4 or below indicating enough inadequacies to recommend removal from the job site. The evaluations of the various departments were as follows:

Daniel Off-site Management	3.0
Daniel On-site Management	4.5
Electrical Department	7.0
Mechanical Department	5.5
Civil Department	4.2
Piping Department	3.6
Control Department	2.4
Administration Department	3.1
Quality Department	4.7
Daniel Overall Average	4.0

The January, 1982, executive management meeting focused on problems associated with the piping reporting system and DIC failure to meet commitments in the piping area made as a result of the October, 1981, management meeting.

Between May and June of 1983, the construction focus shifted from the bulk commodity stage to start up. However, overall construction deteriorated in the first quarter of 1983. In a letter dated April 28, 1983, Wilson Cadman, Chairman of the

Board and President of KG&E, demanded that certain Daniel personnel be removed from the project.

In the Commission's opinion, the evidence establishes that the owners did not assert aggressive management authority over the project until 1983, when Cadman, by letter, demanded drastic changes with regard to DIC personnel.

In the Commission's opinion KCPL, by reason of its previous experience with DIC, should have pushed for strong control of DIC from the inception of the project.

In addition, the Commission makes the following findings with respect to overall project management:

The project did not have an adequate reporting system which would provide the owners with adequate explanations for increases from the definitive estimate or the current annual forecasts.

KCPL, as the nonmanaging partner, had the responsibility to perform internal audits on the project. In the early stage of the project KCPL exhibited a reluctance to perform this duty. Thus, up until the 1980 Pete, Marwick & Mitchell report, KCPL failed to adequately scrutinize DIC's performance during the early stages of the project.

3. SNUPPS/NPI

Touche Ross & Co., (Touche Ross) and Project Management Associates under contract to Touche Ross performed a review of the effectiveness of SNUPPS/NPI's management of Bechtel.

The Touche Ross report was presented as part of Staff's case and was received into evidence as Exhibit 503. The Touche Ross report concludes that SNUPPS/NPI management was good in the areas of design, licensing, quality assurance and procurement management. However, the report concludes that SNUPPS/NPI were limited in the ability to control Bechtel cost and schedule.

NPI's procedure for cost and schedule management, the SNUPPS Management Control Procedure Manual (MCP), lacked detail and did not provide appropriate

guidance for defining responsibilities. Therefore, the MCP was heavily reliant on Bechtel information concerning Bechtel performance.

In addition, the report concludes that NPI did not maintain or have access to an effective tool for evaluating Bechtel design schedule performance. This impaired NPI's ability to assess the status of the Bechtel design process and, therefore, decreased NPI's capability to adequately manage and control Bechtel's schedule performance. The report states as follows:

> NPI did not maintain any independent scheduling reports and therefore relied on Bechtel as its primary source of information. While Bechtel did maintain a full array of scheduling reports, none of them facilitated a complete analysis of Bechtel design schedule management. Several Bechtel reports which provided schedule information include CEBUS, Alert Reports and MAPPER. Key information which was either not included in these reports or not consistently updated in the reports includes construction need dates, man-hour requirements for expediting designs with potential schedule impact, and the overall impact of Bechtel's readjusting its design schedule to react to near-term problems. The lack of the existence of comprehensive document/report placed NPI in a position of relying on Schedule Review Group meetings as its primary source of information associated with potential Bechtel design scheduling problems.
> Exhibit 503, p. 163

Finally, the report concluded that NPI was ineffective in reviewing change/extra work requests and identifying design deficiencies.

Staff's evidence with respect to SNUPPS/NPI management is almost identical to the evidence presented by Staff in the Union Electric case, Re: Union Electric Company, 27 Mo. P.S.C. (N.S.) 1986, 183 (hereinafter Callaway case).

The Company presented extensive testimony citing the savings and benefits associated with the SNUPPS project and asserting that adequate cost and schedule control over the Bechtel design effort did in fact exist.

The Commission finds, as it did in the Callaway case, that SNUPPS/NPI did not focus sufficient attention on cost and schedule control to ensure Bechtel was meeting the schedule requirements as projected. Thus, SNUPPS/NPI were heavily reliant on Bechtel information. The lack of schedule control over Bechtel contributed to the utilities' inability to integrate engineering and construction

which affected both the Callaway and the Wolf Creek projects as is discussed below in Section I-C1 - Direct Labor Man-hours.

Finally, the Commission determines that Staff's request for an audit review of the Company's intended disposition of design deficiencies should be granted. As the Commission found in the Callaway case, it is the Company's responsibility to seek recovery for all costs associated with any design deficiencies for which Bechtel should not have been paid. Therefore, KCPL shall provide Staff a complete list of all design deficiencies it has identified, both safety and nonsafety, a list of those design problems which KCPL would consider to be deficiencies, the costs associated with those design deficiencies listed, and a statement concerning KCPL's proposed action with regard to those deficiencies.

4. Industry Comparisons and Regulatory Change

Company witness Huston conducted a survey of 14 nuclear plants regarding cost and schedule. This analysis concluded that Wolf Creek's actual cost is 10 to 18 percent less than the average plant in the sample.

Company also produced a multiple regression analysis presented by Company witness Martin which predicts a Wolf Creek cost 17 percent greater than actual cost.

Staff produced a multiple regression analysis through the testimony of witness Chernoff showing that Wolf Creek's actual cost exceeds the model's predicted costs by 12 percent.

Public Counsel witness Rosen testified that a statistical analysis of essentially all nuclear power plants completed in the U.S. through 1984, taking account of the major differences in plant characteristics, financial and inflation conditions, results in the final cost of Wolf Creek being approximately 17 percent more than it should be based upon an industry norm.

Although these industry comparisons are interesting, they are dependent on the data base chosen and provide little meaningful information with respect to an

assessment of KCPL's project management for the specific Wolf Creek construction project.

All parties agree that regulatory changes have increased the costs of the Wolf Creek plant. Staff witness Hanauer, whose expertise is based upon 12 years of employment as an expert for the NRC regarding technical safety issues, testified on behalf of the Staff. Hanauer reviewed NRC regulatory requirements in 18 specific areas identified in Company documents as causing significant cost overruns. Although he agreed that some areas caused cost overruns, others did not significantly increase the cost of the plant.

In the Commission's opinion, Hanauer's testimony stands substantially unchallenged. As discussed more fully below, Staff witness Renken has adjusted for regulatory changes which have caused cost increases subsequent to the time of the definitive estimate.

C. Staff Position

1. Direct Labor Man-hours

Staff recommends certain adjustments related to DIC direct labor man-hours. The definitive estimate as contained in Exhibit 536-CJR A shows total DIC direct labor man-hours of 7,593,590. A total of 18,842,374 direct labor man-hours were expended on the project. Staff recommends that 15,989,858 direct labor man-hours be allowed. Staff's disallowance of 2,841,516 man-hours converts to an adjustment of $66,430,000 on a total plant basis excluding AFUDC.

Direct labor refers to work associated with the physical completion of the plant. Workers in the direct labor area are classified by craft such as, carpenters, electricians, pipe fitters and laborers. Indirect labor, in contrast, contributes indirectly to the completion of the plant. Workers included in the indirect category include engineers, secretaries, superintendents and guards, etc.

Staff witness Renken sponsored Staff direct labor man-hours and adjustments. Prior to joining the Commission Staff, Renken had accumulated extensive

experience in the field of nuclear construction. Since joining the Staff in 1980, Renken has been involved in the audit of the Callaway and Wolf Creek nuclear plants.

Since Callaway and Wolf Creek are standardized plants built to the SNUPPS design, the differences between the two plants are mostly related to the cooling and condenser exhaust water outside the standardized power block. The power block portion of both plants was estimated by the same DIC estimators in 1976. The format of both estimates is the same and the assumptions regarding the quantities of various materials that were to be installed are virtually the same. However, the productivity assumptions underlying the two estimates vary significantly. It was assumed that direct labor productivity would be higher at Wolf Creek than at Callaway. It was assumed that Wolf Creek would be built for 72 percent of the direct labor man-hours estimated for the Callaway plant.

Apparently this assumption was based on Bechtel's experience at the ANO 1 nuclear plant in Arkansas. Renken concluded from his firsthand observations at the plants that any supposed advantage for Wolf Creek with respect to productivity should be disregarded.

In contrast to the Callaway definitive estimate, the Wolf Creek definitive estimate contained no contingency for direct labor productivity. The Callaway estimate contained a 20 percent contingency specifically for lower than planned productivity. Renken states that the inclusion of a well considered contingency for less than planned efficiency is considered to be a good estimating practice and an estimate lacking a contingency is seriously deficient.

At Callaway the definitive estimate was used as the basis for measurement of cost overruns, while Wolf Creek essentially ignored the definitive estimate and assessed DIC performance against a series of forecasts prepared by DIC and approved by the utility management which were updated yearly. It was years after the project started that an attempt was made to reconcile the forecast to the definitive estimate.

At Callaway Daniel was instructed to produce after the fact estimate change notices (ECNs) with reference to the definitive estimate assumptions. The ECNs were audited by Staff with regard to amounts and methodology during the Staff's Callaway audit. It is Renken's opinion that the Callaway definitive estimate and ECNs together form a reference estimate which takes into account most of the changes in the SNUPPS power block quantities and unit rates that resulted from regulatory change and design improvements.

Based on the above considerations, Renken concluded that the Callaway project was better documented than Wolf Creek. Renken, therefore, used a modified version of the Callaway definitive estimate adapted to the Wolf Creek design in arriving at his recommended direct labor manhour adjustments.

To the Callaway definitive estimate and ECNs, Renken has added studies performed at Wolf Creek to provide additional updates of unit rates to actual as-built conditions and in some cases he increased unit rates as a result of his own studies and observations.

For the accounts that are Wolf Creek specific, Renken utilized Sargent and Lundy's estimates in some cases. In other cases he has used applicable power block unit rates. In a few instances where accounts were not estimated, he used Daniel performance on accounts that were estimated.

Renken classified the causes of the increased man-hours from the definitive estimate to the as-built total as follows: (1) improvements in plant design to enhance safety; (2) improvements in plant design to improve efficiency and reliability; (3) changes in construction procedures to promote and document quality construction; and (4) low productivity associated with mismatched design and construction or other management deficiencies. Renken has attempted to include categories 1, 2 and 3 in his estimate of a reasonable level of direct labor man-hours. He has attempted to exclude the last category from his direct labor estimate.

Although Renken analyzes causes claimed by the Company and contained in the Rec Pac effort, his analysis does not commence with the as-built total and disallow based on inappropriate cost increases. This is because the quantification of the causes of cost increases was not practiced at the Callaway or the Wolf Creek plant. Renken's approach estimates the job in the same manner a construction project is estimated. He has incorporated documented changes occurring on the project which can reasonably be attributable to the first three categories noted above. This is accomplished by increasing the unit rates and installed quantities. Renken labels his method a built-up estimate and claims that the method incorporates industry data. This is because the built-up estimate takes the form of unit rates based on previous experience. The unit rate includes the assumption of good management. Therefore, in principle, the cost of the plant is built up by multiplying unit rates by installed quantities.

The Company contends that Renken's estimate was improperly performed and is seriously flawed. Company maintains that this is evidenced by the Booz, Allen multi-variate regression analysis comparing the total cost of Wolf Creek and the total costs of other contemporary nuclear construction projects. The Booz, Allen study found that Wolf Creek would be expected to cost 17 percent more than it actually did.

The Commission rejects Company's argument and finds that Renken's method is appropriate. The Commission finds that the method attempts to build up an estimate of what a prudently managed plant should cost under the actual as-built conditions. Although Renken's method uses industry experience in the form of unit rates, and compares performance at the nearly identical Callaway and Wolf Creek plants, he does not adjust based on the level of performance of one plant compared to another. As Renken points out, even a sophisticated multi-variate regression analysis is severely limited by conflicting requirements of too many variables and the limited size of the data base. The Commission agrees with Renken that in a cost comparison of nuclear

plants, management is likely to be the most important variable. Therefore, unless the analysis can purge the other variables of management effects it cannot isolate the effect of management on the construction costs.

Company further contends that Renken's analysis suffers from "construction site myopia" in that he was limited by observations at the plant in his review of plant documents. Contrary to Company's assertion, Renken was involved in the project since 1980 but was not limited to information solely from the site. He received Bechtel monthly reports, change/extra work notices and cost trend reports. He reviewed the meeting minutes of the SNUPPS committee, the construction review group and the technical committee. He has read the correspondence between SNUPPS, Bechtel and the utilities. He has reviewed the Bechtel computer programs and the NRC audits of Bechtel as well as Bechtel's internal audits of itself. He has had the benefit of the Touche Ross audit and evaluation of Bechtel by the Staff for the Callaway case. In the Commission's opinion Renken has been in the unique position of observing the project on a firsthand basis and he has shown that he is an objective and detached observer. Aside from the unreliable Rec Pac effort, Renken's is the only analysis which attempts to arrive at a reasonable level of man-hours for the Wolf Creek plant. It is not based solely on a theoretical study of design and regulatory changes nor does it rely on general industry comparisons which have little relevance to the specific Wolf Creek situation.

Company further argues that Renken's analysis does not adequately consider regulatory change. In the Commission's opinion this argument is without merit. Renken's analysis recognizes regulatory change. He estimates that at least 50 percent of his recommended increases over the definitive estimate are attributable to regulatory and code changes. Mr. Renken referred the Commission to a Bechtel document (Exhibit 537 CJR-SR-2) showing that increased quantities associated with regulatory change were almost trivial when compared to total plant bulk quantities. For example, Three Mile Island (TMI) added 24 hangers out of a plant total of 29,000.

Hanauer and Renken recognized TMI and cold shutdown additions to be the most significant items which were not included in the definitive estimates. To account for this change, Renken increased unit rates by 50 percent in those areas, a factor used extensively by DIC engineers.

The Company produces extensive testimony to the effect that "normal design evolution" is a necessary by-product of fast-track construction. The Commission rejected this argument in Re: Union Electric Company, Case No. EO-85-17 and Case No. ER-85-160 (1985). The Commission continues to reject that argument. In the Commission's opinion Renken succinctly answers this argument as follows:

> Both Mr. Martin and Dr. Meyers explain in great detail why initial design often has to be changed in response to conflicts with other disciplines and coordinated with components available from vendors, code requirements, regulatory requirements, etc. This is all obvious to everyone but what they don't explain is why this "normal design evolution" is allowed to affect the field to the point where good productivity is disrupted and changes have to be made in concrete, steel, piping, hangers, instruments, etc. They don't explain why the normal course of construction for which a structure is either first designed, then estimated, then perhaps redesigned to reduce the estimate and then, finally, built, has become distorted so as to allow continued redesign on the very parts of the plant still under construction. If significant regulatory changes are eminent, or even possible, or if desirable technical improvements are on the horizon, then it is essential for the construction to be paced to the completion of final design so that good productivity can be achieved. This flouting of ordinary common sense is, in my opinion, one of the main factors in the generic cost overruns of the nuclear construction industry and an important contributor to its virtual demise in this country.

In the Commission's opinion Renken has fairly and conservatively reestimated direct labor man-hours at an appropriate level. He has reasonably inferred that the difference between his recommended level and the as-built level must be due to design change, late design, a lack of an integrated design and construction schedule or poor management. Accordingly, the Commission determines that the Renken recommended level of direct man-hours should be adopted.

Renken's manhour adjustments are shown in the chart set forth below which is followed by a discussion of each category:

	Category	Definitive Estimate	Staff	As-Built DIC Scope
1.	Concrete	1,872,800	3,444,937	4,147,319
2.	Structural Steel	366,290	733,539	944,022
3.	Building Finishes	61,770	126,669	343,717
4.	Surface Finishes	254,110	1,169,142	1,282,408
5.	Mechanical Equipment	677,270	1,082,578	1,447,342
6.	Instrumentation	356,200	86,001	149,196
7.	Hangers	551,810	1,609,512	2,463,774
8.	Piping	1,843,360	2,552,505	3,448,847
9.	Electrical	1,385,180	2,448,371	2,841,941
10.	Earthwork	175,440	450,356	577,925
11.	Unit 3 Charges	-	53,825	940,988
12,	Sitework	24,360	142,902	142,902
13.	Insulation & Lagging	-	95,230	112,993
14.	Contingency	0	1,763,236	-
15.	Night Shift Productivity	25,000	231,055	-
	TOTAL	7,593,590	15,989,858	18,842,374

a. Concrete

The concrete category includes the direct labor necessary to complete structures made of concrete. This category encompasses construction of form work, placement of rebar and embeds, pouring and finishing of concrete, removal and clean up of the forms and placement of post-poured embedded items such as plates and sleeves.

Renken proposes 3,444,937 man-hours in the concrete category. Renken's estimate is based on the definitive estimate quantities multiplied by Staff's unit rates utilized for the Callaway Unit with additional man-hour adjustments as follows:

(1) increases in quantities above the level included in the definitive estimate; (2) the addition of mud mats; (3) extra work required to clean and grout containments penetrations for a subcontractor, B&B Insulators, Inc.; (4) charges associated with batch plant operations and maintenance; and (5) enhanced unit rates for approximately 1700 post-applied plates in order to recognize the fact that their out of sequence installation was required by TMI regulatory changes.

Of the total 702,382 manhour difference between Renken's recommendation and the as-built level, approximately 270,000 man-hours are related to the routine use of post-applied plates rather than embeds. Other than the post-applied plates related to TMI referenced above, Renken did not adjust unit rates for their installation. These post-applied plates were included in Renken's estimate at the unit rate necessary to install embeds.

Since embeds are less costly, cause less disruption to other construction activity and preclude possible damage to surrounding equipment that can occur when post-applied plates are installed, Renken concluded that the use of post-applied plates indicated the occurrence of late design.

The Company contends that the use of post-applied plates is an example of design evolution inherent in the fast track process. Company's argument is not persuasive. The definitive estimate which contemplated fast track contained no allowance for post-applied plates. The Wolf Creek project which was approximately ten months behind Callaway experienced 9,951 post-applied plates versus 19,574 at the Callaway plant. Renken testified that he examined the Braidwood plant, a contemporary fast track facility, and did not see any post-applied plates. It is, therefore, reasonable to conclude that post-applied plates are attributable to late design.

The remainder of the difference between Renken's estimate and the as-built total is associated with Renken's concrete unit rate of 20.31 manhours/CY. Renken

concludes the difference must be due to design changes and his testimony describes examples of design change and detailing errors which plagued the concrete area.

Company contends that Renken has not adequately examined whether the causes of the costs were avoidable. Company cites Company witness Linderman's testimony as proof that all concrete overruns were unavoidable and reasonable.

In the Commission's opinion Linderman's rebuttal testimony is of limited reliability. The evidence shows that Renken utilized Daniel's unit rate; that Renken could find no correlation between concrete unit rates and time of construction; and that other contemporary nuclear power plants have achieved better concrete unit rates than the Daniel unit rate.

Based on the foregoing, the Commission concludes that Staff's recommended manhour allowance in the concrete category is reasonable and should be adopted.

b. Structural Steel

Renken recommends 733,539 direct labor man-hours in the structural steel category. He testified that the 210,483 manhour difference between his recommendation and the as-built scope is related to low productivity caused by late design, vendor problems and an inefficient construction sequence. Structural steel includes the following categories:

1. Heavy Structural Steel; Miscellaneous Steel

The Wolf Creek definitive estimate included a unit rate of 16 man-hours per ton for structural steel. This estimate did not assume design changes, and did not anticipate safety regulations, rework interferences, construction problems, repairs and out-of-sequence construction. It was also assumed that material would be delivered on time and unloaded in a manner that would make material accessible to the work crew. Renken concludes that the definitive estimate unit rate was quite optimistic and, therefore, underestimated. He used a unit rate of 27.39 man-hours per ton which he had developed for structural steel at Callaway. Renken testified that his unit rate is sufficient to allow for construction problems, quality control

inspections and safety regulations but does not allow for low productivity caused by late design, rework, vendor problems and out-of-sequence construction.

In the heavy structural steel category 685 design changes occurred which were estimated by the Wolf Creek reconciliation group to cause an additional 51,866 man-hours. Numerous vendor problems also occurred. The Company's documents reflect that field personnel complained that the structural steel did not fit as it was received from the fabricator. Detail errors, misfabrications and design changes occurred in the installation of the fuel building. Excess time was expended because of the misfabricated steel from American Bridge. Design changes occurred in the turbine building. Drawings were destroyed that were necessary to document quality. Steel was not received in proper sequence, nor was it stored for easy excess for the ironworkers. DIC experienced extensive problems in installing the polar crane structural steel. Steel ordered for the outside area buildings was misdesigned and misfabricated.

Renken takes the position that vendor problems could have been avoided had the design been completed early enough to allow a thorough design review and sufficient time for fabrication and checking by the engineers or contractors before shipment to the job site.

One problem that Renken contends that was not related to design or vendor problems was the erection of the rails of the polar crane. The rails were installed on supports which were out of tolerance. Renken states that this problem probably could not have been avoided. However, he believes that the 23,437 man-hours associated with this problem are easily accommodated in the higher unit rates and in his contingency allowance.

The Company's opposition to Renken's structural steel and miscellaneous steel recommended man-hours is based upon Linderman's testimony, the allegation that Staff's structural steel unit rate is unsupported, and the inherent problems associated with fast track.

Contrary to Company's assertion, Renken's unit rate in the steel category is supported by industry data on structural steel unit rates. Accordingly, the Commission determines that Staff's manhour allowance in the structural steel and miscellaneous steel category is appropriate.

ii. Handrail, Grating and Checkered Plate

The Wolf Creek definitive estimate assumed that handrail, grating and checkered plate would be installed on a one-time basis late in the job. Instead, these items were installed in an early phase of the construction process as a substitute for scaffolding, planking and temporary handrails that otherwise would have been installed to support subsequent construction activities. The checkered plate and handrail had to be removed and reinstalled in parts to accommodate piping revisions and design changes. In addition, an unquantified amount of rework had to be performed on handwork and grating subject to 11/1 requirements because the traceability of these materials were lost.

Mr. Renken recommended enough man-hours to permit two complete installations of these items because in his opinion two complete installations would have been sufficient, assuming a well-planned job. The Commission determines that Renken's recommendation in this area is appropriate.

iii. Sheathing and Trumplets

Although the Wolf Creek definitive estimate assumed that the work associated with these items could be performed for 24,270 man-hours, a total of 84,030 man-hours were actually incurred. Based upon interviews with Daniel personnel and a review of plant documents and personal observations, Mr. Renken concluded that the definitive estimate did not anticipate the difficulty of installing the sheathing or the extra tests performed by construction managers to ensure proper installation of these items. Accordingly, Mr. Renken included the as-built man-hours.

iv. Refueling, Pool and Canal Liners

Refueling, pool and canal liners are the stainless steel plates that line the refueling pool and canal. In order to protect the structural concrete from the mild acidity of the refueling water and maintain the purity of the water itself these liners must be watertight. Although Daniel encountered considerable difficulty with the welding performed on the liners and made a mistake during the leak testing that caused some rework, the Staff has nevertheless included the as-built man-hours for this item in his recommendation.

v. Shear Studs

Staff included the as-built man-hours for this item on the ground that the lower manhour level reflected in the definitive estimate was not appropriate for the type of structural steel design used for SNUPPS.

vi. Site Yard and Miscellaneous Installations

Daniel's productivity in the outside area was no better than in the power block. Although the definitive estimate unit rates for structural steel installation in the administration and shop buildings were 16 man-hours per ton, Daniel nevertheless exceeded them expending 19.35 man-hours per ton on the administrative building and 22.57 on the shop building. Moreover, handrails which were initially estimated at .74 man-hours per foot in the power block actually took 12.88 man-hours per foot. These overruns, Renken concluded, were related to design deficiencies, misfabrication and erratic deliveries. Interviews with site personnel indicated that extensive rework and reinstallation were required in the administrative and shop buildings because the heating, ventilation and air conditioning system was redesigned after structural steel was installed. In addition, achievement of acceptable productivity levels in the outside area was impaired by management's failure to establish reference estimates for any of the structural steel accounts in site yard and miscellaneous areas. Mr. Renken was unable to discover any reason why the outside area design and construction could not have been managed so as to obtain an

orderly and efficient construction sequence and an acceptable productivity level. For this area, Renken calculated Daniel's outside area productivity by dividing the Daniel earned man-hours by the as-built man-hours for the accounts for which he had an estimate. The resulting productivity factor of 69 percent was then applied to the total as-built man-hours for the outside area in order to arrive at a recommendation. The Commission concludes that Renken's adjustments in this area are reasonable.

c. Building Finishes

Renken proposes a 126,669 man-hours in building finishes. This compares to an as-built total of 343,717 man-hours. The sub categories of the building finishes area are discussed below:

i. Concrete Block Walls

Concrete block walls were originally estimated as partition walls and non-seismic reinforced walls in the auxiliary and control buildings. In 1979, deficiencies were found in concrete masonry walls in a Bechtel designed nuclear plant. These deficiencies were the subject of an NRC bulletin warning all holders of NRC permits that such walls were under NRC review. In 1980, another bulletin was issued citing design deficiencies related to masonry walls at the Bechtel designed Trojan nuclear plant.

In 1979, the design of most of the concrete block walls in the SNUPPS design were drastically revamped. Since this redesign was issued in the same time frame as the NRC bulletins, the perception at the SNUPPS plants was that Bechtel revamped the SNUPPS concrete block wall design in response to the NRC concern.

The redesigned walls proved to be excessively difficult to install and were constructed with much less efficiency than poured interior walls in the power block. Adding to the cost overrun was a DIC area error in the placement of rebar in some of the redesigned walls in the control building that caused the completed portion of these walls to be hammered downed and replaced. Renken concludes that the walls should have been designed as poured concrete and installed in the normal construction

sequence. Therefore, costs for poured concrete interior walls are included in his recommendation.

The Company contends that engineers planned for construction of the concrete block walls which are interior partition walls, later in the project rather than at the same time as the other concrete work. Company claims that the concrete block walls are an example of design evolution and had nothing to do with the NRC bulletins referenced above. Company also alleges that the concrete walls were built of blocks rather than concrete due to the need to install major pieces of equipment.

In the Commission's opinion the Company has provided no reasonable explanation for the installation of concrete block walls. As pointed out by Mr. Renken the major items of SNUPPS equipment were installed before the surrounding poured walls were complete and the same could have been done with the concrete block walls had they been designed as poured walls. Accordingly, Staff's adjustment is adopted for this category.

ii. Doors, Hatches and Louvers

The definitive estimate assumed that the project's doors, hatches and louvers could be installed for 2,380 man-hours. The as-built man-hours for this category amounted to over 60,000. Staff recommends a manhour level of 6,849 man-hours to this area. Renken concluded that DIC's charges for even the simplest doors are excessive and, therefore, the as-built man-hours are inappropriate. For example, Renken discussed the definitive estimate for 108 hollow metal doors in the control building at 4.2 man-hours each. One hundred and three were installed at 42.1 man-hours each. In the shop building, 45 hollow metal doors were estimated at nine man-hours each. Fifty-five were installed at 49.5 man-hours each. Renken inspected most of the doors and determined that they are ordinary single and double metal doors, the type found in any public and commercial buildings. Staff accepted the Company's reestimate for the doors such as shielding doors, missile resistant doors and water tight doors.

None of the Company's explanations for the overruns in this category are persuasive. Renken's testimony which is partially based on explanations provided by the Reconciliation Group portrays a chaotic situation regarding the installation of the doors.

iii. Metal Siding

For the metal siding category Staff has used the definitive estimate unit rates with an upward adjustment for installed quantities greater than included in the definitive estimate. Daniel's productivity performance for installation of metal siding was low. Company documents cite the inefficient use of manpower and the definite lack in modern timesaving construction techniques in the metal siding area. Company documents also show metal siding was installed at Iatan for $4.20 a square foot, including materials and overhead costs. Renken states that installed labor and overhead costs for metal siding at Wolf Creek were at least $10 a square foot.

Company claims the siding was installed early to protect the workers and had to be removed and replaced when it wore out. In addition, Company contends that siding had to be removed and replaced to install temporary winter heaters for the construction workers.

The Commission finds the Company's explanations in the metal siding area are not persuasive, that its own documents cite the low productivity in this area and, therefore, the Commission concludes that Staff's recommendation in the metal siding area is appropriate.

iv. Miscellaneous Building Finishes

This category encompasses accounts including charges for a variety of minor construction activities like ceilings, tile, steel roof decks, lockers, benches and dry wall. Only a fraction of these accounts were estimated in the definitive estimate and in none of them did DIC achieve the definitive estimate unit rate. Renken testified no information was available from the Company as to how the rates could be justified. To form a Staff estimate for this work Renken identified a

number of finished categories where the definitive estimate assumed scope of work was essentially the same as the as-build scope. For these accounts he calculated an average Daniel efficiency for building finish installation. The product of this factor was multiplied by the value of miscellaneous building finish accounts to arrive at a final estimate.

Company has no explanation for the overruns or other estimate of the area other than the Linderman surrebuttal. The Commission determines that Renken's analysis is reasonable and should be adopted.

d. Surface Finishes

The surface finishes category includes all of the labor necessary for the preparation and application of protective coatings ranging from paints to nuclear coatings and fireproofing. With the exception of the labor effort related to painting and sandblasting of hangers, Renken found that the productivity in this area acceptable and recommended the as-built man-hours. With regard to the labor effort associated with painting pipe hangers, Renken incorporated into his recommendation approximately one-half of the man-hours incurred in excess of the definitive estimate. To recognize the comprehensive hanger painting which was initiated in order to prevent rusting of hangers and associated welds, Renken recommended a unit rate of four man-hours per hanger in order to reflect an appropriate level. The man-hours in excess of Staff's recommendation were caused by repainting that had to be done because the rework on pipe welds and design changes resulted in rework on hangers. The reconciliation group stated that repainting of pipe and hangers occurred when pipe and hanger welds were ground for reinspection and pipe and hanger configuration was changed.

In the Commission's opinion late design, the weld reinspection and the associated hanger rework should not be included in the allowable man-hours for this case. Accordingly, the Commission accepts Renken's recommendation in the surface finishes area.

e. Mechanical Equipment

The mechanical equipment category includes the work that is required to install most of the mechanical equipment including the pumps, compressors, main condenser, and other heat exchangers, permanent cranes and hoists, tanks and miscellaneous mechanical equipment. This category contains three subcategories, (1) the installation of NSSS and mechanical equipment; (2) installation of the main condenser and associated equipment; and (3) installation of HVAC (heating, ventilation and air conditioning) duct works, supports and equipment. Staff recommended all of the 544,224 as-built man-hours in the first category.

Staff recommended 139,235 man-hours out of 264,568 as-built man-hours for the installation of the main condenser and associated equipment. The main condenser is a large heat exchanger that is located under the turbine generator in the turbine building. It consists basically of large boxes containing thousands of tubes each carrying cool water from the Wolf Creek Lake. The SNUPPS work plan called for the condenser to be erected and placed under the turbine generator table. The condenser is not considered a safety-related piece of equipment and so is unaffected by NRC regulations.

The project management decided to depart from the SNUPPS work plan and erect the condenser outside of the turbine building then slide it into its place under the turbine table. The purpose of the change was to shorten the turbine building schedule. Productivity for the overall condenser erection was very poor, 264,568 man-hours for this activity compared to the 190,925 man-hours expended at the Callaway plant despite a major construction error that increased the condenser erection cost at the latter site. Renken's recommendation is based on the Callaway definitive estimate allowance since it does not contain the unit rate discount factor of the Wolf Creek estimate. In addition, Renken includes an estimate for crossover piping since this activity was omitted from the definitive estimate. One example of the poor productivity is contained in a Company letter which describes the use of a

jacking arrangement taking three days to move the condenser into the building in lieu of an arrangement which would pull the condenser inside the building in a matter of hours.

The Company claims the erection of the condenser outside the turbine building at Wolf Creek allowed other construction activity inside the building to continue and, therefore, saved schedule. Company's claim is refuted by the fact that the productivity of the condenser erection at Wolf Creek was even worse than that which occurred at Callaway which the Commission found to be unacceptable. The Commission concludes, therefore, that the Renken recommendation in this area is appropriate.

With respect to HVAC duct work, supports and equipment, Mr. Renken recommends a direct manhour level of 399,120 compared to an as-built level of 635,550 man-hours. Renken's analysis revealed that late design and vendor errors played a significant role in reducing HVAC productivity. The terms of the contract with the fabricator did not permit back charging according to the accepted interpretation of the Bechtel contract with the supplier, Irsay. Therefore, it appears that the risk of misfabricated HVAC components like Bechtel design errors was assumed by the utilities.

An additional problem related to productivity was caused by a significant breakdown of HVAC quality control. Serious problems were discovered in the documentation associated with a large number of HVAC supports. When the supports were reinspected, it was discovered that deficiencies serious enough to require significant rework existed.

Taking into consideration the craft errors, design errors, vendor errors, underestimates and rework, Renken reestimated the unit rates very conservatively and presented the result of the recalculated man-hours. Mr. Renken states in his expert opinion that the unit rates and other allowances that he calculated in this category are so conservative that a well managed HVAC program with design and construction

schedules matched for good construction efficiency, vendor problems minimized by an inspection program and more rigorous attention to quality control would certainly permit the HVAC to be installed for no more and probably considerably less than the recommended manhour level. Company contends that the HVAC overruns were caused by unavoidable extra work and regulatory change. Since Linderman's Rec Pac group failed to develop any meaningful information in this area, the Commission is of the opinion that Renken's recommendation is more than reasonable. Renken's proposed manhour allowance in the HVAC category is greater than the as-built performance at Callaway where HVAC was greatly affected by design changes.

f. Instrumentation

The instrumentation category includes the installation of instruments used to monitor operation of the plant such as gauges, transducers, regulators, detectors, as well as tubing, hangers and stands for instruments.

The definitive estimate included 356,200 man-hours for the instrumentation category. The as-built level for DIC was 149,196 man-hours. Daniel's progress in the instrumentation category proceeded slowly and the owners believed that the start up schedule was being threatened by Daniel's performance. In 1981 the remaining work was reassigned to Westinghouse.

The Westinghouse work was tracked only with respect to its effect on start up. The owners did not track Westinghouse productivity. Staff was unable to obtain through data requests a report on Westinghouse man-hours in the instrumentation category. Therefore, Staff compiled its own total of Westinghouse man-hours by totaling the contractor's daily time reports.

Renken categorizes the owners approach in the instrumentation area as "cost control by schedule control approach". In assessing the merits of this approach Renken testified as follows:

> Of course schedule is the most important factor in plant costs, but failure of the management to track productivity at the same time can lead to wasteful expenditures of man-hours. An over-emphasis on schedule as the primary measure of cost performance

can cause significant cost inefficiencies in other areas or, at the very least, encourage management indifference to other factors which contribute to low productivity. Instrumentation installation at Wolf Creek is a good example of this latter case. Exhibit 536, p. 50

Total instrumentation man-hours for both DIC and Westinghouse totaled 575,218 man-hours compared to 391,000 man-hours at the Callaway plant. In addition, the Westinghouse dollar per manhour rate was twice the DIC rate.

Staff's recommendation is based on the Wolf Creek definitive estimate adjusted downward for instrumentation calibration and testing which was performed by KG&E start up. Staff adjusted the definitive estimate upward for additional scope, extra work associated with turnover and nonpower block instrumentation. Staff's recommendation for both the DIC and Westinghouse instrumentation man-hours is a total of 352,857 man-hours.

Company contends that instrumentation overruns were caused by regulatory change.

In the Commission's opinion Staff's recommended manhour level for instrumentation is appropriate. It is close to the as-built total at Callaway and absent any creditable explanation on the part of the Company as to the cause of the overruns, the Commission is persuaded that the owners failed to control costs in the instrumentation area. Although this attitude is pervasive on the part of the owners in this project, it is hard to understand the owners' tolerance of Daniel's failure to perform.

g. Hangers and Piping

Hangers support the plant piping in its proper location. Hangers which support piping systems vital to safety in the event of a safe shutdown earthquake (SSE) are designated Q hangers. Other hangers support systems whose function does not affect safety directly but could damage a Q system in the event of failure. Other hangers are related to fire protection. These are called special scope hangers which were referred to as quasi-Q hangers at the Callaway plant. Hangers are also

classified by the size of the pipe they support. Any pipe two and one-half inches or larger in diameter is considered large as opposed to small pipe.

Renken stated that Q hangers must be estimated at least double the unit rate for non-Q hangers. Special scope hangers, although less stringent than Q hangers are estimated at almost as high a unit rate as are the Q hangers.

Renken used a definitive estimate of the Callaway plant for the hanger category of 551,810 man-hours. This is because the Wolf Creek definitive estimate was inadequate. The as-built total at Wolf Creek was 2,463,774. Renken added 229,711 man-hours to the definitive estimate to reflect changes in hanger numbers occurring between the time of the definitive estimate and the fuel load. Renken added 243,341 man-hours to reflect the increased scope of large quasi-Q hangers and 162,437 man-hours for increased scope of small quasi-Q hangers. An adjustment of 25,521 man-hours was utilized to include temporary hangers. Temporary hangers were used since the SNUPPS work plan requiring hanger erection before piping erection was not followed.

Renken added 240,000 man-hours to reflect hanger complexity reflecting the final design of the hangers and the increased work associated with redesigned hangers. In addition, Renken included 74,000 man-hours associated with the addition of subsection NF of the ASME Code section 3 which increased quality requirements for Q hangers. 32,967 man-hours were included for pipe whip restraints; 37,858 man-hours for outside area hangers; and 14,796 man-hours for dummy snubbers which were substituted for permanent snubbers until just before the system was placed into operation. Renken added 9,627 man-hours to reflect increased unit rates associated with TMI and cold shutdown. Finally, 12,559 man-hours were deducted to reflect hanger work reassigned from DIC to GE since the man-hours were included in Renken's base estimate.

Renken attributes the difference in Staff's recommended man-hours in the hanger category to late design and drawing revisions. Company documents described

Bechtel's design changes as the cause of poor hanger productivity. Revisions to piping locations arrived without corresponding hanger revisions creating confusion and inefficiency. A 1981 Company memo describes numerous Bechtel hanger revisions which applied equally to non-Q hangers as it did to Q hangers.

Renken believes that a major reason for hanger design changes was the SNUPPS reinterpretation of Regulatory Guide 1.29 of 1973 in January of 1980. This reinterpretation increased the number of special scope hangers and the removal of already installed non-Q hangers.

In the piping area, Renken recommends 2,552,505 man-hours in contrast to a definitive estimate level of 1,843,360 man-hours and an as-built level of 3,448,847 man-hours. Renken described various troubled areas associated with the piping category.

The project experienced problems with regard to pipe cleanliness. The cleanliness standards were established by Bechtel under the ANSI code. The pipe was to be erected clean and subjected to verification flush by the start-up crew. Pipe links (called spools) were stored outdoors at Wolf Creek. The procedure required storage on pallets with the open ends protected. In the summer of 1979, a cloud burst caused flooding and apparently mud was washed into some of the spools. In 1980, dirty pipe required a work hold and the appointment of a special task force which set up procedures for cleaning and inspection. Nevertheless, Wolf Creek continued to have problems with pipe cleanliness. The Bechtel specifications required spool ends to be covered but KG&E management required the quality control group to witness the covering and uncovering of spool ends before work could proceed. In spite of this measure, pipe cleanliness problems continued to surface. Pipe spools were cut down, doubling the man-hours required for welding. In August of 1981, quality control witnessing of spool cover and removal was lifted.

Renken included man-hours for cleaning pipe at the as-built level. He has not included man-hours for quality control wait time, cutting down and rewelding of

the pipes. It is his opinion that pipe spools should have arrived in the power block capped and clean as required by the specifications. After erection they should have been cleaned and capped until the erection of the next spool. Whatever the reason, Renken states that this simply did not happen. Therefore, he has concluded that management was unable to ensure what constitutes nothing more than good construction practices. It is Mr. Renken's opinion that there were not enough utility field engineers during the pipe erection.

The Reconciliation Group cited field change request (FCR) response time as another reason for the overrun in the piping area. Renken rejects FCR response time as a substantial contributor to the overrun since at Callaway the average FCR disposition time was shorter than remembered by the interviewees. In addition, at Callaway where FCR problems would be expected to be greater than at Wolf Creek, piping productivity was better than it was at Wolf Creek.

The Reconciliation Group cites vendor problems as contributing to the overrun. The worst problem in this area was associated with pre-assembled pipe and equipment formations from Gulf and Western. These items arrived in a defective condition requiring a massive reinspection and correction program causing inefficient work sequencing and rework. In Renken's opinion this problem went beyond normally expected vendor problems and in any event no cost quantification of the problem was available.

SNUPPS' reinterpretation of Regulatory Guide 1.29 also caused significant amount of pipe installed as non-Q that should have been special scope. Some materials installed in special scope systems were not traceable as required by the NRC. This caused considerable rework. Renken's recommended man-hours allow for all special scope installation but not for any rework.

Weld reject problems also increased the direct man-hours over the estimate. The reject rate of pipe welds that required radiographic testing (RT) was excessive. A task force of experts from DIC was finally called in to diagnose the problems and

to make recommendations to improve the program. The task force discovered a number of serious deficiencies in the welding organization and especially in the way they were using their personnel. Renken notes that at the time the report of the task force was released the RT weld problem was two years old. Findings in the reports indicate mismanagement of the program by DIC and the utility management. The project encountered other welding problems requiring rework, including many socket welds. The NRC in its systematic assessments of licensee performance (SALP) evaluated Wolf Creek as category 3 (minimally satisfactory) in piping.

Renken has not included any man-hours for the weld reject problems in his recommendations. His recommendation contained unit rates sufficiently high to cover normal problems. However, Renken added a 15 percent increase in welding unit rates for the extra grinding observed taking place both at the Wolf Creek and Callaway plants. This was allowed because in Renken's opinion grinding seems to be necessary to ensure that welds pass QC inspection even though he believes that the contribution of the grinding to the strength of the weld is debatable.

Renken notes that the Wolf Creek reconciliation group estimated design changes at 269,000 man-hours. Renken states that these problems could have been avoided by a properly managed engineering and construction schedule and thus no additional hours have been added except as noted below.

Company contends that Renken manhour adjustment in the hanger and piping category has not adequately reflected regulatory changes and design evolution. In addition, Company claims that it attempted to enforce pipe cleanliness and that Staff exaggerates the weld reject problem.

In the Commission's opinion Renken has estimated the hanging and piping areas at a reasonable level. In the hanger area he has allowed for seismic requirements, subsection NF, enhanced unit rates for special scope, quantity changes, enhanced unit rates for TMI and cold shutdown and enhanced unit rates for congestion.

In the piping area he has allowed for reasonable levels of pipe cleaning, TMI and cold shutdown, increased scope and congestion.

Renken's recommendation is not impaired by a failure to adjust for rework caused by late design, poorly integrated design and construction, vendor problems and inferior work in the welding area.

h. Electrical

The electrical category includes installation of conduit, cable trays, lighting, wire and cable, switches, circuit breakers, and the connection of motors, heaters and other apparatus. The definitive estimate for the electrical area was 1,385,180 man-hours. The as-built level was 2,841,941 man-hours while Renken's recommended level of man-hours is 2,448,371 man-hours. Renken states that the largest reason for the overrun in this area was the increased scope of electrical installation. Changes in the plant design for additional safety and efficiency added electrical quantities of all types.

Renken states that productivity of electrical installation was relatively good at Wolf Creek. However, considerable rework resulted from the same change in Bechtel's criteria for special scope designation and other late design that so negatively affected the piping and hanger installation. Design changes also had an indirect effect in the electrical area since design changes in the piping area results in interference with the electrical components. The piping system would usually take precedence and the electrical components would be removed and rerouted. Renken mentions numerous items that were mentioned in interviews attached to the reconciliation packages. Renken states that most of the items mentioned in the interviews either are included in the estimate unit rates or have a negligible effect on the man-hours. For example, the interviewees state that the conduit location was specified instead of allowing the craft the freedom to route the conduit thereby reducing productivity. Renken states that the effect on productivity is not supported by the unit rates reported in the LCSR.

The interviews also mentioned craft support of the quality control group as affecting productivity. Renken states that his enhanced unit rates allow for quality control and inspection but that craft support for out of sequence reinspection programs of raceway caused by SNUPPS confusion over Regulatory Guide 1.29 has not been included.

Mr. Renken does note that compared to the overruns in piping and hangers the overrun in electrical man-hours is relatively modest, considering the fact that electrical installation is often affected by piping and hanger rework. Renken attributes this improvement in the electrical area to management efforts to reduce the waste that affected the piping and hanger area. This is evidenced by the fact that the electrical overrun was modest compared to piping and hangers at Wolf Creek and much less than electrical work at the Callaway plant.

In the Commission's opinion Mr. Renken's recommended manhour allowance in electrical area is reasonable and should be adopted.

1. Earthwork

Earthwork includes excavation, backfilling and dewatering. Dewatering means removal of any water for any cause, natural or man made, water interferes with construction. The definitive estimate for earthwork was 175,440 man-hours. Renken's recommendation is 450,356 man-hours as compared to the as-built scope of 577,925 man-hours.

The definitive estimate allowed 15,000 man-hours in the dewatering account whereas the as-built level was 245,859 man-hours. Renken recommended an allowance equivalent to the as-built charges for dewatering.

For excavation and backfilling Mr. Renken used the as-built quantities and definitive estimate unit rates increased by a factor of 45 percent. The factor was designed to compensate for the extra care that must be exercised in backfilling around structures designed to survive the design basis earthquake. The remainder of the overrun Renken attributes to excessive unit rates which were incurred in yard

excavation and backfill as a result of design changes and inefficient construction sequence.

Mr. Renken observed as follows:

> Anyone who spent appreciable time on the Wolf Creek construction site could testify to the repetitive digging and backfilling at certain locations. On a well-organized construction project for which engineering schedule and the construction schedule are properly coordinated, this type of inefficiency will not occur because all underground construction in a certain location can be done while an excavation is open. It is then backfilled, and that is the end of it. (Exhibit 536, p. 80).

In the Commission's opinion Mr. Renken's adjustments for the earthwork category are reasonable.

j. Unit No. 3 Charges

Unit 3 charges are a special category of direct man-hours not included in the ordinary charges for direct man-hours which are designated Unit 1. Unit 3 charges were considered to be extra work beyond the scope of the definitive estimate. When extra work was required, Daniel prepared a work authorization (WA) or later an extra work order (EWO) that described the work that was to be done. When the work was reported it was then charged to a unit 3 cost code. However, the guidelines for deciding whether work should be charged to a regular Unit 1 account or whether a WA should be prepared appears to have been blurred as documented in Renken's testimony. The productivity of crews engaged in extra work was not reported to the management and the cost engineers did not issue any estimate of the proposed work.

Renken states that he has not included actual Unit 3 charges in his recommendation explicitly but has included much of the work in the expanded estimate derived from the Callaway case. At Callaway, all Unit 3 charges were incorporated into Unit 1 charges. Estimate change notices were written for the scope increase and unit rating that could be justified above the Callaway definitive estimate. Renken

accepted the ECNs except for those written to cover rework that should have been included in the original design.

Renken proposes the inclusion of 53,825 man-hours associated with Unit 3 charges. These charges were calculated by witness Williams. Renken states that in practice Unit 3 accounts became a permanent dump for charges that Daniel did not wish to charge to Unit 1 accounts. Renken points out that in the piping area at one time Unit 1 and Unit 3 accounts were out of balance by at least 277,000 man-hours. Under these circumstances it was impossible for the project management to track productivity. Thus, Renken concludes that Unit 3 charges represent a large block of uncontrolled man-hours because work authorizations were not estimated in advance of the work. They were issued carte blanche for whatever hours would eventually be charged to them.

In his surrebuttal testimony Renken points out that Mr. Linderman's sample of Unit 3 charges contain work most of which was either included in his recommendations or would have been deleted according to the standards he used in judging Unit 1 man-hours.

However, Renken states that he conservatively did allow the 53,825 man-hours based on a review of the sample of the individual work authorizations. The predominant cause given for the work authorization was design changes. Renken points out that his recommendations already included allowances for most new scope design changes, but some of the Unit 3 work was identified as new scope that was not within his allowance. Based on the sample, this work was included as-built even though it is likely that some of it was not done productively for the reasons stated above. The categorizations depended on the description of the specific Unit 3 charge since Staff was unable to research the reason behind each work authorization. Renken points out that if the descriptions were inaccurate Staff was misled and it is certainly possible given the general carelessness of the record keeping.

Staff witness Williams calculated the amounts to be included in the manhour allowance. Williams reviewed a large sample of Unit 3 charges in order to determine the extent to which the cost fell into one of the following categories: (1) new scope - inside; (2) new scope - outside; (3) extra work caused by repair or maintenance; (4) extra work or rework caused by design change; (5) extra work or rework caused by miscellaneous reasons; (6) documents that the Company could not find. Costs falling within the first three categories were allowed by Staff while costs determined to fall within the latter three categories were disallowed. The results were then extrapolated to the entire Unit 3 extra work population.

Although Company contends that Staff's Unit 3 adjustment is arbitrary and unsupportable, the Commission believes that the inclusion of any Unit 3 charges is only one example of Mr. Renken's devotion to fairness and the conservativeness of his approach. The Commission believes that Renken's direct manhour estimates are reasonable in themselves without the addition of Unit 3 charges. Accordingly, the Commission accepts Renken's inclusion of a portion of the Unit 3 charges.

k. Site Work

Mr. Renken recommends inclusion of the entire 142,902 man-hours incurred for site work as of March 30, 1985. This category includes direct man-hours necessary to grade the site, haul top soil, install yard drainage and various other activities. The Commission determines that Renken's recommendation in this area is reasonable.

l. Insulation

This category refers to the direct man-hours necessary to apply insulation and lagging to piping, valves and equipment to reduce heat transfer to the surrounding area and to insulate electrical circuits for fire protection. Although the definitive estimate assumed that most of the work would be performed under subcontract it was performed by Daniel and part by other subcontractors.

Renken estimated an appropriate level of man-hours for the insulation categories. However, the as-built man-hours for insulation exceed Renken's recommendation by 135,552 man-hours. Renken adjusts the Daniel portion by 17,763 man-hours.

No satisfactory explanation was offered to explain the overrun between his recommendation and the as-built man-hours. KG&E management did not adequately track the productivity of the subcontractor work. No reconciliation of these man-hours was provided to the Staff.

The Commission notes that Staff also took a conservative approach with its exclusion of overruns in the insulation overrun category. In making this adjustment, Renken assumed that the inefficiency was proportionately distributed between Daniel and the subcontractors even though he suspected that most of the fault lay with the unsupervised subcontractors. The dollar per manhour charges of the subcontractors was higher than Daniel's. Thus it is likely that Renken's adjustment is low in this area.

m. Night Shift Productivity and Contingency

The Wolf Creek definitive estimate underestimated for night shift productivity as the definitive estimate contained 25,000 man-hours for this purpose. Renken allowed 231,055 man-hours for night shift productivity. This allowance was based on the Callaway estimate upscaled in proportion to his recommended direct man-hours. As noted above, Renken also added a contingency allowance of 1,763,236 man-hours since the Wolf Creek definitive estimate contained no allowance for contingency.

2. Adjustments Related to Direct Labor Man-hours

a. Scaffolding

Scaffolding is classified as an indirect account although it is closely related to direct man-hours. Scaffolding was estimated at 4.4 percent of directs at

Wolf Creek and 4.3 percent of directs at Callaway, but at Callaway the estimate included an extra allowance of 6 percent for pipe scaffolding. Renken states that the Callaway approach is slightly more conservative than the straight 4.4 percent so he used it for his recommendation. Renken also added allowances estimated at Callaway for extra scaffolding associated with the increased scope of surface preparation and temporary snubbers. His recommendation of 745,205 man-hours compare to the 961,642 as-built man-hours. Scaffolding at Wolf Creek consumed 5.1 percent of directs versus the 4.6 composite that he recommended. He attributes this difference to the use of scaffolding caused by a large amount of rework at the plant. Renken observed that in the case of hanger modifications, scaffolding was removed only to be reerected when rework was required. Renken notes that at the Callaway plant scaffolding consumed 7.4 percent of the directs. This corroborates the role of late design on excessive scaffolding costs.

Having reviewed Renken's recommendation in the scaffolding area, the Commission determines that it is reasonable and should be adopted.

b. Schedule

KCPL achieved a construction schedule of 93 months from first safety-related concrete to fuel load. That figure encompasses a 29-month schedule slippage from the original March 1977 estimate. KCPL attributes most of the delay to regulatory changes.

Staff has submitted a schedule duration analysis which attempts to calculate the effect of its man-hour recommendations on the Wolf Creek construction schedule. This calculation cannot be exact and must result in an approximation.

Staff witness Renken performed the same schedule calculations for Wolf Creek that he performed for Callaway. Mr. Renken calculated the rate of completion of the as-built plant as a percentage per month. The rate of completion curve was divided into several sections and approximated by linear segments. The slope of each linear segment was determined by a regression analysis. A correlation factor greater

than .985 was ensured for each segment. Mr. Renken then calculated the work-off rate by multiplying the slope times the as-built total man-hours. The work-off rate was then applied to the Staff's man-hour recommendations. That calculation resulted in a schedule duration of 79.2 months. The schedule duration was counted backward from the project completion date of January 31, 1985.

KCPL argues that Mr. Renken evaluated neither productivity penalties associated with increased manpower nor critical path effects of regulatory changes.

The Commission finds that Mr. Renken's analysis did, in fact, account for productivity penalties associated with increased manpower levels at Wolf Creek. That was demonstrated by Mr. Renken's rejection of the Wolf Creek Definitive Estimate man-hour discount factors and the unrealistic productivity assumptions which are reflected in that estimate. It is further reflected in his adoption of the Callaway Definitive Estimate and its 20 percent contingency for nonproductivity.

The Commission recognizes that Mr. Renken's analysis was based upon the completion of the as-built plant and not upon the critical path. It follows that Mr. Renken did not analyze the effect of regulatory changes upon the critical path. The Commission does not believe that a critical path analysis is necessary in this instance and finds Mr. Renken's calculations pertaining to the as-built plant to represent the most reasonable method demonstrated of calculating a proper schedule. This is particularly true since the Commission has accepted Mr. Renken's recommended level of direct labor man-hours. In his review of direct labor man-hours, Mr. Renken has considered both regulatory change and lack of productivity.

The Commission has purposely not addressed the schedule set forth by Staff through O'Brien-Kreitzberg & Associates, Inc. (OKA). The OKA analysis was sufficiently flawed to negate any possibility of its use and is, therefore, rejected in its entirety. The Commission has found Mr. Renken's analysis, although not originally set forth as an alternative, to be far more reliable than that of OKA. In fact, the Commission finds the results of Mr. Renken's analysis to be the only acceptable

schedule in this case. The Commission believes KCPL's actual schedule would have been shortened if the Company had had an integrated design-construction schedule in place.

The Commission finds little in the record which supports KCPL's assertions that a 93-month schedule is an exemplary achievement, except for its industry comparison. As previously noted, the Commission does not believe an industry comparison can adequately account for the differences in management performance between nuclear plants and is therefore not controlling.

The Commission notes that Mr. Renken's 79.2-month schedule comports favorably with both the schedule adopted by the Commission in the Callaway case and the schedule adopted by the Kansas Corporation Commission regarding Wolf Creek. Those schedules are 80.5 and 78.5 months, respectively. The adoption of Mr. Renken's schedule necessitates a decrease in the Staff's recommended level of disallowances for AFUDC, KG&E salaries, Wolf Creek builders risk insurance, safety meetings and indirect costs.

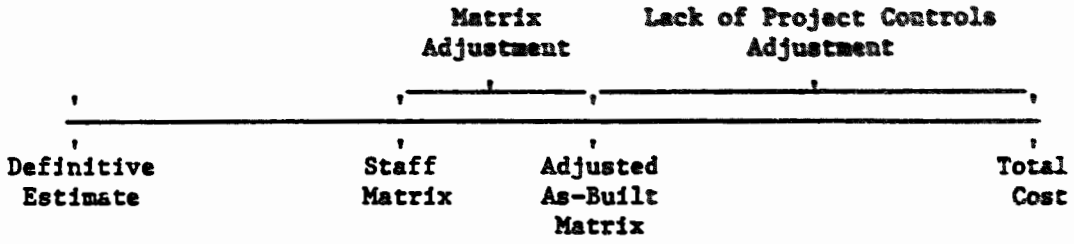
c. Indirect Manual Labor and Materials

Indirect Manual Labor refers to craft labor performed by Daniel employees who are not actually working on the physical plant. Indirect Materials refers to materials and supplies necessary for the construction of the Wolf Creek Generating Station but not a part of the actual permanent plant structure.

Staff proposes to disallow $19,687,057 for indirect labor man-hours and $5,088,563 for Indirect Materials cost. Staff utilized a matrix format which relates indirect costs to certain variables or components of the construction project, such as schedule duration, direct man-hours, peak craft manpower, peak nonmanual man-hours, total manpower, piping man-hours, and number of welders qualified. The matrix relationships were based on those used in preparing the Definitive Estimate. Therefore, as a given variable changes, i.e., schedule duration, so does the allowance for indirect costs. The variables Staff utilized were supplied by Daniel and were

utilized during the formation of the Definitive Estimate, as well as for various forecasts.

A graphic depiction might simplify for the reader Staff's use of its matrix. The following chart is not drawn to scale.



To perform its analysis, Staff developed an As-Built Matrix and a Staff Matrix. The As-Built Matrix determined an indirect cost estimate on the actual or as-built Wolf Creek construction project variables. The Staff Matrix was used to determine an estimate of indirect costs based upon Staff's recommended Wolf Creek construction project variables. The difference between the two matrix calculations represents Staff's matrix disallowance. Staff's lack of project controls disallowance was developed by subtracting labor cost underruns from the labor cost overruns, in excess of the As-Built Matrix, to arrive at a figure for net overruns.

The Company faults Staff's overall adjustments for several reasons. Company witness Fouts maintains that Indirect Manual Labor costs should follow Direct Labor costs. It is Company witness Linderman's contention that many costs were driven by variables in addition to those used by Staff. Company asserts that Staff has applied different variables to similar cost codes between the Wolf Creek and Callaway cases. Additionally, it is contended that Staff has no reasoning to support its lack of project controls disallowance, and Company suggests Staff's method is deficient because it disallows certain cost codes that were either unknown at the time of the Definitive Estimate or did not have an estimated number of man-hours because they were transfer or allowance accounts. Finally, Staff's Indirect Materials adjustment is improper, according to the Company, because it does not net cost underruns to overruns.

The Commission does not believe that indirect manual labor and materials costs always follow direct craft activity. Obviously, neither does the Company, since Mr. Fouts' testimony conflicts with Mr. Linderman's claim that even Staff's 11 project variables were insufficient to cover all reasons for excessive indirect labor costs. In recognition of this, Mr. Fouts defers to Mr. Linderman.

The evidence indicates the owners, through Daniel, utilized the variables Daniel gave to Staff in preparing the Definitive Estimate. Those same variables were utilized in preparing various project forecasts as well as in the preparation of the Company's reconciliation packages. Although Mr. Linderman suggested variables other than those used by Staff had impacted certain cost codes, it appears that those variables were not always reflected in the Company's cost reconciliation packages. If they were reflected in the reconciliation packages, the man-hours associated with each reason were often quantified by order of magnitude estimates, with plugged numbers and unquantified explanations accounting for a large portion of the quantifications. The Commission's position toward plugged numbers and unquantified explanations is set forth more fully under Phase IV, Section I.C.6., Project Cost Reconciliation. For now, let it suffice to say that the Commission is of the opinion that plugged numbers and unquantified explanations provide evidence of a lack of project cost controls.

The Commission finds the Staff could only rely upon the variables it was provided. Staff received its information from Daniel's chief estimator, who was contacted as recently as during the preparation of the reconciliation packages to determine in which accounts certain costs should be placed. Daniel was the constructor of the Wolf Creek plant. Daniel was actively involved in and intimately familiar with the construction of Wolf Creek, and its information is appropriate to rely upon. The Commission finds Staff used the most appropriate variables available. They were relied upon by the owners in the beginning of the project for the Definitive Estimate, in the Company's various forecasts, and even in the reconciliation

packages. It makes little difference that the variables driving various cost codes may have differed from those used for the Callaway plant. The Commission notes that Union Electric changed its cost coding system sometime during the construction project.

In its lack of project cost controls adjustment, the Staff did not detail all of the disallowed cost codes allegedly unaccounted for by the Definitive Estimate. The evidence indicated that many of the cost codes were actually accounted for elsewhere in the Definitive Estimate. Since Staff's analysis was performed on an aggregate rather than cost code basis, those cost codes would be reflected in Staff's bottom line.

The Definitive Estimate represents the estimated cost of an efficiently constructed plant. Any cost codes added after the Definitive Estimate must be adequately explained by the Company. That explanation could best be shown through the Company's reconciliation packages. The reconciliation packages did not sufficiently explain the additional costs in excess of the As-Built Matrix. Therefore, the Staff has properly disallowed those costs. Staff's disallowance for lack of project controls is simply a mathematical calculation; one that is similar to the type of calculation used by the Company in its own reconciliation packages. Staff's method of quantifying that lack of project control adjustment was to disallow the amount of labor costs which were in excess of the As-Built Matrix once underruns were netted against overruns. The Commission finds this a sufficient and adequate method of so quantifying. At a minimum, it is better than the Company's attempted quantification of various expenditures in its reconciliation package analysis.

Since the Commission believes the Staff's matrix approach is a reasonable method of comparing the costs of Wolf Creek, the Commission finds it is reasonable to infer that the unexplained costs in excess of the As-Built Matrix are due to a lack of project controls. Further support for this inference is found in Phase IV, Section I.B., Overall Project Management.

With regard to the Indirect Materials question, the Commission believes it is unnecessary to net cost underruns against cost overruns. That netting of costs for Indirect Manual Labor was not a part of the matrix adjustment, it was in addition to it. In this case, Staff has allowed 95 percent of the actual Indirect Materials expenditures and is not alleging a lack of project controls was the cause of the 5 percent adjustment. The adjustment merely reflects that there is a difference between the Staff's recommended level of expenditures for Indirect Materials and the actual level of expenditures. This appears reasonable and is consistent with the method the Commission adopted in the Union Electric case.

Based upon the foregoing, the Commission is adopting Staff's proposed disallowances for Indirect Manual Labor and Indirect Materials. The disallowances being adopted by the Commission are to include the related issues of payroll taxes, insurance and fringe benefits. A point of contention arose between the Company and Staff as to the inclusion of contractor's operation insurance in the Staff's payroll tax, insurance and fringe benefit factor. The Commission believes it is properly included as the premium for the insurance is tied to payroll amounts expended at Wolf Creek. The Commission notes the dollar amount of this disallowance will have to be adjusted due to the Commission's adoption of Mr. Renken's proposed schedule.

d. Indirect Nonmanual Labor

Indirect Nonmanual Labor is that portion of the construction labor force whose contribution is other than direct craft related. Staff recommends a $24,704,283 (total plant) disallowance for Indirect Nonmanual Labor to reflect Staff's adjustments for schedule and the lower level of total direct man-hours associated with Wolf Creek. Staff did not attempt to input data concerning Indirect Nonmanual Labor into its matrix adjustment because the pertinent information from the Company was not in the Definitive Estimate format required by the matrix calculation. The difference in format was due to various restructurings of the project.

The Company disagrees with Staff's proposed disallowance because it has not been shown the costs were imprudently incurred, nor that Staff's method demonstrates the proper ratio between indirect nonmanual man-hours and direct man-hours.

The Commission believes Staff's method is well-reasoned and sound. The Staff could not have utilized the matrix methodology without undue difficulty; thus, it utilized an appropriate alternative. It is reasonable to assume the Indirect Nonmanual Labor man-hours are directly related to the number of direct labor man-hours and the duration of the project schedule. The Company has provided no evidence to negate this assumption. Adjustments for those two variables have previously been adopted by this Commission, supra. It is therefore necessary to likewise adjust for Indirect Nonmanual Labor man-hours. The Commission is adopting Staff's proposed disallowance once it is modified for Mr. Renken's increase in schedule of 2.2 months over that relied upon by Staff witness Winter in his calculations.

e. Builder's Risk Insurance

Staff witness Winter proposes a $872,562 (total plant) disallowance to reflect the impact of OKA's recommended schedule duration on the Wolf Creek project for builder's risk insurance. The Company's arguments have previously been stated under the schedule issue, as this adjustment ties directly to schedule duration. Since the Commission has accepted Mr. Renken's schedule, it finds the Staff adjustment is reasonable, once it is modified to include the additional 2.2 months allowed through Mr. Renken's schedule.

f. KG&E Salaries

The Staff adjustment for KG&E salaries of $5,644,355 (total plant) is premised upon the same arguments set forth under Builder's Risk Insurance. For the same reason and under the same condition, the Commission accepts Staff's proposed adjustment.

g. Safety Meetings

Staff recommends an adjustment which reflects the elimination of certain man-hours and costs associated with safety meetings from the indirect cost code entitled "Safety Related Items". Staff proposes a $1,471,025 (total plant) disallowance to avoid double-counting of man-hours related to safety meetings which have already been included in Staff's recommended level of direct man-hours.

KCPL contends the cost of increased regulatory requirements was not properly recognized in Staff's recommended level of direct labor man-hours nor in Staff's matrix. KCPL further contends the Commission should offset the proposed disallowance by allowing credit for cost savings resulting from its increased safety efforts.

The Commission believes that Staff's matrix adequately accounts for the increase in safety meetings due to regulatory changes. After the filing of the Company's rebuttal case, it was discovered that Mr. Renken had not included an allowance for safety meetings where his man-hour allowances were not based on the Callaway Definitive Estimate unit rates. It was also determined the Callaway Definitive Estimate unit rates used by Mr. Renken did not reflect a full 30 minutes for safety meetings. Mr. Renken corrected those errors.

Since Mr. Renken corrected his direct man-hours to include a full 30 minutes of safety meetings and Staff's matrix utilized direct man-hours as one of its variables, the full 30 minutes of safety meetings were reflected in the matrix.

The Commission has previously adopted Mr. Renken's direct labor adjustments and deems it reasonable to accept the safety meeting adjustment to avoid double recovery by the Company.

The Commission does not believe it is appropriate to allow credit for any project cost savings, i.e.: lower insurance premiums, resulting from safety meetings. The Commission is of the opinion the Company should not receive a bonus for doing

what it is required by law to do. The Company is given adequate "credit" for its cost savings by Staff's allowance of the 30-minute meetings.

h. Overtime

Staff proposes a reduction in the pricing of its recommended direct labor man-hours to reflect the disallowance of unproductive overtime costs. Staff's adjustment does not encompass all overtime costs. The proposed disallowance is tied only to the 7 percent of total overtime which Staff believes was unproductive. To arrive at that percentage, Staff utilized an article from the November 1980 Construction Labor News and Opinion entitled "Extended Overtime is Dangerous to Your Health". The article was given to Daniel by the owners to use as a guide when evaluating the need for extended overtime. the article addressed the findings of a November 1980 Business Roundtable report "Scheduled Overtime Effect on Construction Projects".

The report's findings are best summarized by the following table taken from the Business Roundtable report.

RELATIONSHIP OF HOURS WORKED, PRODUCTIVITY AND COSTS
40 Hours vs. 50 Hours

1	2	3	4	5	6	7	8
	Productivity rate						
50 Hour Overtime Work Weeks	40 Hour Week	50 Hour Week	Actual Hour Output for 50 hr. week	Hour gain over 40 hr. week	Hour loss due to Productivity drop	Premium Hours	Hour Cost of Overtime Operation
0-1-2	1.00	.926	46.3	6.3	3.7	10.0	13.7
2-3-4		.90	45.0	5.0	5.0	10.0	15.0
4-5-6		.87	43.5	3.5	6.5	10.0	16.5
6-7-8		.80	40.0	0.0	10.0	10.0	20.0
8-9-10		.752	37.6	-2.4	12.4	10.0	22.4
10-11-12-&-up		.750	37.5	-2.5	12.5	10.0	22.5

The report indicates that scheduled overtime of 50 hours for six to eight weeks results in a productivity return comparable to that of a 40-hour work week. Staff's adjustment for unproductive overtime was calculated in the following manner. Staff initially identified the weeks where an individual craft worked 25 percent or more overtime for six or more weeks. Staff then applied the appropriate productivity factors on a week-by-week basis. That application determined the unproductive hours

by week. Those unproductive hours were then priced at the actual wage rates at the time they were incurred. The unproductive hours and their associated dollars were subtracted from the actual hours and dollars on the actual schedule before determining the wage rate to apply in pricing the Staff's recommended man-hours. The resultant composite wage rate for Staff's recommended man-hours is less the portion of the original wage rate attributable to unproductive overtime.

The Company faults Staff's analysis for several reasons. The Company contends the Business Roundtable report was to be used as a guideline only and that according to the report itself, no precise calculations regarding cost of overtime may be drawn from it. The Company further contends the report is inapplicable unless the entire job is placed on overtime. It does not apply to periodic overtime of the type the Company utilized.

It is the Company's assertion that Staff misapplied the Business Roundtable data by analyzing by craft rather than individual, and by analyzing overtime information which involved more than 60 hours per week by the 50 hour per week chart rather than the 60 hour per week chart. Company believes it is being penalized for reduced productivity during the six week period when productivity does not occur until after the six week point is reached. The Company asserts that it did rotate workers and schedule necessary breaks. According to the Company, that is evidenced by its low absenteeism, turnover and accident rates. Finally, the Company argues that any loss of productivity was far outweighed by schedule savings.

The Commission finds that the Company used the Business Roundtable report as a guide to evaluating extended overtime. That was a reasonable decision, as the report is one of the few studies pertaining to construction overtime over extended periods of time. Although supposedly intended only as a "guideline", it appears to have been the only material given Daniel to follow in evaluating extended overtime. The Company put more than a small amount of credence in its reliability. According to Company witness Palermo, "quite a bit of emphasis" was placed on the report. It

is reasonable to assume the information contained in the report is accurate. The Company does not refute the calculations, merely their applicability to Wolf Creek. Company agrees that productivity drops as extra overtime hours are worked.

The Company terms the overtime used on the Wolf Creek project as periodic overtime. As defined by the Company, periodic overtime means the selective use of some crafts and workers to accomplish specific goals and tasks during critical periods. The Business Roundtable report distinguishes two types of overtime: "[Scheduled, which is] a continuing schedule of extended workdays or workweeks for entire crews or projects ..."; and "occasional or sporadic overtime which usually involves certain workers or crews who are held over for a few hours after the regular workday to finish a specific job...."

The evidence presented by Staff indicates that what the Company refers to as periodic overtime is really the same as scheduled overtime according to the Business Roundtable report. The Commission is not persuaded the report is inapplicable unless the total job is placed on extended overtime. It is therefore proper to compare the Business Roundtable report to the occurrence of scheduled overtime at Wolf Creek.

The Business Roundtable report refers to individuals working 50 or more hours per week. The Commission is cognizant of the fact that Staff has compared craft data, rather than individual data, from Wolf Creek to the statistics shown in the study. The Commission is aware that the payroll records of individual workers were not retained, thus prohibiting Staff from making such an analysis. The only weekly record of individual worker overtime is that maintained on a 33 week computer tape. Each week the data from the oldest week is deleted and that from the latest week is added.

Staff performed a comparative analysis of the 33 week tape provided by the Company on both a craft and individual basis, which indicated the amount and duration of unproductive overtime, as classified in the Business Roundtable report, was

comparable. It demonstrated that certain individuals had extended periods of overtime for consecutive weeks without rotation. The Commission finds Staff's analysis, of necessity, was made on a craft basis. That does not fatally flaw the analysis. The evidence indicates Staff's 7 percent figure is a conservative estimate. On the 33 week tape Staff was given to evaluate, 20 percent of the listed individuals worked extended scheduled overtime of 50 hours or more for six weeks or longer. It was impossible for Staff to determine from the Company's records of craft activity whether individual workers worked scheduled overtime of 60 hours rather than 50 hours for six consecutive weeks. Therefore, the Commission believes it was appropriate to utilize the 50 hour, six week standard in view of the lack of individual data from the Company.

The Commission does not believe the Company is being unjustly penalized for the lower productivity reflected in the six week period. The Commission finds the decreasing productivity level reflects the cumulative effect of extensive scheduled overtime. Thus, it must be accounted for once the six week period is reached.

The Commission finds the Company's evidence of lack of unproductive overtime symptoms, i.e., excessive absenteeism, excessive accidents, etc., is a more accurate reflection of the 93 percent of overtime that Staff does not propose to disallow than it is of the 7 percent it does propose to disallow. An example that productivity actually did decline as a result of extended overtime is found in the Company's reconciliation package support for construction changed turnover dates. "[A 24-hour testing schedule in December, 1983,] required additional manpower and each individual was required to work extended hours. As a result, overall productivity declined, requiring more manpower."

Clearly, the Company was not seriously attempting to rotate the overtime of its workers. No analysis was performed to determine whether workers on extended overtime were being rotated and given breaks. According to Company witness Fouts, studies were performed to determine the amount of overtime worked by critical crafts,

not individuals. Yet Mr. Fouts maintains individuals were rotated or given breaks. This differs from his description of the overtime approval process since 1981. Mr. Fouts indicates that overtime activities were submitted to the owners for prior approval. The activities were reviewed and checked to ensure the work was potentially on the critical path. A list of the approved activities was then given to Daniel, who made the actual overtime list. That list set forth the day, building, numbers of personnel in each craft worked, and the hours they would be working. That list was approved by the owners. No mention was made of individuals, with the exception of overtime for nonmanual personnel.

Company witness Linderman's use of a hypothetical situation involving worker rotation to demonstrate the deficiency of Staff's analysis and his statement that Staff did not consider the "possibilities" of individual worker rotation is not persuasive. He did not attempt to demonstrate which, if any, particular workers had been rotated, yet unjustly considered on extended overtime for purposes of Staff's study. Of course, that type of evidence would have been impossible to put forth in light of the Company's record-keeping.

The Commission finds the Company maintained inadequate records of individual employee overtime. In an attempt to determine what portion, if any, of that overtime was unproductive, it was necessary to use craft rather than individual data. That data corresponded favorably to the only individual overtime information the Company maintained, the 33 week tape. Company's evidence of lack of unproductive overtime symptoms is not sufficient to prove that worker fatigue did not occur and result in unproductive overtime.

The Commission finds Staff's evidence of unproductive overtime is corroborated by the Company's higher than average percentage of construction project overtime coupled with the Company's Management Performance Evaluation, which attributes $28 million of increased project costs to poor productivity. The Commission believes Staff's 7 percent proposed disallowance is a reasonable one. It follows that any

schedule savings resulting from use of overtime must have occurred from productive overtime which was worked, not from the overtime proposed to be disallowed by Staff. Therefore, the Commission is adopting the Staff's proposed disallowance.

i. Back Charges

Staff proposes two adjustments related to back charges. The first adjustment eliminates $56,198 (Staff Missouri jurisdictional) in plant costs associated with back charges which were not collected as a result of certain negotiated settlements with vendors. The Commission determines that Staff's exclusion of the settled back charges should not be adopted. Staff has not alleged that the Company improperly entered the settlements.

Staff also proposes an adjustment to eliminate $1,253,031 (Staff Missouri jurisdictional) in plant costs associated with open back charges and job invoice back charges as of March 30, 1985. These represent costs that Daniel and the Company believe back chargeable but which have not been collected or otherwise resolved. Until these back charges are resolved, it is Staff's position that they should be excluded.

The Commission determines that open back charges should be excluded as proposed by Staff to avoid double recovery and to provide an incentive for the Company to collect the charges.

j. Instrumentation - Westinghouse

The Westinghouse allowable man-hours associated with the instrumentation category were calculated by Ranken as discussed in Section I.C.1.e., Instrumentation Direct Labor Man-hours.

Staff witness Kuensting calculated the cost of the Westinghouse man-hours. In addition, Kuensting sponsored an adjustment to disallow the unproductive Westinghouse indirect man-hours incurred in support of the Westinghouse direct man-hours which were disallowed by Ranken. Kuensting based the adjustment on an as-built direct manhour ratio of .84 percent.